Appendix H. Response to Public Comments on the Proposed Desalination Amendment and Staff Report with Substitute Environmental Documentation

Associated with the Draft Staff Report Including the Draft Substitute Environmental Documentation for the Proposed Desalination Amendment

Letter ID	Commenter(s)	Submitted by	Date Submitted
2	Orange County Sanitation District	James Colston	7/29/2014
3	General Public	Kae Bender	8/3/2014
4	General Public	Stormer Feiler	8/9/2014
5	General Public	D.P. Schulz	8/12/2014
6	Municipal Water District of Orange County	Richard Bell	8/15/2014
7	Sanitation Districts of Los Angeles County	Philip Friess Grace Robinson Hyde	8/15/2014
8	South Coast Water District South Orange County Wastewater Authority	Andrew Brunhart Betty Burnett	8/18/2015
9	Timothy Hogan	Alden Research Laboratory, Inc.	8/13/2014
10	United States Department of Commerce- National Oceanic and Atmospheric Administration, Monterey Bay National Marine Sanctuary	Paul Michel	8/18/2014
11	Salt of the Earth Energy LLC	Joe Veytia	8/15/2014
12	City of Santa Barbara Public Works Department	Rebecca Bork	8/18/2014
13	Brownstein Hyatt Farber Schreck, LLP on behalf of Mesa Water District	Diane De Felice	8/18/2014
14	San Diego County Water Authority	Maureen Stapleton	8/18/2014
15	Poseidon Water LLC	Peter MacLaggan	8/18/2014
16	California American Water	Richard Svindland	8/19/2014
17	Intake Works	Anthony Jones	8/18/2014
18	CalDesal Association of California Water Agencies	Ron Davis David Bolland	8/19/2014
19	Heal the Ocean	Hillary Hauser James Hawkins	8/19/2014
20	Tenera Environmental	John Steinbeck	8/18/2014

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Letter ID	Commenter(s)	Submitted by	Date Submitted
21	California Coastkeeper Alliance Surfrider Foundation Heal the Bay Natural Resources Defense Council City of Huntington Beach PCFFA California Coastal Protection Network Center for Biological Diversity Coastal Environmental Rights Foundation Endangered Habitats League Planning & Conservation League Wholly H2O Environmental Action Committee of West Marin Resident for Responsible Desalination Southern California Watershed Alliance 7th Generation Advisors	Sean Bothwell Joe Geever Sarah Sikich Karen Garrison Debbie Cook Zeke Grader Susan Jordan Emily Jeffers Livia Borak Dan Silver Rebecca Crebbin-Coates Elizabeth Doherty Amy Trainer Merle Moshiri Conner Everts Leslie Tamminen	8/19/2014
22	California Coastkeeper Alliance Surfrider Foundation Natural Resources Defense Council Heal the Bay	Sean Bothwell Joe Geever Karen Garrison Sarah Sikich	8/19/2014
23	Metropolitan Water District of Southern California	Deven Upadhyay	8/19/2014
24	California Coastal Commission	Charles Lester	8/19/2014
26	General Public	Lynne Harkins	8/19/2014
27	United States Department of Commerce- National Oceanic and Atmospheric Administration, National Marine Fisheries Service	Chris Yates	8/19/2014
28	General Public	William Bourcier	7/25/2014
29	West Basin Municipal Water District	Rich Nagel	8/19/2014
30	Effluent Free Desalination	Stephen Keese	8/6/2014

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#2	**James Colston, Orange County Sanitation District**	
2.1	OCSD seeks clarification specifically on the definition of "Desalination Facility" referenced on Appendix I Definition page 45 of the Ocean Plan. As it states, "DESALINATION FACILITY is an industrial facility that processes water to remove salts and other components from the source water to produce water that is less saline than the source water." As the current definition stands, Desalination Facility can be interpreted broadly enough to include wastewater treatment and recycling facilities that use wastewater as its source water to produce potable water. The definition should be clear and consistent with "Chapter III.L. Implementation Provisions for Desalination Facilities, section 1 (a)... applies to desalination facilities using seawater" referenced on page 27 of the Ocean Plan. Wastewater recycling has potential to provide millions of gallons per day of reclaimed potable water across the state. To help facilitate this needed practice, OCSD recommends that the definition of Desalination Facility in the Ocean Plan incorporate the term "seawater" to prevent misinterpretation.	The definitions in the proposed Desalination Amendment are inserted into Appendix-1 of the Ocean Plan that includes the Definitions of Terms. Terms in Appendix-1 are often defined in a general or broad manner since they may have multiple applications throughout the Ocean Plan. The definition "desalination facility" does apply broadly to many types of facilities, but chapter III.L.1.a clearly states that chapter III.L applies to "desalination facilities using seawater." Seawater is defined as "salt water that is in or from the ocean. For the purposes of chapter III.L, seawater includes tidally influenced waters in coastal estuaries and lagoons and underground salt water beneath the seafloor, beach, or other contiguous land with hydrologic connectivity to the ocean." Therefore, chapter III.L does not apply to water recycling facilities, brackish groundwater desalination facilities, or any other desalination facility not using seawater as defined.
#3	**Kae Bender, General Public**	
3.1	...[M]y experience with desalinated water is that the quality for human consumption is less than optimal. I think those whose water will be used for human consumption should always have the opportunity to speak to their preferences how and whether the desalinated water is an acceptable option for their community. I suggest that while desalinated water may be sufficient for certain purposes, like industry and pools, it isn't necessarily the most appropriate choice for human consumption. I believe this quality issue is vital to consumers and should be addressed in your final report.	The proposed Desalination Amendment is intended to protect ocean water quality and marine life from those impacts associated with seawater desalination facility intakes and discharges. Consideration of factors affecting the suitability of desalinated water for human consumption is beyond the scope of this project.
3.2	Further, ocean life and the environment need to be considered before desalination designs and site selection options are narrowed. Certainly the subsurface intakes have been shown safer for marine life, and the positioning and arrangements of intake and outflow as well as the impact on various species indigenous to and transient through selected areas needs to be thoroughly evaluated in every case. Industry domination of	Water Code section 13142.5(b) requires that facilities use the best available site, design, technology and mitigation measures feasible to minimize intake and mortality of all forms of marine life. The proposed Desalination Amendment provides additional direction to the regional water boards on how to evaluate new and expanded facilities to ensure that this goal is met. As recommended by the commenter, the

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	studies cannot be allowed to substitute for due diligence on the part of water authorities	proposed Desalination Amendment incudes direction to use subsurface intakes where feasible by requiring that the best available site, design, technology, and mitigation measures feasible are used to minimize intake and mortality of all forms of marine life. These requirements will ensure that an owner or operator and the regional water boards use an appropriate analytical process for evaluating whether the statutory requirements are met during the planning phase.
3.3	Finally, the energy consumption for the plants needs to be included in the impact analysis for every desalination plant proposal. These huge complexes consume significant power, and the environmental impact of the energy sources should be evaluated as part and parcel of the cost to the area. Desalination projects are not stand-alone, environmentally neutral energy consumers. The effect of power sourcing can have a significant impact on the air quality locally as well as affecting climate change factors. These tangential costs of the desalination equation must be included in the pre-approval evaluations of each individual plant proposal and should not be swept under regulatory awareness. Explicit inclusion not only of the immediate impact but the long tail costs associated with fossil fuel clean up need to be factored in to every consideration.	Agree. A discussion of power consumption and associated greenhouse gas emissions related to power consumption is included in section 12.1.7 of the Staff Report with SED. This discussion is on the overall impacts of desalination facilities and provides a baseline with which the proposed project and project alternatives may be compared. Greenhouse gas emissions from the proposed project and project alternatives are evaluated in Section 12.4.4 of the Staff Report with SED. While the analyses in section 12.1 are quantitative and detailed, the analyses in Section 12.4 are necessarily less detailed and more qualitative. This is appropriate for a programmatic level CEQA analysis where site, design, technology, and mitigation are not known. The purpose of the Staff Report with SED is to evaluate the potential impacts of the Desalination Amendments, which is the project before the State Water Board. The energy requirements and associated greenhouse gas emissions should be analyzed during the environmental review of individual projects.
3.4	As a concerned citizen in Southern California, I urge the Board to include these [desalinated water quality, ocean life and the environment, and energy consumption] considerations before final approval of your desalination policy. Environmental and consumer advocacy groups, not industry spokespersons, have the interest of California citizens at heart, and should have more influence on your choices than corporate pressure.	Comment noted.
#4	**Stormer Feiler, General Public**	
4.1	I support this effort, and would like to suggest that in terms of mitigation for potential desalination effects that the board also considers flow augmentation to facilitate maintaining adequate surface flows where those flows are insufficient to support existing and the recovery of	The comment appears to propose that treated ocean water be used to augment inadequate stream flows, rather than to propose flow augmentation as that term is used in the policy, which is to dilute residual brines that are discharged to the ocean. This response

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	beneficial uses.	assumes that the commenter is suggesting using fresh water produced by a desalination facility to augment surface stream flows. The proposed plan addresses coastal desalination facilities that process seawater. The areas that can readily be served with water supplies produced by these desalination facilities are at low elevations on or near the coast. Although it may be financially feasible to deliver water to existing coastal water supply distribution systems, it may not be economically feasible nor environmentally beneficial to construct water transmission systems and to pump desalinated water to upstream areas, including the smaller stream tributaries that are often affected by low instream flows due to water diversions. Construction and operation impacts of the water transmission system can cause significant impacts and use significant amounts of energy in addition to the energy used as a result of the desalination process. Furthermore, the production of additional water for flow augmentation in surface streams would simply externalize impacts from freshwater habitats to the ocean. All of the environmental impacts of seawater desalination are directly or indirectly related to the volume of desalinated water that is produced. Producing additional water increases intake impacts, such as impingement and entrainment, uses more energy, can disturb more habitat, and can increase discharge impacts. The comment does not identify the beneficial uses that would be enhanced by flow augmentation. Where the stream impairment is due to lack of dilution flows to provide assimilative capacity for concentration based chemical impairments, the suggestion to augment flows may result in some benefits. However, where the impairment is due to mass loading issues, little benefit is likely to be realized as that loading will still occur. Where the benefit is due to physical or biological factors, the outcome is uncertain and may be adverse. Fisheries biologists believe that, in some cases, augmentation of flows in main stem and major tributaries during the summer months as a result of water supply augmentation is adverse to fishery habitat in both the river system and in its coastal lagoon. For instance, in its biological opinion on the Russian River, the National Marine Fisheries Service (NMFS) issued a Biological Opinion that concluded that that current flow levels in the Russian River and Dry Creek during the summer, which are

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		augmented by imported flows from the Eel River and from releases from water storage projects in the Russian River watershed, are too high for young coho salmon and steelhead. NMFS biologists believe that reducing summertime flows in the Russian River and its tributary, Dry Creek, would provide better fishery habitat by reducing velocity, minimizing the need to artificially breach the sandbar at the river mouth, and potentially improving estuary conditions for steelhead by allowing the formation of a freshwater lagoon. (Biological Opinion for Water Supply, Flood Control Operations, and Channel Maintenance conducted by the U.S. Army Corps of Engineers, the Sonoma County Water Agency, and the Mendocino County Russian River Flood Control and Water Conservation Improvement District in the Russian River Watershed, National Marine Fisheries Agency, September 24, 2008, pp. 226-233.) Additionally, surface stream flow augmentation with water from a source foreign to the natal stream of anadromous fish could impair their migration, particularly upstream migration by adults. Adult salmon use their olfactory cues to find their way to their natal streams. The specific processes involved in natal stream imprinting are only partially understood and thought to involve chemical factors related to both amino acids and, during smoltification, physiological changes related to salinity. When the expected olfactory cues are diffuse or mixed, adult fish can have a difficult time locating their natal stream and may stray. If enough fish stray, population stresses can occur in both the natal stream and the stream into which the fish stray. (Matthew L. Keefer & Christopher C. Caudill, Department of Fish and Wildlife Resources, University of Idaho, A Review of Adult Salmon and Steelhead Straying with an Emphasis on Columbia River Populations (2012).) From an environmental perspective, a better solution than to augment surface streams with desalinated water would be to use desalinated water as an in lieu supply for existing uses, leaving natural stream supplies in the river for instream purposes. However, the State Water Board cannot compel a water right holder to reduce water diversions as a result of the production of desalinated seawater. Provided that a water right holder properly report his or her cessation of, or reduction in, the use of water under existing rights as the result of desalinated water,

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		that water right holder is protected from forfeiture of his or her water rights. The State Water Board is prohibited from reducing the amount of fresh water authorized for appropriation by the water right holder's water right permit or from reducing the permitted amount that would otherwise be licensed as a result of desalinated water. Furthermore, the water right holder may sell, lease, exchange, or otherwise transfer any water or water right that has ceased being used or has been reduced as the result of the use of desalinated water. (Wat. Code, § 1010.)
4.2	Developing new water supplies should not only encourage flow augmentation to surface waters to restore and maintain beneficial uses, but also, as the staff have pointed out, the additional water supplies may fuel additional housing and economic growth in California. However, as we are all aware there are many stressed surface water ecosystems in the state that would benefit from adequate flows. Perhaps there is a path in this process to address more than local impacts	We support alternative water supplies including water recycling and water conservation as described in response to comment 21.130. A goal of the proposed Desalination Amendment is to support the use of ocean water as a reliable supplement to traditional water supplies while protecting beneficial uses. Desalination is another water supply option that can be used in conjunction with other water supplies to ensure areas can meet their water demands. The proposed Desalination Amendment would establish an analytical framework for evaluating proposed desalination projects that would use seawater in order to increase availability of potable water supplies. It is up to water providers to evaluate various supply options and costs and impacts of each to make informed decisions about future supplies. Selecting water supply alternatives at a local, regional, or statewide level is not the State Water Board's role and the State Water Board does not propose to prioritize or rank water supply options on a statewide level.
#5	**D.P. Schulz, General Public**	
5.1	Pg.4 b. [of the proposed Desalination Amendment] states; b. (4) Analyze oceanographic, bathymetric, geologic, hydrogeologic, and seafloor topographic conditions, so the siting of a facility, including the intakes and discharges, minimize the intake and mortality of marine life. Comment: For those sites intending to employ an array of subsurface intake pipes, as has been recommended by the Water Board, there is a possibility that a portion of the desalination brine plume field could be recaptured by the intake and recirculated thru the system. This hydrogeologic feedback could lead to a system instability or, as a minimum, a gradual increase in	The proposed Desalination Amendment includes a receiving water limitation for salinity that states "Discharges shall not exceed a daily maximum of 2.0 parts per thousand above natural background salinity* to be measured as total dissolved solids (mg/L) measured no further than 100 meters (328 ft) horizontally from the discharge. There is no vertical limit to this zone." An alternative receiving water limitation may be approved by the regional water board if it is protective of water quality and other beneficial uses of ocean waters. The receiving water limitation for salinity will prevent an increase in nearshore salinity concentrations regardless of whether brine is recaptured and recirculated through the system. An owner or operator will still be

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	the near shore salinity concentration until stabilizing at some elevated value of saline concentration. This is more likely to occur when the position of the input and output structures are located relatively close together in order to take advantage of existing power plant facilities as is the case in Huntington Beach. It is suggested that the Board request that the desalination facility applicant submit an oceanographic analysis that addresses this issue in accordance with the requirement of par.(4) above.	required to meet the salinity receiving water limitation.
5.2	Pg.4 b. [of the proposed Desalination Amendment] also states: b.(5) Analyze the presence of existing infrastructure, and the availability of wastewater to dilute the facility's brine* discharge. Comment. Existing regulations prevent untreated wastewater (sewage) from being discharged directly into the near shore. Partially treated wastewater (treated to full secondary treatment standards) may still require additional treatment prior to being useful to the desalination facility. It is suggested that the Board request that the desalination facility applicant seek input from the local water agencies, (in Huntington Beach, the OCWD and OCSD), in order to determine if the brine discharge from groundwater recovery and replenishment systems could be piped to the desalination facility and blended with seawater prior to use in the desalination system.	The intent of the language was to analyze the availability of treated sewage wastewater or wastewater from an OTC facility, or other wastewater source that would be discharged through ocean outfalls to dilute a desalination facility's brine prior to discharge. The Division of Drinking Water does require all sources of supply to have a sanitary survey which would include identifying any wastewater sources for ocean or any surface water sources. The Surface Water Treatment Rule requires the sanitary survey be completed every five years. If a source was influenced or potentially influenced by a sewage source and the water source was deemed acceptable, this would usually mean a small percentage of the overall water being of sewage origin, and then the water treatment plant would be designed and operated to treat that particular source water quality. At times, the Division of Drinking Water requires additional treatment depending on the quality of the surface water source quality. If the intake could be moved to decrease the influence, the Division of Drinking Water would require it. There are also restrictions on source water quality but not necessarily in regulations, besides the MCLs. Most are guidance documents on what type of treatment based on water quality and what is too much to consider a drinking water source. The permit issued by the Division of Drinking Water is the final say on treatment verses source water quality and permits on sources can be denied if deemed unacceptable. "Brine" from groundwater recovery and replenishment systems typically has a salinity concentration between 2 and 12 parts per thousand (1ppt

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		@1PSU). Blending the groundwater recovery brine with seawater prior to use in the desalination system is unlikely. If anything, brine from groundwater recovery and replenishment systems could be used to dilute brine produced from seawater desalination prior to discharging into the ocean. The second scenario is addressed in the proposed Desalination Amendment. An owner or operator will consult with local water agencies if interested in commingling with wastewater during the CEQA process.
5.3	Pg. 7 [of the proposed Desalination Amendment]states: (2)(a) The preferred technology for minimizing intake and mortality of marine life resulting from brine* disposal is to commingle brine* with wastewater (e.g., agricultural, sewage, industrial, power plant cooling water, etc.) that would otherwise be discharged to the ocean, unless the wastewater is of suitable quality and quantity to support domestic or irrigation uses. Comment: It is suggested rewording the above paragraph by replacing "wastewater" with "treated wastewater" and "sewage" with "brine from recycled water systems." Also, it is suggested that the Board consider adding words to the effect; "Priority for wastewater treatment systems should be established in order to provide source water for treatment directly to full drinking water standards in order to replenish our depleted fresh water supplies prior to consideration for use in seawater desalination systems."	The intent of the language in chapter III.L.2.(d)(2)(a) is to use wastewater that would otherwise be discharged to the ocean for diluting brine waste. The wastewater used for commingling and the commingled discharge must meet all of the Ocean Plan standards in addition to those proposed in the Desalination Amendment. Some of the wastewater used for dilution (e.g. filter backwash) may not require treatment prior to discharge into the ocean. The Water Code requires that water be put to the highest beneficial use. From a policy perspective, the State Water Board fully supports water recycling as a means of meeting water supply demands through groundwater recharge, surface water augmentation and direct and indirect potable reuse, provided that human and environmental health are protected. However, the State Water Board believes that local water suppliers are best positioned to determine the “loading order” of their water supplies based on site specific conditions and regional water supply planning. Please see response to comment 21.2 regarding prioritizing or ranking water supply options on a statewide level.
5.4	Pg. 13 3 b. [of the proposed Desalination Amendment] states: 3 b. The receiving water limitation for salinity* shall be established as described below: (1) Discharges shall not exceed a daily maximum of 2.0 parts per thousand above natural background salinity* to be measured as total dissolved solids (mg/L) measured no further than 100 meters (328 ft) horizontally from the discharge. There is no vertical limit to this zone.	The receiving water limit for salinity was established using data from salinity toxicity studies and an Expert Review Panel’s findings and recommendations (Phillips et al. 2012 and Roberts et al. 2012). Roberts et al. (2012) conservatively recommended the receiving water limitation be met within 100 meters of the discharge structure in all directions and throughout the water column. Please see response to comment 5.1 regarding brine being recaptured in the system.

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	Comment: It is suggested that the Board consider adding a more stringent far field salinity concentration limit in the vicinity of the desalination facility collection system that insures the brine from the discharge is not captured and recirculated thru the system leading to further degradation of the near shore water quality. The numerical value and specific location of far field salinity monitoring could be determined from task b. (4) above.	
5.5	Also, as stated in the California Water Quality Control Plan dtd. Aug. 19, 2013: Pg. iv states; 8. The Ocean Plan is clear that there shall not be degradation of marine communities or other exceedances of water quality objectives due to waste discharges. This is true for all near coastal ocean waters, regardless of whether a Marine Protected Area is present. If sound scientific information becomes available demonstrating that discharges are causing or contributing to the degradation of marine communities, or causing or contributing to the exceedance of narrative or numeric water quality objectives, then new or modified limitations or conditions may be placed in the NPDES permit to provide protections for marine life, both inside and outside of Marine Protected Areas. Comment: According to this Ocean Plan policy statement, coastal desalination plants that are planning to withdraw seawater and discharge brine into near coastal ocean waters, including those currently on the State 303d list of impaired waterbodies, should only be considered only if no other more appropriate sites can be located. Even then, the brine discharged into the impaired water body would have to be blended with an equivalent amount of unimpaired water from another source in order to avoid further degradation of the water quality. The Huntington Beach desalination facility site is currently on the 303d list for pathogens, and PCB's (polychlorinated biphenyls). In addition, discharge of brine from a desalination plant significantly increases the concentration of the background concentration of certain toxins and heavy metals. It is suggested that the Board consider adding language to the Water Quality Control Plan that provides the same level of protection of further water	State Water Board Resolution 68-16, referred to as the Anti-Degradation Policy, prohibits regulatory actions by the Water Boards that result in the degradation of impaired water bodies and requires that certain findings be made to ensure the public interest is protected before a regulatory action results in the degradation of waters of high quality waters. Desalination facilities withdrawing water through subsurface intakes require less pretreatment because the sediment acts as a natural filter for contaminants. Facilities using surface water intakes, including intakes in 303d listed water bodies, will still be required by the regional water board to meet all water quality standards in the Ocean Plan per their NPDES permit. The receiving water limitation for salinity mentioned in comment response 5.1, in conjunction with existing Ocean Plan requirements, will prevent further water quality degradation in 303d listed water bodies and other areas outside of Marine Protected Areas. In addition, discharges required to meet water quality standards set forth in the Ocean Plan must also comply with state and federal antidegradation policies. See, State Water Board Resolution 68-16 and 40 C.F.R. §131.12. Resolution 68-16 requires that discharges to water of the state shall be regulated to achieve the "highest water quality consistent with maximum benefit to the people of the State" and has been interpreted to incorporate the federal antidegradation policy in situations where the latter is applicable.

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	quality degradation to 303d listed impaired water bodies, due to the desalination facility brine discharge, as it does for Marine Protected areas.	
5.6	Pg. 1 B. [of the proposed Desalination Amendment]: b. To the extent there is a conflict between a provision of this plan and a provision of another statewide plan or policy, or a regional water quality control plan (basin plan), the more stringent provision shall apply except where pursuant to chapter III.J of this Plan, the State Water Board has approved an exception to the Plan requirements, and except in chapter III.L, in which the provisions of this plan shall govern. Comment: As worded above, this precludes the possibility of Local Coastal or Regional Water Boards of imposing provisions to Local Coastal and Basin Plans that may be more protective of the regional environment and economy. It is suggested that the Board consider modifying the language above to state in effect; "To the extent there is a conflict between a provision of this plan including the provisions of sect. III. L, and a provision of another statewide plan or policy, or a regional water quality control plan (basin plan), both shall apply, and the more stringent provision shall prevail."	Comment noted. Proposed Desalination Amendment language was revised to reflect the suggestion that the more stringent provisions shall prevail.
#6	**Richard B. Bell, Municipal Water District of Orange County**	
6.1	Clean Up Inconsistent Language Section 13142.5(b) application to intake and brine disposal should be made consistent throughout the document. The terminology, "Best available site, design, technology and mitigation feasible..." needs to be consistently used throughout the document. For example, Page 2 c. and Page 22- "Best available" needs to be inserted before site, and "feasible" inserted after measures. There are other places in the document where similar abbreviated versions are used and these should be all made the same per 13142.5(b).	The proposed Desalination Amendment and the Staff Report with SED were revised to include references to "available" and "feasible" for the statutory factors, in order to make the intent clear. A feasibility definition has been also been added, using CEQA's definition, as consistent with the *Surfrider* decision. The factors set forth in the statute are to be assessed in order to ascertain the best collective set of measures after each analysis is considered separately.
6.2	Page 2 2.a.(1) [of the proposed Desalination Amendment] - Clarification	The draft Amendments are intended to allow a regional water board to

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	of owner or operator responsibility in project development and design for satisfaction of the requirement "...best available site, design, technology and mitigation measures feasible shall be used to minimize intake and mortality of all forms of marine life..." Water supply agencies are responsible for developing their projects and have the capability to manage, design, construct and operate/maintain desalination facilities. The responsibility of the Regional Water Boards is to make a determination that Section 13142.5(b) is met by the applicants proposed project. For this reason, we recommend that the second sentence in the first paragraph on Page 2 under item 2.a.(1) be changed to read: "This request shall include sufficient information that demonstrates that the project provides the best available site, design, technology and mitigation measures feasible which shall be used to minimize the intake and mortality of all forms of marine life in its request for a Water Code section 13142.5(b) determination to --for-- the regional water board to conduct the analyses described below."	require that a project proponent prepare the required analysis and supporting reports for review and approval. The analysis referred to in chapter III.L.2.a.(1) concerns the review and assessment of information separately required in sections III.L.2.b – e, in which it is clear that the proponent must develop information and submit adequate reports to inform regional water board decision-making.
6.3	Need for Ocean Desalination and consistency with regional planning documents. Page 4. 2.b.(1) [of the proposed Desalination Amendment] Site - This section, under determination of the best available site, brings into the Ocean Plan the determination whether the proposed ocean desalination facility is needed and whether the proposed project is consistent with an integrated regional water management plan or an urban water management plan and County or City general plans regarding growth. This determination is beyond the scope of the statutory requirement under Section 13142.5 and is not part of the determination of the best available site. We don't see a need for this in the Ocean Plan. Water supply agencies are responsible for determining the need for local resource developments, not the SWRCB or RWQCB's, and these projects would be incorporated in their plans. It should be noted that water agencies develop Water Master Plans, Water Resource Plans,	The proposed Desalination Amendment was revised to consider the identified need for desalinated water consistent with applicable adopted county general plans, integrated regional water management plans, or urban water management plans, or other water planning documents if these plans are unavailable. The inclusion of need is applicable to Water Code section 13142.5(b) because the section requires considerations that minimize intake and mortality of all forms of marine life. Subsurface intakes do not impinge or entrain organisms; however, subsurface infiltration galleries will have construction-related impacts that will result in marine life mortality. The construction-related impacts of subsurface intakes will be directly proportional to the intake volume; larger intake volumes will require more construction. Surface intakes may impinge and entrain organisms and the intake volume will also be directly proportional to the amount of marine life mortality. The impacts of brine discharges are also related to a facility's size and discharge volume. Thus, it is important to consider need for the water as part of the Water Code section 13142.5(b) because the size of the

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	Water Reliability Plans, and Facility Plans which are relied upon for project development decisions. We are recommending that this provision be deleted since it is not a specified part of a Water Quality Control Plan and is not relevant to the regulation of intakes and brine disposal.	facility is directly related to intake and mortality of marine life. Subsurface intakes should be used to the maximum extent feasible. The intent of the language is to ensure that if there is a situation where an Urban Water Management Plan identified a need for 10 MGD of desalinated water, but only 9 MGD could be acquired through subsurface intakes, the regional water board would not automatically reject subsurface intakes as an option. Instead, the regional water board could require the use of subsurface intakes for the 9 MGD and find an alternative means for acquiring the other 1 MGD. The alternative means that 1 MGD could include withdrawing water through a screened surface intake or seeking out other water supply options like recycled water. Chapter III.L.2.d.(1)(a)ii. allows the regional water boards to determine that a combination of subsurface and surface intakes may be the best available intake technology feasible for a project. The language will help to ensure subsurface intakes are not automatically precluded as an option based on an Urban Water Management Plan alone. Further, several parties have commented that large infiltration galleries may not be technically feasible to operate. Some parties have expressed concern that facilities will be proposed that far exceed the reasonable water supply needs of a community in order to “game” the results of the feasibility analysis to allow the project proponent to reject the amendment’s preferred intake technology of subsurface intakes in order to avoid potential construction costs. The State Water Board is aware that water agencies prepare a variety of types of planning documents. The intent of the provision is to ensure that the water demand assumption made as part of the feasibility studies required by the amendments be consistent with the water demand assumptions in those planning documents prepared for other purposes.
6.4	Section 13142.5(b) Site Page 4. 2.b.(2) [of the proposed Desalination Amendment]- Change "avoid" to "minimize" to be consistent with Section 13142.5(b) . Page 4. 2.b.(6) - Change the second sentence to read as follows and	Adding the phrase “based on dispersion modeling” would restrict the method by which an owner or operator could demonstrate that its discharge was sited at a sufficient distance from an MPA or SWQPA. An owner or operator could determine this either through modeling or field studies and both methods would be acceptable ways to comply

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	delete the third sentence: "Discharges shall be sited at a sufficient distance from a MPA or SWQPA based on dispersion modeling so that there are no significant impacts from the discharge on a MPA or SWQPA --and so-- such that the salinity within the boundaries of a MPA or SWQPA and so does not exceed the lowest observable effect level for the most sensitive species in the MPA above the natural --background-- salinity." --to the extent feasible, intakes shall be sited as to maximize the distance from a MPA or SWQPA-- Assuring a "no impact' standard is impossible to comply with as it is possible that some slight increase in salinity from the discharge could reach an MPA or SWQPA under unusual ocean conditions. Since there is natural variation in ocean salinity, it would be difficult to comply with an average condition and this should be changed to not exceeding the natural salinity that would occur at any time. Maximizing the distance from an MPA or SWQPA is limitless, sets no feasible boundary, is a subjective consideration, and could lead to excessive costs to public agencies without any added protective benefit to marine organisms in the MPA or SWQPA. Determination of a reasonable or sufficient distance to be fully protective of the MPA and SWQPA should be determined by the Regional Board with dispersion modeling information provided by the project proponent.	with this requirement. Adding "significant" between "no" and "impacts" would imply that some impacts from a desalination facility discharge to an MPA or SWQPA would be allowed as long as the regional water board determined the impacts were insignificant. The definition of natural background salinity has been modified to take into consideration seasonal variation. Natural background salinity will be calculated based on the natural historic monthly average and brine discharges must not result in an increase in salinity above what is natural for a given month. The language proposed by the commenter would not be adequately protective of MPAs or SWQPAs and would place an additional burden on an owner or operator to perform additional studies. The suggested language, "…so that there are no significant impacts from the discharge on a MPA or SWQPA such that the salinity within the boundaries of a MPA or SWQPA does not exceed the lowest observable effect level for the most sensitive species in the MPA above the natural salinity" is unclear. If the commenter is suggesting the standard be based on the LOEC for the most sensitive species within a MPA or SWQPA, there are multiple issues with this suggestion. First this would require extensive studies to identify the most sensitive species within the MPAs and SWQPAs within the proximity of the discharge. The studies would have to be designed to adequately evaluate the most sensitive species over time to capture any seasonal variation in species utilizing the MPAs and SWQPAs. Additionally, a standard based on the LOEC would not be adequately protective of marine life because many species can tolerate salinity increases above natural background salinity for short durations, but could experience significant negative effects over longer exposure times, which may not be identified during the LOEC toxicity testing. Furthermore, chapter III.E.4.(a) of the 2012 Ocean Plan states that, *"Waste* shall not be discharged to areas designated as being*

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		of special biological significance. Discharges shall be located a sufficient distance from such designated areas to assure maintenance of natural water quality conditions in these areas." Many SWQPAs have been designated "to prevent the undesirable alteration of natural water quality within MPAs" including any changes that would result from a nearby brine discharge. Staff has updated the language in chapter III.L.2.b.(6) of the Ocean Plan to be consistent with the existing implementation provisions for Marine Managed Areas language in chapter III.E.4.(a) (see above) to ensure that brine discharges from desalination facilities do not permanently degrade water quality in these designated areas. Staff changed the last sentence to read "To the extent feasible, surface intakes shall be sited so as to maximize the distance from a MPA or SWQPA.*" Surface intakes can impinge and entrain marine life and should be sited a sufficient distance from a MPA or SWQPA. Staff expects the source water body for most species will overlap at least one MPA or SWQPA. Siting a desalination facility where the source water body does not overlap an MPA will be challenging, if not impossible. Dispersion of organisms from MPAs is important data that can help determine where the organisms move as they leave MPAs and SWQPAs. Dispersion data can help to determine better locations to site surface intakes. The regional water board should consider organism dispersion data provided by an owner or operator when determining the best available site that is most protective of a MPA or SWQPA and minimizes intake and mortality of all forms of marine life. Including a requirement that a surface intake be sited where it would be "fully protective" of a MPA or SWQPA would set an owner or operator up for failure if even one larva that came from an MPA or SWQPA was entrained at a surface intake. The added language will ensure dispersal data is considered and that the facility is in the best available site feasible.
6.5	Determination that Subsurface Intakes are infeasible by the Regional Board.	Mitigation of impacts are part of the determination but are considered after the best available site, design, and technology feasible are

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	Page 6, Section 2d(1)(a)(i) [of the proposed Desalination Amendment] allows the Regional Board to make a determination that subsurface intakes are infeasible based on their analysis of specified criteria, including "presence of sensitive habitats, presence of sensitive species, energy use, impact to freshwater aquifers, local water supply, and existing water users..." This section should allow mitigation of impacts and not be solely used by the Regional Board to determine that a subsurface intake is infeasible due to a finding of the presence of any of these criteria. The following language should be added: "Project mitigation measures and monitoring programs that would minimize impacts to coastal resources shall be considered by the Regional Water Board in such determinations."	implemented. The presence of sensitive species would not automatically eliminate the feasibility of subsurface intakes, but avoidance measures should be taken before moving to mitigation. The proposed language is unnecessary because the regional water boards will already consider mitigation in the overall determination.
6.6	As proposed, potential for recycling would prohibit co-disposal of brine with municipal wastewater. Page 7, Section 2d(2)(a) [of the proposed Desalination Amendment] states that the preferred technology for minimizing mortality of marine life resulting from brine disposal is to "...commingle brine with wastewater...unless the wastewater is of suitable quality and quantity to support domestic or irrigation uses". We believe this phrase could be misconstrued and could be interpreted to prohibit co-disposal of brine with municipal wastewater if the Regional Board determines that the wastewater is of suitable quality and quantity for future recycling. Water supply agencies are responsible for development of water supply and reliability projects, and would always seek the least cost project that meets the water agencies supply objectives. If a future recycling project is planned, then the wastewater and water agency would determine if sufficient wastewater flows would remain that would be adequate for dilution of the brine or the agency would plan a new brine disposal system. It would be best to delete this phrase and replace it with language that would note something along the lines: "nothing in this section shall prohibit the future recycling of wastewater". We recommended that paragraph 2d(2)(a) on page 7 of the consolidated Draft Regulations be changed to read as follows:	To address this comment, the language: “unless the wastewater is of suitable quality and quality to support domestic or irrigation uses” in chapter III.L.2.d.(2)(a) was removed and replaced with: *“The wastewater must provide adequate dilution to ensure salinity of the commingled discharge is less than or equal to the natural background salinity,* or the commingled discharge shall be discharged through multiport diffusers.* Nothing in this section shall preclude future recycling of wastewater.”* The second part of the comment proposes the addition of “For commingled brine and wastewater discharges, when the combined TDS is near ambient ocean salinity sub-section 2.(c) shall not apply.” Chapter III.L.2.d.(2)(c) was deleted since it would not be done for an owner or operator commingling brine with wastewater or for discharges from multiport diffusers, only for an alternative brine disposal technology. The requirements to assess the factors in the new chapter III.L.2.d.(2)(c) (formerly chapter III.L.2.d.(2)(d)) include the assessment of those factors for an alternative brine disposal technology. An owner or operator commingling or using multiport diffusers is no longer required to conduct the analysis in the former chapter III.L.2.e.(2)(c). However, they may still have to consider some of the same factors when developing their Marine Life Mortality Report in

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	"The preferred technology for minimizing intake and mortality of marine life resulting from brine disposal is to commingle brine with wastewater (e.g., agricultural, sewage, industrial, power plant, cooling water, etc.) that would otherwise be discharged to the ocean --unless the wastewater is of suitable quality and quantity to support domestic or irrigation uses--. For commingled brine and wastewater discharges, when the combined TDS is near ambient ocean salinity sub-section 2.(c) shall not apply. Nothing in this section shall preclude the future recycling of wastewater."	chapter III.L.2.e.(1). For an owner or operator commingling brine with an adequate amount of wastewater to dilute the brine, there would be no additional ocean water being withdrawn to dilute the brine (e.g. flow augmentation) and therefore no intake-related entrainment associated with the selected discharge technology. There would be no osmotic stress from elevated salinity if there is a sufficient volume of wastewater for dilution when commingling. Analysis of marine life mortality associated with the turbulence that occurs during water conveyance and mixing will only need to be done if there are live organisms in the conveyance water (e.g. flow augmentation) and would not need to be done for commingling. Lastly, shearing stress at the point of discharge will need to be evaluated for facilities that are commingling, but they will only need to evaluate the incremental shearing-related mortality that occurs over that which is already occurring from the discharge of the discharge of wastewater from the wastewater treatment plant effluent. In some cases, the regional water board may determine there is no incremental mortality that results from shearing of organisms at commingled outfalls. Depending on the size of the desalination facility relative to the size of the wastewater facility, the incremental mortality may not be significantly elevated or detectable over historic WWTP discharge amounts, which vary seasonally and depending on groundwater infiltration into the collection system. However, an owner or operator of a desalination facility using commingling as a brine disposal strategy will need to at least include the items in chapter III.L.2.e.(1)(b) when applying to the regional water board for a Water Code 13142.5(b) determination. There may be instances when an owner or operator is proposing to commingle brine with wastewater and there is not a sufficient volume of wastewater to adequately dilute the brine to ambient. If the resulting commingled effluent is partially diluted with wastewater but negatively buoyant, it will need to be discharged through a multiport diffuser. In this case, an owner or operator would need to include osmotic and shearing impacts to marine life in the Marine Life Mortality Report.
6.7	Page 9 e. [of the proposed Desalination Amendment] Mitigation: Add the following language to the end of the paragraph:	The proposed language in this comment would leave intake-related impacts and construction-related impacts from facilities that commingle

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	The owner or operator shall fully mitigate for --all-- marine life mortality associated with the desalination facility. "This provision shall not apply to brine disposal by commingling with wastewater."	their brine with wastewater unmitigated. Additionally, it assumes there will be no discharge-related impacts at facilities that commingle their brine. Commingling is the preferred discharge technology because it has the potential to dilute brine and produce a positively or neutrally buoyant plume. However, there may be some instances where there is insufficient wastewater to adequately dilute the brine. In this case, the commingled discharge may result in an area around the discharge that exceeds 2ppt above natural background salinity. The owner or operator might need to mitigate for that area. Additionally, Water Code section 13142.5(b) requires mitigation for all marine life mortality, which includes shearing related mortality at any new or expanded facility. WWTPs do not currently have to mitigate for shearing related mortality, and the concept is somewhat new in the regulated community. Historically, mitigation has not been required for impacts within the zone of initial dilution, including shearing-related mortality that occurs when discharging through multiport diffusers. WWTPs and other ocean dischargers may use multiport diffusers on ocean outfalls but are regulated under National Pollutant Discharge Elimination System permits pursuant to Clean Water Act section 402, which also serves as Waste Discharge Requirements under Porter-Cologne chapter 4, article 4 (§§ 13260 et. seq.) and chapter 5.5 (§§ 13370 et. seq.), and do not require mitigation for these types of impacts. However, Water Code section 13142.5(b) requires that an owner or operator of a new or expanded desalination facility mitigate for all mortality of all forms of marine life including that which occurs as a result of the construction and operation of the facility. This further includes any shearing-related mortality that occurs as a result of the addition of the brine waste stream to the effluent for commingled discharges or any other mortality that occurs in the zone of initial dilution (ZID) or brine mixing zone (BMZ). In some cases, the regional water board may determine that the shearing-related mortality from the addition of the brine waste stream is not significantly higher than the shearing mortality that occurs at a WWTP in the absence of the brine stream. In this case, the regional

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		water board may not require mitigation for shearing mortality, but they still may determine there is mortality associated with brine toxicity within the ZID or BMZ that requires mitigation. An owner or operator of a new or expanded desalination facility will need to estimate and mitigate for all impacts associated with the discharge whether or not they commingle their brine. Additionally, they will need to mitigate for any mortality associated within intakes and construction, whereas the proposed language would exempt an owner or operator commingling their brine from those obligations.
6.8	Requirement for mitigating shearing stress induced mortality and any increase in mortality resulting from a commingled discharge entrainment impact in the Brine Mixing Zone (BMZ). Page 10 - 2. e.(1)(b) [of the proposed Desalination Amendment] - Existing wastewater agencies are not required to mitigate for the very small entrainment, shearing, or commingling losses that might occur from wastewater disposal within the zone of initial dilution. The SWRCB Expert Panel indicated that the mortality from shearing losses is likely quite small from high pressure jets and would be non-existent in low pressure wastewater outfall diffusers. The Expert Panel also recommended that the toxicity and other requirements of the Ocean Plan should be met at the edge of the brine mixing zone, not someplace inside of the mixing zone. The purpose of the mixing zone is to allow a small area for initial dilution of the brine or commingled wastewater plume. Add the following language to the end of Section (b) on page 10: "This section does not apply to commingled brine discharges with wastewater."	The language has been changed to clarify the receiving water limitation shall be met at the edge of the brine mixing zone or zone of initial dilution. Please see response to comment 15.11 regarding mitigation within the brine mixing zone.
6.9	Page 13 Receiving Water Limitation for Salinity - Compliance with "Natural Background Salinity" as worded is non-attainable. Under Receiving Water Limitations for Salinity, the "natural background salinity" is to be used. The definition provided for "natural background salinity" is a 20 year average or a site specific average based on new data collected at the discharge point on a weekly basis over 3 years.	Thank you for this suggestion. Salinity will vary monthly based on precipitation, storm water runoff, and influxes from other freshwater sources. The definition of natural background salinity was updated in the proposed Desalination Amendment and Staff Report with SED to be based on the mean monthly natural salinity for an area. Consequently, the receiving water limitation for salinity will be based on 2 ppt above the historical average (or 3-year average when historical data are

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	Using long term averages would make it impossible to comply with the allowable 2,000 mg/l maximum incremental increase above ambient or reference salinity when natural salinity levels exceed their average condition. Instead, a reference, moving average background salinity for the site would be a better approach. We would recommend using a 12 month moving average of monthly salinity. More frequent sampling than monthly sampling would not add sufficiently to the accuracy of determining the moving mean for establishing the reference salinity. A moving mean is a better measure as sometimes errors in sampling and analysis can occur.	unavailable) salinity for a given month. Please also see responses to comments 15.17 and 13.130.
6.10	Page 14 [of the proposed Desalination Amendment]- Receiving Water Limitation for Salinity, the Alternate Method should allow use of site specific most sensitive species that are found in the impacted habitat. To provide for appropriate flexibility without causing any additional impact, site specific habitat species that occur and would be affected by the discharge should be used in the determination of the appropriate receiving water limitation for salinity. For example, it makes no sense to use rocky habitat species in sandy or muddy bottom habitats and vice versa. It would seem better to use the most sensitive species that have developed protocols for the impacted habitat.	The proposed Desalination Amendment does not allow the use of indigenous species to establish an alternative receiving water limitation for a number of reasons. The five species selected for WET testing in the proposed Desalination Amendment were selected from Table III-1 of the Ocean Plan, which was developed and implemented in accordance with Water Code sections 13170.2(c) and (d). The species in the Ocean Plan were developed and approved by the State Water Board for toxicity testing of all discharges into ocean waters of the state. Other waste dischargers must use the species in Table III-1 for toxicity testing, so there is no justification to allow dischargers of brine to use other species. Furthermore, as described in Section 8.7.5 of the Staff Report with SED, the species in Table III-1 and chapter III.L.3.c.(1)(b) serve as representatives of related species. For example, larval development is the same for bivalves (e.g. clams, mussels, cockels, and oysters) from fertilization to the point just before undergoing metamorphosis to the juvenile stage. Regardless of whether a larva differentiates during metamorphosis into a California mussel living on a pier piling or into a bean clam buried in soft-bottom habitat, the larval phase will respond similarly to elevated salinity. An explanation of how and why the chronic toxicity testing protocols were developed and how using endemic species for WET testing can result in a receiving water limitation for salinity that is not adequately protective is described below. First, Water Code section 13170.2(c) requires that, “the state board shall develop bioassay protocols to evaluate the effect of municipal and

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		industrial waste discharges on the marine environment" and section 13170.2(d) adds that, "the state board shall adopt the bioassay protocols and complementary chemical testing methods and shall require their use in the monitoring of complex effluent ocean discharges." In 1990, the State Water Board adopted a list of seven critical life stage toxicity testing protocols to be used for determining compliance with the chronic toxicity objective. The protocols were developed to meet the requirement in Water Code section 13170.2(c). In order to be included in Table III-1 of the Ocean Plan (approved tests for chronic toxicity), each test protocol had to meet all seven of the following criteria: 1. the existence of a detailed written description of the test method; 2. a history of testing with a reference toxicant; 3. interlaboratory comparisons of the method; 4. adequate testing with wastewater; 5. measurement of an effect that is clearly adverse; 6. measurement of at least one nonlethal effect; and 7. use of marine organisms native to or established in California. The 1990 list of critical life stage toxicity testing protocols was reviewed by a 10 member external advisory panel known as the Protocol Review Committee (PRC) that included aquatic toxicology experts representing industry, academia, and government. In 1994, the PRC suggested a revised list of critical life stage protocols acceptable for use in measuring compliance and added two additional criteria (Bay et al., October 1994): The protocol must have information that documents relative sensitivity to toxic/reference materials and compares it to current Ocean Plan-listed tests; and the organism(s) specified in the protocol must be readily available either by field collection or by laboratory culture. The State Water Board developed and adopted the standard critical life stage protocols in Table III-1 based on the PRC's recommendations in order to ensure toxicity data collected by dischargers were accurate,

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		consistent, reproducible, reliable, and comparable among projects. The five species listed in the proposed Desalination Amendment were selected from Table III-1 of the Ocean Plan, which were selected based on their longstanding history of use in toxicity test method research, development, and implementation. For additional information regarding the development of Table III-1 of the Ocean Plan and the PRC's recommendations, please see State Water Board 1995 and State Water Board 1996. In order for an owner or operator to conduct toxicity tests on the most sensitive species with "developed test protocols," the most sensitive species must first be identified through studies. Then the toxicity test for the species must meet all nine of the requirements above. At the time the 1995 PRC Report was released, there was only one critical life stage that was close to meeting the nine criteria. The protocol developed by Reish et al. (1994) for the polychaete *Neanthes spp.* met six of the nine criteria, but did not meet the following: a written protocol is available, there has been adequate testing with wastewater, and there is sufficient intra- and interlaboratory testing. Since there is only one other species (*Neanthes spp.*) that is close to meeting the standards required for adoption into Table III-1, it seemed unlikely an owner or operator would elect to perform studies to identify the most sensitive species at their site, and then develop test protocols for each of the most sensitive species that meet all nine of the above mentioned criteria. We determined the option would be cost and time prohibitive and that ultimately, no one would pursue that pathway. In the past 20 years, the remaining three criteria for the *Neanthes spp.* may have been met; however, the Water Boards have not yet made that determination. If a regional water board determines the *Neanthes spp.* test has met the remaining three criteria and still meets the other six criteria, the regional water board can add the *Neanthes spp.* test to the required list of toxicity tests per chapter III.L.3.c.(1)(b) of the proposed Desalination Amendment. The addition of polychaetes to the toxicity testing requirements may be beneficial since polychaetes are ubiquitous in marine habitats. Some polychaete species are common

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		in soft-bottom habitats and would serve as a good representative of a benthic soft-bottom species with low mobility. This could help to address concerns that the species in chapter III.L.3.c.(1)(b) are not representative of the species at “my discharge” by providing an additional representative of a broader taxa. However, the concern that the species in chapter III.L.3.c.(1)(b) are not representative of the species at “my discharge” is unfounded. The Ocean Plan list (Table III-1) covers a broad taxonomic range as well as different physiological endpoints and meets the goal of protecting indigenous species as required in section 13170.2(b). (State Water Board 1995) The species in Table III-1 are representatives of their broader taxa (e.g. the mussel and bean clam example), which means the toxicity data from these species can be used to make general assumptions of how a brine discharge will impact a group of similar species without having to perform tests on each individual species present at a discharge. There are a number of other issues that can occur if an owner or operator were to deviate from the standard Ocean Plan list (Table III-1). Allowing an owner or operator to select species for toxicity testing may also result in an inadequately protective receiving water limitation for salinity because species that are known to be more tolerant of salinity changes may be selected. Deviating from the standard Ocean Plan list by using wild-caught animals for laboratory toxicity testing can also be problematic. Wild-caught animals have varying states of fitness and variable exposure to environmental contaminants, and there are a number of other confounding environmental factors that have the potential to influence toxicity test results. Often, laboratory raised animals are used in in toxicity studies in order to control variables that can influence the test results. Some of the Table III-1 species are collected from the field, but are consistently collected and handled by a reputable dealer. Using non-standardized methods for the collection of species and the toxicity tests themselves creates a significant risk that the toxicity tests will not be accurate. This can result in establishing an alternative receiving water limitation that is not adequately protective because it was based on inaccurate data.

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		In conclusion, it is important that there are standard test protocols developed for the animals that meet the abovementioned nine criteria, and the only species/test that meet all nine are in Table III-1 of the Ocean Plan. These species represent a broad taxonomic range and are representatives for other related species in California. Deviating from this list will result in regulatory inconsistencies and may result in an alternative receiving water limitation that is not adequately protective of beneficial uses.
6.11	Page 16 [of the proposed Desalination Amendment]- Definition of BMZ should be specified that it is for dedicated brine disposal discharge lines equipped with multiport diffusers and that it does not apply to conventional wastewater outfalls that may be used for commingling brine for disposal. Further, the BMZ definition should be consistent with the mitigation requirements in the draft amendment and as now written would inadvertently prohibit brine disposal. As currently defined, acutely toxic conditions are to be prevented in the BMZ. Whether brine discharge is considered acutely toxic depends on how dilution is factored in. If dilution is not factored in, it would be impossible to prevent acutely toxic conditions. When brine firsts enters the ocean from the diffuser it is about twice the concentration of seawater undergoing dilution in the BMZ and would be acutely toxic. The very purpose of the BMZ is for dilution of the brine to prevent acute and chronic toxicity from concentrated seawater at the edge of the BMZ. Acute toxicity should be met at the edge of the BMZ as recommended by the Expert Panel (September 23, 2013 workshop presentation and March 2012 Expert Panel Final Report). Granite Canyon Lab work provided chronic toxicity evaluations for brine but not for acute toxicity. It is not possible at this time to know if some distance within the BMZ could be established for acute toxicity as is now provided in NPDES permits for wastewater outfalls for constituents other than salinity. We recommend that under the definition for BMZ on page 16, that the third sentence of the definition be changed to read as follows:	The definition of brine mixing zone was revised to: *"BRINE MIXING ZONE is the area where salinity* exceeds 2.0 parts per thousand above natural background salinity,* or the concentration of salinity approved as part of an alternative receiving water limitation. The brine mixing zone shall not exceed 100 meters (328 feet) laterally from the points of discharge and throughout the water column. The brine mixing zone is an allocated impact zone where there may be toxic effects on marine life due to elevated salinity."* Language was added to clarify that the brine mixing zone is for salinity alone. All other water quality criteria should be regulated consistently with other existing Ocean Plan provisions. The definition recognizes that there may be toxic effects related to elevated salinity within the brine mixing zone. While the definition does not specifically state "acute" and "chronic," there may be acute and chronic toxicity due to elevated salinity in the brine mixing zone. Acute and chronic toxicity conditions resulting from elevated salinity should be prevented at the boundary of the brine mixing zone and the designated use of the water beyond the brine mixing zone should not be impaired as a result of the brine discharge mixing zone. The definition of brine mixing zone was revised to accommodate for an approved alternative receiving water limitation for salinity. Furthermore, the language "unless otherwise authorized by the regional water board in accordance with this plan" was removed to prevent

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	"The brine mixing zone is an allocated impact zone where water quality criteria can be exceeded as long as acutely and chronic toxic conditions due to elevated salinity are prevented at the edge of the brine mixing zone and the designated use of the ocean water beyond the brine mixing zone is not impaired as a result of the brine discharge --mixing zone--. This section shall not apply to commingled discharges through existing wastewater outfalls that fall under existing NPDES permits.	confusion. An alternative receiving water limitation may be above 2 ppt above natural background salinity, but the brine mixing should not exceed 100 meters (328 feet) laterally from the points of discharge and throughout the water column. This requirement is consistent with the project goal to provide a consistent statewide approach for protecting water quality and related beneficial uses of ocean waters and controlling adverse effects of desalination discharges by minimizing the area of impact. Commingling brine with wastewater and discharging brine through multiport diffusers are both technologies that can reduce or eliminate toxic effects of salinity within a relatively small area (100 m). Alternative discharge technologies that are equally protective as commingling with wastewater of discharging through diffusers should also be designed to minimize the area where salinity exceeds 2 ppt above natural background salinity or the alternative receiving after limitation (other than 2 ppt). An owner or operator will demonstrate compliance with the receiving water limitation for salinity by either developing an effluent limitation where they would be required to conduct mixing zone studies to calculate Dm (see chapter III.L.3.b.(2)(b)), or by demonstrating compliance with the receiving water limitation by monitoring salinity in the receiving water. Dm is the minimum probable initial dilution expressed as parts seawater per part wastewater. Since the limitation applies throughout the water column, monitoring for salinity should occur from the seafloor to the sea surface. The regional water board may still require mitigation for impacts within the brine mixing zone because Water Code section 13412.5(b) requires mitigation for mortality of all forms of marine life associated with the desalination facility. For more information please see response to comment 15.11. The last recommended sentence was not incorporated is because it cannot assumed that in all cases of commingling that there will be an adequate volume of wastewater to dilute brine to below natural background salinity levels. If there is an insufficient volume of wastewater to dilute the brine, and the resulting commingled plume is

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		negatively buoyant, a brine mixing zone is appropriate. In the event the brine is sufficiently diluted with wastewater and the commingled discharge is less than 2 ppt above natural background salinity, the brine mixing zone definition would not apply because the first line of the brine mixing zone definition states that it "is the area where the salinity* exceeds 2.0 ppt above natural background salinity.*" In this scenario, a wastewater treatment plant accepting the brine and discharging the commingled effluent would simply monitor salinity to demonstrate they meet the receiving water limitation for salinity. In addition to salinity monitoring to demonstrate compliance with the receiving water limitation for salinity, the standard NPDES requirements would apply to the commingled discharge.
6.12	Page 17 [of the proposed Desalination Amendment]- Add Definition of "Feasible". Section 13142.S(b) utilizes the term "feasible". It is important that this term be defined and be consistently utilized. It should be noted that in the recent Court of Appeals Decision in Surfrider Foundation v. Cal. Regional Water Quality Control Board upheld the use of the definition of "feasible" under CEQA. Under CEQA, "feasible" means "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social and technological factors". The Coastal Act relies on the same definition. For consistency, the SWRCB should incorporate this same definition and include it under Definitions.	Many commenters have advocated for including a definition of feasibility within the proposed Desalination Amendment. Two possible approaches have been identified. First, industry and potential project proponents favor including the definition used in the California Environmental Quality Act (CEQA) and in the California Coastal Act: *"'Feasible' means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors."* (Public Resources Code § 21061.1; § 30108). In the alternative, environmental groups favor using a definition of feasible that excludes cost. This approach is based upon the definition of "not feasible" set forth in the State Water Board's Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling (OTC Policy): *"Cannot be accomplished because of space constraints or the inability to obtain necessary permits due to public safety considerations, unacceptable environmental impacts, local ordinances, regulations, etc. Cost is not a factor to be considered when determining feasibility under Track 1."*

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		For purposes of the OTC Policy, determination of feasibility is limited to whether or not a power generator may pursue an alternative compliance option. Track 1 compliance requires installation of a closed-cycle wet cooling system or commensurate reduction in intake flow rate, while Track 2 allows reductions in impingement mortality and entrainment to a comparable level through use of operational or structural controls, or both. The OTC Policy allows Track 2 compliance only where the owner or operator demonstrates to the State Water Board's satisfaction that Track 1 is "not feasible." The Policy otherwise does not use this term, although the section on submitting implementation plans requires an assessment of periods during which power generation will be "infeasible" because of repowering or retrofit. The CEQA definition of feasibility has been added to the definitions in the proposed Desalination Amendment. The CEQA definition was added because it is better suited to requirements governing facilities yet to be built, each with a significant range of site-specific variables. Because Water Code section 13142.5(b) requires the "best available site, design, technology and mitigation measures feasible" to "minimize the intake and mortality of all forms of marine life," the definition used will inform determinations for each factor set forth in the statute. The definition must be capable of applying to each. Moreover, the CEQA definition was used to develop a plan for complying with Water Code section 13142.5(b) at the Carlsbad desalination facility and was upheld as appropriate by the appellate court in Surfrider Foundation vs. California Regional Water Quality Control Board (2012) 211 Cal.App.4th 557. Thus, available legal precedent supports using this broader definition of feasibility. The "not feasible" definition included in the OTC Policy is tailored to the relatively narrow question of whether an existing power plant is allowed to pursue an alternative method of compliance at a facility already built and operating. With its references to space constraints and permitting restrictions resulting from public safety, the definition clearly envisions considerations about suitability of the preferred method of installing cooling towers. Development of new desalination facilities will involve feasibility determinations that should allow a broader analysis.

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		Finally, cost is an appropriate consideration where it represents a substantial unknown for new facilities developing sources of potable water. By contrast, costs associated with installation of a wet cooling system for an existing power plant are more predictable, with information developed in part from EPA's efforts to adopt a regulatory standard for plants subject to Clean Water Act section 316(b). The State Water Board decision to exclude costs for determining feasibility of Track 2 for OTC plants represented a policy determination based upon available data.
#7	**Philip L. Friess, Sanitation Districts of Los Angeles County**	
7.1	Our primary concern is that the Desalination Amendments and the associated Draft Staff Report do not adequately distinguish between seawater desalination and non-seawater desalination, such as desalination of recycled water and brackish groundwater. Brines from non-seawater desalination are significantly less saline than brines from seawater desalination, and therefore have positive buoyancy. It is our understanding that the State Water Resources Control Board considered the need for additional regulation of non-seawater desalination brines during the early stages of development of the Desalination Amendments, but found that additional regulation was not warranted. The Scientific Advisory Panel formed to examine brine discharges found that the regulatory approach in the existing Ocean Plan is adequate for positively buoyant plumes, as documented in the "Management of Brine Discharges to Coastal Waters - Recommendations of a Scientific Advisory Panel" prepared by SCCWRP in 2012. The proposed addition to the Ocean Plan of implementation provisions for desalination facilities is specifically limited to desalination facilities using seawater, and the Sanitation Districts support this limitation. Inappropriate regulation of non-seawater desalination brines could impact our ability to beneficially reuse over 250 million gallons per day of recycled water produced at our Joint Water Pollution Control Plant, hindering the state's goals of improving the reliability and sustainability of its water supply. However, the Draft Staff Report is confusing with respect to seawater and non-seawater desalination. In many places it uses the	Please see response to comment 8.1. The draft Staff Report with SED section 2.1 (Page 12) Desalination Process. Staff added language to clarify that while the scope of desalination in California may be broad; the scope of the proposed Desalination Amendment only includes seawater desalination facilities. The draft Staff Report with SED section 7.1.6. (Page 36) The Need for Special Considerations or Protections of Sensitive Habitats. Added language to clarify that "brine discharges from seawater [or brackish water] desalination facilities can pose significant risks to sensitive habitats." The draft Staff Report with SED section 8.6.5 (Page 93). Added language to clarify "An owner or operator of a seawater desalination facility must evaluate multiple brine disposal alternatives independently and then in combination with the best site, design, technology, and mitigation alternatives, employ the discharge method that best minimizes intake and mortality of marine life." The draft Staff Report with SED section 8.7 (Page 93). Added language to clarify that the receiving water limitation for salinity would be applied to seawater desalination facilities.

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	general terms "desalination" and "brine" when referring only to seawater desalination and brines generated from such desalination. This could lead readers to incorrect conclusions regarding the nature of non-seawater desalination and brines, which in turn could have adverse consequences relating to recycled water projects that discharge brine from advanced treatment processes. To provide more clarity in the Draft Staff Report, we recommend specifically using the term "seawater" with the terms "desalination" and "brine" when referring to seawater desalination and seawater desalination brines. The following sections may need to be revised to provide this clarity: Section 2.1 (Page 12), Section 7.1.6 (Page 36), Section 8.6.5 (Page 93), and Section 8.7 (Page 93).	
7.2	Additionally, the proposed amendments to the Ocean Plan, as indicated in the appendix to the Draft Staff Report, could be interpreted as unintentionally requiring that the new salinity monitoring and reporting provisions apply to all brine discharges, not just those from seawater desalination facilities. Imposition of additional monitoring requirements on brine discharges from water recycling facilities has not been justified, particularly in light of the Science Advisory Panel findings mentioned above. Any imposition of new monitoring requirements on brine discharges from water recycling projects should be carefully considered, given the critical need to increase recycled water usage in the state. We therefore recommend the following revision, to eliminate any ambiguity in the monitoring and reporting requirements: Appendix III, page 67: "Seawater --D--desalination facilities discharging brine into ocean waters shall monitor salinity as described in chapter III.L.4."	Comment noted and the suggested change was made.
7.3	Finally, the current version of the Ocean Plan contains a typographical error in Figure VIII-5 on Page 86 of Appendix VIII. The Sanitation Districts' facility should be labeled "LA County Sanitation Districts JWPCP" instead of "Los Angeles County JWPCP Carson NP." We would like to request correction of this as part of the non-substantive changes made during this reopener of the Ocean Plan.	Comment noted. The label on the map was revised to “"LA County Sanitation Districts JWPCP.”
#8	**Andrew Brunhart, South Coast Water District**	

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8.1	As a threshold matter, we are concerned that with respect to the regulation of desalination facilities, the focus of the Draft Amendments is on ocean desalination facilities and not brackish groundwater facilities.	The scope of the proposed Desalination Amendment is intended to cover desalination facilities that intake seawater and discharge brine into ocean waters. In the proposed Desalination Amendment, seawater is defined as: *"salt water that is in or from the ocean. For the purposes of chapter III.L, seawater includes tidally influenced waters in coastal estuaries and lagoons and underground salt water beneath the seafloor, beach, or other contiguous land with hydrologic connectivity to the ocean."* The definition of seawater covers facilities that withdraw seawater through subsurface intakes. In some cases, the salinity of the subsurface water will vary based on environmental factors, like tidal fluctuations, which may result in the seawater periodically being brackish. Brackish water has salinity that is higher than potable water, but lower than seawater. Salinity concentrations of brackish water range from 1,000 mg/l total dissolved solids (TDS) to 25,000 mg/l TDS. (U.S. Department of the Interior Bureau of Reclamation 2014: http://www.usbr.gov/research/AWT/brackish.html) The scope of the proposed Desalination Amendment is not intended to include intakes from water recycling facilities and groundwater desalination facilities unless those facilities intake seawater. Additionally, brine discharges or reject water from water recycling efforts are significantly less saline than brine discharges from seawater desalination facilities and less saline than seawater, meaning they are neutrally or positively buoyant. Consequently from a salinity standpoint only, brine discharges from water recycling efforts do not pose a significant threat to water quality or other related beneficial uses of ocean waters because the salinity of the wastewater is typically far below natural background salinity of ocean water. For these reasons, brine discharges from water recycling efforts should not be covered under the scope of the proposed Desalination Amendment. Brackish groundwater has a wide range of salinities. By definition, brackish is a combination of fresh water and salt water and can range

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		from 2 to about 35 ppt depending on the location and time of day in tidally influenced areas. Discharges from facilities that desalinate brackish groundwater may or may not pose a threat to water quality, depending on the concentration of salt in the brackish groundwater. For example, a brackish groundwater desalination facility may be withdrawing water with 3 ppt salinity, which would make their “brine” or reject water concentration around 6 ppt, assuming a 50 percent production efficiency (for every 2 gallons of source water, one gallon of freshwater and one gallon of brine are produced). When the brackish groundwater has a salinity that is less than half of the receiving water concentration, the discharge plume will be a positively buoyant plume, thus avoiding negative effects on the benthic environment. However, when source water concentrations exceed 18 ppt, the brine concentration (>36 ppt) exceeds the ambient seawater concentration (30 to 35 ppt) and has the potential to negatively affect the environment. Figure 8.1-1 below illustrates this point. One of the primary reasons for addressing desalination facilities is the negative effect of hypersaline brine on marine organisms. The Brine Panel and toxicity studies investigated impacts on elevated salinity rather than impacts of low salinity plumes on marine life. The impacts of low salinity discharges on marine life have been documented through wastewater treatment facility effluent monitoring. Brackish groundwater desalination facilities with high salinity brine discharges will pose a threat to water quality whereas other facilities with low salinity discharges likely will not, based on salinity alone. Roberts et al. (2012) and Phillips et al. (2012) found salinity fluctuations as low as 2 parts per thousand (ppt; 2,000 TDS) above natural background salinity could have negative impacts on marine life. Brackish water desalination facilities will require further consideration before including regulations for them in a statewide Plan because the salinity of the source water will be constant at some locations, but variable at others. This poses a regulatory challenge because one of the goals of implementing statewide requirements is consistency. The variability in source water salinity concentrations among facilities would make it difficult to implement an appropriate receiving water limitation

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		for salinity that would apply to all brackish groundwater desalination facilities in California. Figure 8.1-1 below presents three brackish groundwater desalination facilities with different source water and brine salinities measured in ppt. The figure illustrates how varying salinity of source water can influence the density of the discharged plume. Facility A produces a positively buoyant "brine" plume that would not affect the benthic marine environment. Facilities B and C would form dense, negatively buoyant plumes that could negatively affect the benthic marine environment if not properly discharged. Currently, regional water boards issue waste discharge permits (either WDRs or NPDES permits) for brackish water desalination facilities on a case-by-case basis. More research is needed to identify an appropriate statewide limitation to apply to brine discharges from brackish groundwater desalination facilities. The Staff Report with SED does not adequately study brackish groundwater desalination facilities and staff would need additional time to research the impacts associated with the facilities and incorporate the information. Furthermore we would need to meet with stakeholders in the brackish groundwater desalination facility community to solicit feedback on the proposed Desalination Amendment language. Brackish groundwater desalination facilities are currently regulated by the regional water boards on a case-by-case basis. However, if there is sufficient public interest the State Water Board may address the issue in a subsequent amendment to the Ocean Plan.
8.2	SCWD owns and operates a groundwater recovery facility ("GRF") which extracts and treats brackish groundwater for potable use, and we have previously been impacted by the San Diego Regional Water Quality Control Board's application of Ocean Plan Table A standards to the facility. As we have repeatedly indicated, we believe that the State Water Resources Control Board ("State Board") must amend the Ocean Plan to exempt such facilities from the Ocean Plan Table A Standards at the facility in circumstances where the brine discharge can be co-disposed with wastewater at an outfall. In such case, the application of Ocean Plan	The following language was added to Table 2 (Formerly Table A) of the Ocean Plan: *"4. Compliance with Table 2 effluent limitations for brine discharges from desalination facilities that commingle brine and wastewater prior to discharge to the ocean may be measured after the brine has been commingled with wastewater, provided that the permittee for the commingled discharge accepts responsibility for any exceedances of the Table 2 effluent*

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	standards should occur at the outfall. While the Amendments recognize comingling of brine effluent with treated wastewater as a preferred disposal method, it does not address the issue of compliance point (i.e., at the outfall rather than at the facility). The GRF treats low quality/brackish groundwater to produce drinking water. The GRF was designed to allow for compliance with effluent limitations to be determined at the outfall as was allowed by the NPDES permit at the time. Prior to the commencement of operations at the GRF, despite no change in the governing regulations, the San Diego Regional Water Quality Control Board ("SDRWQCB") amended the NPDES permit to require compliance with Ocean Plan Table A standards at the GRF. After the initial startup period, SCWD determined that the GRF's brine discharge could not meet the Ocean Plan Table A standards due to the high levels of naturally occurring iron and manganese salts in the groundwater. SDRWQCB levied $204,000 in mandatory minimum penalties ("MMPs") against SCWD for these exceedances despite SCWD's demonstration that the brine discharge did not impact the SJCOO. SCWD and SOCWA (the NPDES permit holder) sought a permit modification from SDRWQCB and urged it to exercise its best professional judgment ("BPJ") to allow for compliance to be determined at the outfall rather than the GRF in light of the benefits of the GRF and the fact the brine effluent did not impact water quality or beneficial use at the outfall. MWD supported this request, as did a number of other water districts and municipalities. SDRWQCB denied the request, and the State Board dismissed SCWD's petition for review of the matter on March 4, 2011. However, the State Board indicated that the brine discharge issue would be addressed through the Ocean Plan Amendments.	*limitations."* This language addresses the point of compliance issue for brackish groundwater desalination facilities that commingle brine with wastewater.
8.3	...[W]hile the Draft Amendments appear to favor commingling brine discharge with treated wastewater (see page 34, Sec. L.2.d.(2)(a)) as a preferred technology for brine disposal, this language does not appear to apply to brackish groundwater treatment facilities. Sec. L.l.a. states that Chapter III.L "applies desalination facilities* using seawater."	The scope of the proposed Desalination Amendment is intended to cover seawater desalination facilities. The proposed Desalination Amendment was revised to address the point of compliance issue for brackish groundwater desalination facilities that commingle with wastewater. Please see responses to comments 8.1 and 8.2.

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	Moreover, the Draft Amendments do not appear to address the compliance point issue we raised at all.	
8.4	Finally, we believe there is a significant difference between dedicated brine lines and commingled brine/wastewater discharge, and the two should be regulated differently (currently, there does not appear to be a distinction). A commingled brine/wastewater discharge has much less potential impacts and may actually improve the salinity of the wastewater to lessen the impact of the wastewater on marine and benthic environments.	Commingling brine with wastewater is the preferred brine disposal method because it results in the least amount of intake and mortality of marine life. Facilities with dedicated brine lines and facilities that commingle brine with wastewater must both meet the receiving water limitation for salinity. Some facilities that commingle brine with wastewater may have an adequate volume of wastewater to dilute the brine to below natural background salinity. However, as wastewater recycling advances, wastewater may become unavailable to sufficiently dilute the brine. In this case, it is important that a facility with the commingled discharge is required to meet the receiving water limitation for salinity. Since wastewater will not always provide complete dilution of brine, a discharger must demonstrate they meet the receiving water for salinity. However, chapter III.L.1.e. of the proposed Desalination Amendment was revised to state that, *"Chapter III.L.4 [the monitoring and reporting requirements of the proposed Desalination Amendment] shall not apply to a wastewater facility discharging a positively buoyant commingled effluent through an existing wastewater outfall that is covered under an existing NPDES permit as long as the owner or operator monitors for compliance with the receiving water limitation set forth in chapter III.L.3. For the purposes of chapter III.L.4, a positively buoyant commingled effluent shall mean that the commingled plume floats when it enters the receiving water body due to salinity levels in the commingled discharge being lower than the natural background salinity.*"* If brine is diluted to the point where the commingled plume is positively buoyant, it is no longer a threat to water quality from a salinity standpoint. Dischargers of commingled effluent must still meet all other requirements in the Ocean Plan per their NPDES permit.
8.5	As such, SCWD suggests the following changes to the Draft Amendments to allow the comingling of brine discharge from a	The proposed language revision is no longer necessary since the change noted in response to comment 8.2 was made.

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	desalination facility (either ocean or brackish groundwater) so long as all water quality objectives are met at the edge of the brine mixing zone. 1. Modify Chapter III.L.1.a. [of the proposed Desalination Amendment] as follows: "a. Chapter III.L applies to desalination facilities* using seawater,* and where specifically noted, desalination facilities using brackish groundwater*"	
8.6	Modify Chapter III.L.2.d.(2)(a) [of the proposed Desalination Amendment] as follows: "The preferred technology for minimizing mortality of marine life resulting from brine* disposal is to commingle brine* with wastewater (e.g., agricultural, sewage, industrial, powerplant cooling water, etc.) that would otherwise be discharged to the ocean, --unless the wastewater is of suitable quality and quantity to support domestic or irrigation uses--. Brackish groundwater* desalination facilities may also commingle brine* with wastewater as long as all applicable water quality objectives are met at the edge of the zone of initial dilution*. We deleted "unless the wastewater is of suitable quality and quantity to support domestic or irrigation uses" for a number a reasons. First, while water reuse and recycling should certainly be encouraged (note that SCWD spent $2.8 million dollars last year to put in a recycled water system filtration system using RO to improve the quality of recycled water by removing the high TDS that are inherent in the potable water supply that is delivered to the District through the State water systems), many factors play into whether reuse and recycling are feasible, and it should be up to the water agencies to determine whether the water can be reused or recycled. The suitability of the water in and of itself should not preclude a desalination facility from being able to commingle its brine effluent with the wastewater. In any event, if a future recycling project is planned which may reduce the volume of wastewater available for the dilution of brine, a regional water board may condition the permit on the availability of the wastewater pursuant to Section L.2.a.(5).	The proposed language revision is no longer necessary since the change noted in response to comment 8.2 was made. Please see response to comment 6.6 regarding the deletion of, "unless the wastewater is of suitable quality and quantity to support domestic or irrigation uses."

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8.7	Modify Chapter III.L.2.d.(2)(c) [of the proposed Desalination Amendment] as follows: "the owner or operator to analyze the brine* disposal technology or combination of brine* disposal technologies that best reduces the effects of the discharge of brine* on marine life due to intake-related entrainment, osmotic stress from elevated salinity,* turbulence that occurs during water conveyance and mixing, and shearing stress at the edge of the brine mixing zone or zone of initial dilution --point of discharge--...." Modify Chapter III.L.2.d.(2)(d) [of the proposed Desalination Amendment] as follows: "Brine* disposal technologies other than wastewater dilution and multiport diffusers,* such as flow augmentation,* may be used if an owner or operator can demonstrate to the regional water board that the technology provides a comparable level of protection. The owner or operator must evaluate all of the individual and cumulative effects of the proposed alternative discharge method on marine life mortality, including (where applicable); intake-related entrainment, osmotic stress, turbulence that occurs during water conveyance and mixing, and shearing stress at the edge of the brine mixing zone or zone of initial dilution. --point of discharge--" For purposes of commingling brine discharge with wastewater for disposal, the standard water quality objectives, testing and mixing zone analysis appropriate to POTW discharges should apply. Such standards allow for a zone of initial dilution and impacts are assessed outside of this zone of initial dilution. SOCWA's current NPDES permit states: "Numerical water quality objectives established in Chapter II, Table B of the Califomia Ocean Plan shall not be exceeded outside of the zone of initial dilution as a result of the discharges from the Facilities." (San Juan Creek Ocean Outfall Order No. R9-2012-0012, NPDES NO. CA0107417, p. 22).	The proposed language revision is no longer necessary since the change noted in response to comment 8.2 was made. Furthermore, the language in chapter III.L.2.d.(2)(d) does not address the point of compliance, but rather how to compare alternative brine disposal technologies. Please see responses to comments 6.11 and 18.24.

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	Furthermore, a dilution allowance is provided for the acute toxicity numeric limit that allows compliance at the edge of the zone of initial dilution. (See Ocean Plan at Chapter III.C.4.b.). This is consistent with the Expert Panel's recommendation that brine discharge be regulated by the mixing zone approach where water quality standards must be met at the mixing zone boundary:… To require impact analysis and mitigation of these impacts within the brine mixing zone appears to be inconsistent with the Expert Panel's recommendation and the existing regulatory scheme.	
8.8	Modify Chapter III.L.2.d.(2)(e) [of the proposed Desalination Amendment] as follows: "Mitigation for the purposes of this section is the replacement of marine life or habitat that is lost due to the construction and operation of a desalination facility* after minimizing marine life mortality through site, design, and technology measures. The owner or operator may choose whether to satisfy a facility's mitigation measures pursuant to chapter III.L.2.e.(3) or, if available, L.2.e.(4). The owner or operator shall fully mitigate for all marine life mortality associated with the desalination facility.* With respect to brine disposal, where wastewater is commingled with brine as a disposal option, so long as the NPDES permit discharge water quality standards are met, compliance at the edge of the zone of initial dilution* shall be presumed to be fully protective of marine life impacts sustained from brine disposal." For facilities which commingle brine with wastewater as a discharge option, the NPDES permit governing the wastewater discharge should be fully protective of marine life impacts. As such, so long as the brine does not result in any exceedance of NPDES permit limits, compliance at the edge at the zone of initial dilution should be sufficiently protective of marine life impacts and should not require any further mitigation.	Please see response to comment 15.11.
8.9	Modify Chapter III L.2.d.(2)(e)(1)(b) [of the proposed Desalination	Please see responses to comments 15.11, 6.11, and 18.24.

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	Amendment] as follows: "For operational mortality related to discharges, the report shall estimate the area in which salinity* exceeds 2.0 parts per thousand above natural background salinity* or a facility-specific alternative receiving water limitation (see § L.3) outside of the brine mixing zone* or zone of initial dilution*. The area in excess of the receiving water limitation for salinity* shall be determined by modeling and confirmed with monitoring. The report shall use any acceptable approach for evaluating mortality that occurs due to shearing stress resulting from the facility's discharge --including any incremental increase in mortality resulting from a commingled discharge--. The requirement to evaluate shearing impacts shall not apply to commingled brine discharges with wastewater." As discussed above, analysis of impact should occur outside of the mixing zone or zone of initial dilution. The requirement to evaluate shearing impacts should not apply to commingled brine/wastewater discharge. Existing POTWs are not required to mitigate for entrainment and shearing losses that might occur from wastewater disposal within the zone of initial dilution. Such losses are expected to be quite low or non-existent for the low pressure wastewater outfall diffusers. Indeed, the Expert Panel recognized that there is no published evidence of mortality due to diffuser jets and that shearing losses from diffusers would likely be low because exposure to damaging turbulence is on the order of seconds. (See Desalination Plant Entrainment Impacts and Mitigation, October 9, 2014 at p.3). The Expert Panel noted that "literature reports of damage to larvae caused by turbulence are generally based on longer exposure times." (See id.). Given the lack of scientific evidence demonstrating the potential for shearing impacts from diffusers, the requirement to evaluate these impacts is unwarranted.	
8.10	Modify Chapter III L.3.d.(4)(a)(l) [of the proposed Desalination Amendment] as follows: "An owner or operator must perform facility-specific monitoring to	The intent of the language in chapter III L.4.a.(1) is to differentiate between compliance monitoring via a Regional Monitoring Program and performing monitoring that will assess water quality at the discharge (i.e. facility-specific monitoring). The actual location(s) of the

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	demonstrate compliance with the receiving water limitation for salinity,* and evaluate the potential effects of the discharge within the water column, bottom sediments, and the benthic communities. --Facility-specific m--Monitoring is required until the regional water board determines that a regional monitoring program is adequate to ensure compliance with the receiving water limitation. Receiving water monitoring for salinity shall be conducted at the boundary of the defined brine mixing zone* or zone of initial dilution* and shall be conducted at times when the monitoring locations are most likely affected by the discharge. The monitoring and reporting plan shall be reviewed, and revised if necessary, upon NPDES permit renewal. The regional water board may require additional monitoring at the desalination facility, however, compliance with water quality objectives is to be determined at the edge of the brine mixing zone* or zone of initial dilution*." "Facility-specific monitoring" should be clarified, particularly for commingled brine and wastewater facilities. Such monitoring should occur in the receiving waters at stations representative of the area within the waste field where initial dilution is completed, i.e., at the edge of the brine mixing zone or zone of initial dilution.	compliance monitoring will be at the discretion of the regional water boards. Furthermore, some facilities may have the receiving water limitation for salinity converted into an effluent limitation using the equation in chapter III.L.3.b.(2), in which case, the location of the monitoring may not be at the boundary of the brine mixing zone. As stated in response to comment 8.4, a wastewater facility discharging a positively buoyant commingled effluent through an existing wastewater outfall that is covered under an existing NPDES permit will not have to comply with the requirements in chapter III.L.4.
8.11	Add definitions of "brackish groundwater" and "zone of initial dilution" [to the proposed Desalination Amendment]: "BRACKISH GROUNDWATER is water from below the ground surface that has more salinity than fresh water but less than sea water. Brackish groundwater may be replenished by recharge systems (using various water sources from runoff, storm flows, returning domestic supplies, treated recycled water, other brackish groundwater sources, etc). "ZONE OF INITIAL DILUTION is a regularly shaped area (e.g., circular or rectangular) surrounding the discharge structure (e.g., submerged pipe or diffuser line) that encompasses the regions of high (exceeding standards) pollutant concentrations under design conditions.	Brackish groundwater does not need a definition at this time since it is not addressed in the proposed Desalination Amendment. Regarding defining the zone of initial dilution, please see response to comment 18.33.
8.12	Modify footnote 1 of the Table 2 (formerly Table A) effluent limitations [in chapter III.B of the Ocean Plan]:	Please see response to comment 8.2.

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	"Table 2 effluent limitations apply only to publicly owned treatment works and industrial discharges for which Effluent Limitations Guidelines have not been established pursuant to sections 301, 302, 304, or 306 of the Federal Clean Water Act. Table 2 shall not apply to brine discharges from brackish groundwater treatment facilities that are commingled with treated wastewater prior to disposal to an outfall." This footnote would further clarify that the compliance point for Table 2 standards for brackish groundwater treatment facilities that commingle brine discharge prior to disposal with treated wastewater is at the outfall, and not at the facility, as discussed above.	
#9	**Timothy Hogan, Alden Research Laboratory, Inc.**	
9.1	Pg 44, Section 8.3.1 [of the Staff Report with SED]- "There are instances that occur where surface intakes have to be temporarily shut down because animals (e.g. sea jelly swarms) or other debris clog the intake and prevent source water from entering the facility." Though it's true that intakes experience episodic influxes of high debris loads, screens are typically adequate for managing debris. This text may overstate the problem and make intake operators seem passive. In actuality, intake operators continually assess the risk of intake blockages which may result in facility shutdowns and de-rates (each of which has substantial economic impacts and, therefore, incentive for preventing). It is important to understand that there is also a large body of work on the approaches and technologies for forecasting, preparing for, and mitigating anticipated debris events. Some references include: - Electric Power Research Institute. 2004. Circulating and Service Water Intake Screens and Debris Removal Equipment Maintenance Guide. EPRI, Palo Alto, CA: 2004. 1009672. - Electric Power Research Institute. 2009. Best Management Practices Manual for Preventing Cooling Water Intake Blockages. EPRI, Palo Alto, CA: 2009. 1020524.	Comment noted.

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	- World Association of Nuclear Operators (WANO). November 2007. Intake Cooling Water Blockage.Significant Operating Experience Report. WANO SOER 2007-2.	
9.2	Pg 45, Section 8.3.1 [of the Staff Report with SED]- "The natural filtration process of a subsurface intake eliminates the need for pretreatment requirements. (National Research Council 2008)" This statement reads too definitively and misrepresents the reference. To be clear, NRC 2008 states, "By taking advantage of the natural filtration provided by sediments, subsurface seawater intakes can *reduce* (emphasis added) the amount of total organic carbon and total suspended solids, thereby *reducing* (emphasis added) the pretreatment required for membrane-based desalination systems and lowering the associated operations and maintenance costs."	Language was added to the section 8.3.1 of the Staff Report with SED to clarify that in some cases, pretreatment will be required for water from subsurface intakes.
9.3	Pg 45, Section 8.3.1.1.2 [of the Staff Report with SED]- "Smaller organisms in the water column such as algae, plankton, fish larvae, and eggs, that pass through surface water intake screens are drawn into the facility and will perish when exposed to the high pressure and heat of a cooling water or desalination system." A couple of notes regarding this characterization of entrainment: It is uncommon for algae (micro or macro algae) to be included in the commonly accepted definition of entrainment. The Environmental Protection Agency's (EPA) recently released 316(b) Rule refers to entrainment as "any life stages of fish and shellfish in the intake water flow entering and passing through a cooling water intake structure and into a cooling water system, including the condenser or heat exchanger." Plankton is a general term which loosely refers to all animal and plant life that floats passively in the water column. As such, plankton includes both zooplankton (early life stages of fish and shellfish) and phytoplankton (plants).	Desalination requires different considerations than once-through cooling facilities because the intakes are regulated under different statutes. Desalination intakes at new or expanded facilities will be regulated under Water Code section 13142.5(b). Water Code section 13142.5(b) is different from CWA 316(b) in that it requires consideration of all forms or marine life, which includes species of marine algae. It is a common misconception that algae are plants and often people refer to phytoplankton and algae as plants. However, algae and plants are taxonomically distinct. There are only a few species of true marine plants in California. The majority of primary producers in the marine environment are phytoplankton and macroalgae, which play a similar critical role as plants do in terrestrial environments in that they convert and transfer energy from the sun to the marine environment. The term “plankton” does mean drifter and broadly refers to organisms that cannot swim against the currents. Plankton includes phytoplankton and zooplankton, which are also general terms that include more than just early life stages of fish, shellfish, and plants (e.g. non-shellfish invertebrates, algae, and salps). Historically, 316(b) entrainment studies have focused only on early life stages of fish and shellfish.

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9.4	Although it is commonly accepted that entrainment mortality for seawater desalination is 100%, it should be clarified that organisms entrained in water used for dilution purposes (flow augmentation) are not exposed to the same stressors as organisms entrained in the water that undergoes the desalination treatment process. That is, organisms entrained in the dilution flow are not likely to experience 100% mortality.	While this may be a logical assumption there are no data to support that organisms entrained in dilution flow for flow augmentation systems will not experience 100 percent mortality. The burden is on the owner or operator proposing to use a flow augmentation system to conduct studies to demonstrate if organisms survive the flow augmentation system and if so, the percent survival of all forms of marine life in the dilution water. Unless otherwise demonstrated to the satisfaction of the regional water board in consultation with the State Water Board, mortality of organisms entrained in the flow augmentation intake water is assumed to be 100 percent.
9.5	Pg 46, Section 8.3.1.1.2 [of the Staff Report with SED]- "Mortality of impinged and entrained organisms is generally assumed to be 100 percent in the absence of site-specific studies. (U.S. EPA 2004; Pankratz 2004)" Neither the U.S. EPA nor the Pankratz 2004 reference state that impingement mortality is assumed to be 100%. The survival of impinged organisms is commonly accepted and forms the basis of certain compliance alternatives relative to 316(b).	This was an oversight since impingement mortality is not assumed to be 100 percent. Language in the Staff Report with SED was changed to reflect that mortality associated with entrainment is assumed to be 100 percent.
9.6	Pg 46, Section 8.3.1.1.2 [of the Staff Report with SED]- "The entrainment estimate for cooling water intakes provides an example of the scale of entrainment that might occur if desalination efforts expand in California." This is hyperbole as the feedwater withdrawn by proposed seawater desalination facilities in CA is substantially less than seawater withdrawn for power plant cooling purposes. According to the 2007 California Energy Commission report "Assessing Power Plant Cooling Water Intake System Entrainment Impacts", the coastal power plants in CA potentially withdraw 17 billion gallons/day. A large seawater desalination facility may draw 100 million gallons/day (if assuming 50% recovery). Since entrainment is proportional to flow, the potential for the scale of entrainment from seawater desalination to reach that of cooling water withdrawals is very unlikely.	The language in section 8.3.1.1.2 in the Staff Report with SED was changed to reflect this comment.
9.7	Pg 46, Section 8.3.1.2.1 [of the Staff Report with SED]- "Additional mortality may occur through brine exposure in the mixing process and through predation in conveyance pipes." I am not aware of any data on	Data for marine life mortality that results from intake and conveyance of the marine life through flow augmentation systems are unavailable. Foster et al. (2013) preliminarily examined the impacts to marine life

Please note all tables and figures referenced are present at the end of this document

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	predation in flow conveyance pipes; I would request a reference for this.	from flow augmentation systems and listed factors that should be evaluated during an assessment of marine life mortality that occurs in flow augmentation systems. Surface water intakes have a tendency to foul with filter feeding marine organisms. These filter feeding organisms may establish themselves in the conveyance pipes of a flow augmentation system and prey on organisms in the dilution water. An owner or operator may periodically manually or chemically remove fouling organisms from the intake and water conveyance pipes to increase efficiency and consequently reduce the potential predation of larvae. An owner or operator may not specifically be required to examine predation in conveyance pipes, but they will need to compare the number of live organisms that enter the pipe to the number of organism that survive the flow augmentation system.
9.8	Pg 47, Section 8.3.1.2.3 [of the Staff Report with SED]- "Screened intakes can be placed in areas of high local currents and wave--induced water motion to transport marine debris and organisms off and away from the screens. (Kennedy/Jenks Consultants, 2011)" Screened intakes are installed everywhere, essentially, with installations onshore, in canals, in bays, in lagoons, etc. This should read "passive screened intakes" as ambient hydrodynamic conditions are key to optimal performance (biological and operational) for these types of screens. The consideration of ambient currents is an issue when considering passive intakes since there is no other means to move debris away from the screen; however, with active screens (e.g., traveling water screens) ambient currents are less of a concern since the screen is designed to collect and remove debris. In addition, Alden co-authored the intake-related portion of the referenced report, specifically the section on the passive screened intake being considered for the SCWD2 project.	Clarifying language was added to section 8.3.1.2.3 of the Staff Report with SED.
9.9	Pg 47, Section 8.3.1.2.3 [of the Staff Report with SED]- "Studies suggest that the type of screen, size of the screen slot opening, and the method of intake are all factors that influence reductions of marine life mortality." It's important to note that there are a number of other factors that influence the biological performance of intake screens. These can include intake	Each of these factors and how they relate to intake mortality is described in detail in section 8.3.1.2 of the Staff Report with SED with the exception of predicted debris loads. Debris loads may have an impact on efficiency for a facility to withdraw source water, but the connection between higher debris loads and lower intake and mortality

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	location, intake velocities (approach and through-screen), ambient currents, predicted debris loads, life stages and species composition present near the intake location, etc.	of marine life are not well established in the scientific literature.
9.10	Pg 47, Section 8.3.1.2.3 [of the Staff Report with SED]- "Passive intake screens are not self-cleaning and require manual cleaning either by divers or by retrieving the screen tor cleaning and maintenance." The paragraph beginning with the previous sentence is poorly structured. Essentially all passive screen manufacturers include features to allow cleaning of screens without the regular need for divers to do manual cleaning. Passive wedgewire screens (such as those made by Bilfinger Water Technologies [formerly US Filter/Johnson Screens] and Hendrick Screen Company) are typically equipped with airburst systems to deliver a high pressure burst of compressed air to the screens to clear it of any accumulated debris. Other manufacturers (such as Intake Screens, Inc) offer passive screens with rotating drums and fixed brushes to clean the screens. In cases where the installation location of far offshore, there can be a need for divers and manual cleaning.	The Staff Report with SED distinguishes between passive and active screening technology. Passive by definition means "without an active response" and in the context of screens, refers to screens that do not have self-cleaning mechanisms such as brushes. The screens with rotating drums and fixed brushes to clean the screens are considered active screens. The paragraph on passive intake screens clearly states, "To reduce or eliminate manual cleaning and maintenance requirements, screens can be equipped with manual *air burst cleaning systems* [emphasis added] or brushes to periodically clean the screens."
9.11	Pg 48, Section 8.3.1.2.3 [of the Staff Report with SED]- "Coarse bar screens, floating booms, and angled coarse screens" This section is poorly organized. In general, water enters a shoreline intake through a trash rack (also referred to as a bar rack). This first structure in the flow path is typically coarsely-spaced vertical bars designed primarily to exclude debris. The trash rack is equipped with a cleaning mechanism, typically a trash rake, to keep it clean. I'm not aware of any intakes using clear spacing as low as 2 mm as this would constitute a serious risk of becoming overloaded with debris. Though used at some intakes, floating booms are not used commonly enough to warrant discussion in this section "Angled coarse screens" are not the same as trash racks. Angled screens are used, in some cases, to divert organisms to a collection point (within the intake, not "away from the intake" as stated) where they can be returned to the source waterbody.	The language was revised in section 8.3.1.2.3 of the Staff Report with SED to include this information.
9.12	Pg 48, Section 8.3.1.2.3 [of the Staff Report with SED]- "Traveling screens have been shown to substantially reduce impingement mortality. (U.S. EPA 2011) Impingement data from Dominion Power's Surry Station	Language was updated in section 8.3.1.2.3 of the Staff Report with SED to reflect that only modified traveling screens have the ability to reduce fish impingement mortality. The fact that traveling screens and

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	was collected during the 1970s." It's important to note that only "modified" traveling water screens provide fish-friendly features that can reduce impingement mortality; conventional traveling water screens do not have these features (fish lifting buckets, low pressure spraywash system, fish return trough, etc.) It's unclear why Dominion Station is called out, there is a plethora of data available on impingement survival on modified traveling water screens throughout the U.S.	modified traveling screens have been used in many applications and at many facilities is helpful. The Dominion Power was specifically mentioned because data were readily available and was used as an example for other facilities using similar systems without having to provide an exhaustive list of data from each facility.
9.13	Pg 48, Section 8.3.1.2.3 [of the Staff Report with SED]- "Fine-meshed screens "Very few would agree that fine-mesh includes sizes up to 9.5 mm. Screens with 9.5 mm openings are generally considered to be coarse-mesh and have been the industry standard for traveling water screens at cooling water intakes in the power industry. In the recently released final 316(b) Rule (particularly in the discussion of the Comprehensive Technical Feasibility and Cost Evaluation Study [§ 122.21(r)(10)]), EPA states, "The study must include an evaluation of technical feasibility of closed-cycle cooling and fine-mesh screens with a mesh size of 2 mm or smaller..." In this sense, fine-mesh as it relates to 316(b) compliance must be 2 mm or smaller.	The language in section 8.3.1.2.3 of the Staff Report with SED was updated.
9.14	Pg 48, Section 8.3.1.2.3 [of the Staff Report with SED]- "While fine-meshed screens can reduce entrainment of adult and juvenile fish, they still allow phytoplankton, zooplankton, eggs, and fish and invertebrate larvae to pass through." The life stages of fish that are precluded from entrainment depends wholly upon the screening mesh size and morphometric dimensions of the species present; it is not accurate to state that these screens only reduce entrainment of adult and juvenile fish. Meshes of 0.5, 1.0, and 2.0 mm can reduce entrainment of many fish larvae and eggs.	Language was changed to, *"While fine-meshed screens are primarily effective at reducing entrainment of adult and juvenile fish, they still allow all phytoplankton and zooplankton, and the majority of eggs, and fish and invertebrate larvae to pass through. Efficacy of fine-meshed screens is highly dependent on species and life stage."* Some fine-mesh screens are capable of excluding some eggs and fish and invertebrate larvae, but the data are highly species- and life stage-specific. For example, the Bureau of Reclamation (2007) reported no significant reduction in entrainment using a 0.6 mm slot size screen for gizzard shad eggs and larvae. However, the same study reported 100 percent reduction in entrainment of fathead minnow eggs, smallmouth bass larvae, and blue catfish eggs and larvae using the same screen slot size. Table D in Appendix D of the Staff Report with

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		SED provides additional entrainment data and exemplifies the point that entrainment data are highly species and life-stage specific. Staff changed the language in the Staff report to acknowledge that some eggs and fish and invertebrate larvae may benefit from a small screen slot sizes, but that the majority are entrained.
9.15	Pg 48, Section 8.3.1.2.3 [of the Staff Report with SED]- "Wedgewire screens are passive screening systems that act as a physical barrier to prevent organisms from being entrained. The screen slot size must be sufficiently small to physically block passage of an organism in order for wedgewire screens to effectively prevent entrainment. (EPRI 1999)" This statement is true - that exclusion technologies, such as cylindrical wedgewire screens, function on the basis that organisms need to be physically large enough to excluded by the screen. However, recent (and some historical) research has demonstrated that larval exclusion is not solely a physical phenomenon; rather, there are hydrodynamic and behavioral components that increase the biological performance of cylindrical wedgewire screens.	The language in section 8.3.1.2.3 of the Staff Report with SED was updated to clarify the additional conditions that make wedgewire screens effective at reducing impingement and entrainment. The references provided by AldenLabs (See response to comment 9.20) were reviewed and are now included in the Staff Report with SED.
9.16	Pg 49, Section 8.3.1.2.3 [of the Staff Report with SED]- "The only pilot study that has implemented wedgewire screens on an intake is at West Basin Municipal Water District's (WBMWD) pilot desalination facility." This is incorrect. In CA alone, there have been multiple pilot-scale studies of cylindrical wedgewire screens; they are listed below: - Marin Municipal Water District - tested a 2.4-mm (3/32-in) cylindrical wedgewire screen - Santa Cruz and Soquel Creek - tested a 2.0-mm cylindrical wedgewire screen - West Basin Municipal Water District - currently testing 1.0- and 2.0-mm cylindrical wedgewire screen In addition to these CA desalination-related pilot-scale studies, the following describes previous pilot--scale studies that have been conducted with cylindrical wedgewire screens: Weisberg et al. (1987) conducted a field evaluation of cylindrical	Comment noted. The Staff Report with SED was updated to correct the statement that West Basin Municipal Water District was the only facility to implement wedgewire screens on its pilot facility intake.

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	wedgewire screens (1, 2, and 3 mm) in the Chalk Point Generating Station intake canal in Maryland. The results demonstrated that exclusion was influenced not only by the size of organisms, but also by hydrodynamics, particularly since not all fish small enough to be entrained were always entrained. The biological efficacy of the screens was reported as a reduction in entrainment over an open port. The authors concluded that the entrainment of larger larvae was regularly reduced by 80% over the open port and by 90% over the ambient densities of larvae in the canal. Browne (1997) conducted a field evaluation of cylindrical wedgewire screens (1, 2, and 3 mm) from a floating facility at the Oyster Creek Generating Station on Barnegat Bay in New Jersey. The researchers concluded that the air backwashing feature functioned well in keeping the screens free of debris and that the screens constructed of metals with higher copper contents had the lowest amount of biofouling. Too few organisms were collected in entrainment samples to draw significant conclusions about the biological performance of the screen, though the authors pointed out that fewer fish were entrained through the 1-mm screen than the 2-mm screen or the open port and that those that were entrained through the 1-mm screen were generally smaller. Impingement was negligible. Lifton (1979) conducted a similar evaluation of 1- and 2-mm cylindrical wedgewire screens on the St. John's River in Florida. The data indicated that there was no significant difference in entrainment between the 1- and 2-mm screens. Sixty-five percent of the time, the screened intakes entrained at least 50% fewer organisms. Gulvas and Zeitoun (1979) evaluated entrainment through pilot-scale cylindrical wedgewire screens (2 and 9.5 mm) in Lake Michigan. The results indicated that entrainment densities were much lower than ambient densities of larvae and that no significant differences were seen in entrainment among either screen or the open pipe (control). In addition, no fish were impinged on the screens. EPRI (2005, 2006) completed a comprehensive pilot-scale field evaluation of the exclusion efficiency of 0.5- and 1.0-mm cylindrical wedgewire screens in three different water bodies (ocean, estuarine, and freshwater). The results indicate that 0.5 and 1.0 mm wedgewire screens can effectively exclude eggs and larvae at through-screen velocities of 0.5 and 1.0 ft/sec.	

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	I am also aware of a pilot-scale entrainment study that evaluated biological effectiveness of a 2.0-mm cylindrical wedgewire screen in the Hudson River as part of the evaluation for United Water's Haverstraw Water Supply Project. The citation for Tenera 2013b is also not germane to WBMWD's desalination pilot facility. It is related to the proposed design of a cylindrical wedgewire intake for the Diablo Canyon Power Plant.	
9.17	Pg 49, Section 8.3.1.2.3 [of the Staff Report with SED] - "Another issue in the marine environment is fouling marine organisms. The fouling organisms may impede the structural integrity of the screens or prevent adequate intake flow. Z--alloy screens were found to be the most effective at preventing corrosion or fouling in a one- year study. (Tenera Environmental 2013b)' This text may understate the magnitude of the O&M risk posed by narrow-slot cylindrical wedgewire screens. There is a much larger volume of work on the topic of wedgewire screens and fouling control. Two relevant studies that address biofouling on narrow-slot wedgewire screens in a marine environment are described below: - McGroddy, Peter M., Steven Petrich, and Lory Larson. 1981. Fouling and Clogging Evaluation of Fine-Mesh Screens for Offshore Intakes in the Marine Environment. In: Advanced Intake Technology for Power Plant Cooling Water Systems. Proceedings of the Workshop on Advanced Intake Technology. April 22-24, 1981. A study was conducted at the Redondo Beach Generating Station to assess fouling and clogging of fine-mesh screens (McGroddy et.al. 1981). This study was done in two parts; the first part looked at debris clogging and the second investigated the propensity of different materials to fouling. The debris study was conducted in a small, test tank using an 18 in diameter wedgewire screen. Based on the flow characteristics of this screen, Alden estimates that it had 1.0 mm slot openings. Flow for this tank was provided from behind the existing traveling screens. To provide	Information from McGroddy et al. (1981), Wiersema et al. (1979), and scwd2 was added to the Staff Report with SED to better characterize operational and maintenance challenges posed by narrow-slot cylindrical wedgewire screens.

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	a cross current an air circulation bubbler was used. This bubbler provided a cross current of between 6 and 9 cm/sec (0.2 and 0.3 ft/sec). Debris obtained from the intake waters was added and the head-loss measured. The results of this study indicated that the screens are prone to fouling and that multiple air-bursts are needed to completely clean the screens. The cleaning is also most effective when the screen is less than 50% blocked, which could require the screens to be air-burst daily or more frequently during high debris loading periods. Additionally, they note that re-impingement of debris on the screens occurs at low cross-screen velocities. The second stage of the McGroddy et al. 1981 study compared the rate of biofouling of several potential screening materials. Small material coupons were placed on the intakes for several weeks. The percent covered and head-loss through the material was measured. The materials tested included carbon steel, epoxy-coated steel, copper, and stainless steel. The mesh size of these materials varied from 0.7 mm to 2 mm. Some of these coupons were also subject to a heat treatment to determine the effectiveness of the heat treatment on controlling bio-fouling. The results showed that stainless steel was the least prone to bio-fouling of all the materials. However, the stainless steel coupons all had larger mesh openings than the other screen types. In addition, there appears to be inconsistencies between the percent covered and headloss through identical meshes. The results of the heat treatment tests indicate that the heat treatment kills attached organisms, but does not remove their shells and that the screens are quickly re-colonized. - Wiersema, James M., Dorothy Hogg, and Lowell J Eck. 1979. Biofouling Studies in Galveston Bay-Biological Aspects. In: Passive Intake Screen Workshop. December 4-5,1979. Chicago, IL The second relevant study was conducted in Galveston Bay, Texas (Wiersema et al. 1979). This study compared the rates of fouling for several small wedgewire screens. All the test screens were 9.5 inches in diameter with 2.0 mm slot openings. The only difference between the	

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	screens were their construction materials; one was stainless steel, two were copper-nickel alloys (CDA 706 and CDA 715), and one was a silicon-bronze-manganese alloy (CDA 655). These screens were mounted to a test apparatus that contained pumps and flow meters to measure the flow through each screen during the test period. The total duration of the test was 145 days. The results indicate that the copper alloys significantly reduce bio-fouling of the screens. At the conclusion of the test period the copper alloy screens remained at least 50% open. The stainless steel screen fouled very quickly and was completely clogged after 2 weeks. In general, the progression of bio-fouling agents was similar for all the screens. First a slime layer formed over the screens which trapped sediments and provided a base for further colonization. After about 4 weeks hydroids began to colonize the screens. The hydroids were the dominant bio-fouling organism until tube-building amphipods appeared. The amphipods were only able to establish themselves on the portions of the screen with significant hydroid cover. This is assumed to be a result of the hydroids providing a buffer between the screens and the amphipods. Throughout the test period there was a small amount of colonization by bryozoans and loosely attached barnacles. While this study did not include an air backwash, the researchers postulated that an air-burst could be used to break up the slime layer thus retarding the growth of other bio-fouling agents. To date, there have been no studies to determine if an air backwash would effectively remove the slime layer. In addition to these two studies, the SCWD2 pilot-scale cylindrical wedgewire study included investigations of biofouling potential of various screen materials (City of Santa Cruz Water Department & Soquel Creek Water District SCWD2 Desalination Program: Open Ocean Intake Study Effects. ESLO2010-017.1. http://www.scwd2desal.org/documents/Draft_EIR/Appendices/Appendix G.pdf.) It is important to note, however, that this study was limited to the evaluation of screen material coupons and to periodic visual observations of the pilot-scale screen that was intermittently operated for the biological	

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	evaluation. It likely does not accurately reflect the magnitude of biofouling that would be expected with a screen through which flow is being continually withdrawn for a full-scale facility.	
9.18	Pg 49, Section 8.3.1.2.3 [of the Staff Report with SED]- "It is imperative that the wedgewire screens are maintained so slot-size integrity is maintained, through-screen velocity does not exceed 0.5 ft/s (0.15 m/s), and the facility still has adequate intake flow." As a rule of thumb, it is common to assume a degree of blockage in the design a wedgewire screen array. EPA, in the proposed 316(b) Rule, indicated that the 0.5-ft/sec through screen velocity should be under a 15% blocked condition. Therefore, it is common to target approximately 0.43 ft/sec through screen velocity.	Language was added to section 8.3.1.2.3 of the Staff Report with SED regarding intake velocity and the 316(b) rule.
9.19	Pg 49, Section 8.3.1.2.3 [of the Staff Report with SED]- "However, other studies have shown that a small screen slot size does not by itself result in significant clogging or cleaning problems. (Taft 2000)" The referenced paper was written by Alden's former president and inaccurately characterizes the conclusion. The paper states the following about narrow-slot wedgewire screens: "However, there are major concerns with clogging potential and biogrowth. Since the only two large CWIS to employ wedge-wire screens to date use 6.4 and 10 mm slot openings, the potential for clogging and fouling that would exist with slot sizes as small as 0.5 mm, as would be required for protection of many entrainable life stages, is unknown. In general, consideration of wedge-wire screens with small slot dimensions for CWIS application should include in situ prototype scale studies to determine potential biological effectiveness and identify the ability to control clogging and fouling in a way that does not impact station operation."	Language in the Staff Report with SED was updated to accurately reflect the conclusions in Taft 2000. Additional information was included regarding recent biofouling data from West Basin Municipal Water District that showed no significant clogging or biofouling of 1.0 mm slot size screens that were deployed in ocean waters off of Redondo Beach, CA for 18 months.
9.20	Pg 49, Section 8.3.1.2.3 [of the Staff Report with SED]- "Importance of Screen Slot Size." The majority of the references cited in this section are secondary sources. It does not appear that the SWRCB staff reviewed the original work for each of the studies and sites that are included in this section.	In some instances, access to a hardcopy or electronic copy of the primary sources was not possible. Some of the primary sources were inaccessible to staff. The secondary sources contained enough information to illustrate the main point. The proposed Desalination Amendment solicited public comments on additional information on screen slot sizes. The issue was also raised during the Public Workshop on August 6th and at the Public Hearing on August 19th.

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		After the close of the public comment period, staff followed up on this comment and other comments regarding screen slot size references with an email to the commenter. The commenter provided additional reference material. McLaren and Tuttle 2000 was not attached in the email as stated; however, Thompson 2000 discussing intake modification to reduce entrainment and impingement at the Brunswick power plant in North Carolina was attached. The references provided by Mr. Holden were incorporated into the Staff Report with SED as appropriate.
9.21	Pg 49, Section 8.3.1.2.3 [of the Staff Report with SED]- "Tampa Bay seawater desalination plant" It is important to note that the co--located desalination plant draws feedwater (approximately 50 MGD) from Big Bend Station's heated effluent (i.e., after it has already been screened and passed through the power plant cooling system). As such, it is the cooling water intake system of the power plant (flow capacity of 1.4 billion gallons/day) that makes use of the 0.5-mm traveling water screens. The 0.5-mm screens are only used seasonally between March 15 and October 15 and only in the intake for Units 3 and 4 (the intake for Units 1and 2 is equipped with 9.5-mm dual-flow traveling water screens). Low-pressure and high-pressure screen wash pumps provide wash water to the spray nozzle supply headers. Aquatic organisms and debris are rinsed from the fine-mesh screens, collected in a common trough, and routed to a screened sump. The sump incorporates a trash basket to facilitate removal of debris. Three Hidrostal pumps discharge rinsed organisms and debris into one of two 18-inch fiberglass organism return lines. The organism return system is approximately 0.75 miles long and discharges into a natural embayment south of the station discharge canal. The fine-mesh traveling water screens at Big Bend were considered to be very successful. They were sufficient, in the view of the EPA and the Florida Department of Environmental Regulation, for reducing entrainment at the CWIS for Units 3 and 4. In addition, studies at full-scale installation indicate that the survival of impinged organisms on the fine-mesh screens were comparable to, and in some cases higher than, those achieved during the prototype study. However, the survival of	The purpose of the 8.3.1.2.3, Importance of Screen Slot Size section is to provide entrainment reduction data from studies that have looked at the use of various screen slot sizes. The Tampa Bay facility did experience an 80 percent reduction in impingement and entrainment of fish eggs and larvae. Clarifying notes have been added to reflect that the Tampa Bay facility uses the 0.5 mm traveling screens seasonally and only for Units 3 and 4.

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	some fragile species/life stages was lower (e.g., bay anchovy). As part of the evaluation of the fine-mesh screens, an auditing program was established to monitor the conditions of the screens and optimize their screening efficiency. The biggest O&M problem at this site was biofouling (particularly barnacles and mussels). It was found that biweekly manual cleaning of the screens by a two-person crew was effective in preventing damage to the screen mesh and seals. Later studies at Big Bend focused on optimizing the screening.	
9.22	Pg 49, Section 8.3.1.2.3 [of the Staff Report with SED]- Reference to Robert Pagano is outdated (1976); many newer references with better information are available. In addition, "traveling screens" is a general category that includes, among many other designs, the single-entry, double-exit center-flow design at Barney Davis.	As stated in response to comment 9.20, staff followed up on this comment with an email requesting the references from the commenter and the commenter provided references with additional information on traveling screens (Bureggemeyer et al. 1987; Thompson 2000; Hogath and Nichols 1981). The provided references were reviewed and added the appropriate information to section 8.3.1.2.3 of the Staff Report with SED.
9.23	Pg 49, Section 8.3.1.2.3 [of the Staff Report with SED] - "The Tennessee Valley Authority pilot studies showed reductions in striped bass larvae entrainment of up to 99 percent using 0.5 mm screens." The TVA studies were conducted in a laboratory with hatchery-reared striped bass; they were not pilot-scale studies as indicated.	Language was added in section 8.3.1.2.3 of the Staff Report with SED to reflect that the study was completed in a laboratory setting with hatchery-reared fish.
9.24	Pg 50, Section 8.3.1.2.3 [of the Staff Report with SED]- "0.5 mm fine mesh screen at the Brunswick seawater cooling Power Plant in North Carolina showed entrainment reductions of 84 percent. Similar results were shown at the Chalk Point Generating Station in Maryland, which also uses seawater for cooling, and the Kintigh Generating Station in New Jersey. (Tetra Tech Inc. 2002)" Regarding Brunswick, the screens were 1.0-mm mesh and only 3 of the 4 traveling water screens had this mesh size; the fourth screen had standard 9.5-mm mesh. The design of this intake is also fairly unique and likely confers a substantial benefit in terms of managing debris. The intake is comprised of a stationary diversion structure located at the mouth of the intake canal in the river, a traveling water screen structure at the end of the intake canal, and a fish return system. The diversion structure is a stationary, V-shaped screen	Clarifying language was added to the Staff Report with SED that the 0.5 mm mesh screens were tested and used for limited periods of time on two of the four intakes at the Brunswick facility. Additional language was included to clarify the "similar results" were from a pilot study. The statement in the Staff Report with SED that, "Similar results were shown at pilot studies at the Chalk Point Generating Station in Maryland, which also uses seawater for cooling, and the Kintigh Generating Station in New Jersey." Is from the Tetra Tech 2002 report that states, "In periods of limited use or study, fine mesh on two of four screens at the Brunswick Power Plant in North Carolina showed 84 percent reduction in entrainment as compared to conventional screens, while similar results were seen in pilot studies at the Chalk Point Generating Station in Maryland and at the Kintigh Generating Station in New Jersey."

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	comprised of 9.4-mm copper- nickel mesh panels. The V-shape was chosen to aid in the sweeping of debris from the screen face during ebb and flood tides. As such, the traveling water screens at the end of the 2.7-mile long intake canal likely experience lighter debris loads than if the screens were adjacent to the estuary. Regarding Chalk Point, this intake does not have 0.5-mm traveling water screens. They use a double barrier net at the head of an intake canal. The outside mesh is 1.5 in and the inside mesh is 0.75 inch. The traveling water screens at the terminus of the intake canal use 9.5-mm mesh screening. I assume SWRCB staff is referring to the pilot-scale study done in the Chalk Point intake canal with 1.0, 2.0, and 3.0-mm wedgewire screens (Weisburg, S. B., W. H. Burton, F. Jacobs, and E. A. Ross. 1987. Reductions in Ichthyoplankton Entrainment with Fine-Mesh, Wedge Wire Screens. North American Journal of Fisheries Management 7: 386-393.). Regarding Kintigh, this facility is located on Lake Ontario not in New Jersey. It too, uses 1.0-mm mesh, not 0.5-mm.	The intent of this section in the Staff Report and SED is to provide entrainment data for facilities that have tested screens with small slot or mesh sizes. Staff recognizes there may be operational challenges with small slot size screens for facilities like once-through cooling facilities that require large volumes of intake water. However, since desalination facilities will not be pulling in as much water at OTC facilities, the operational challenges are reduced. Staff also recognizes there may be operational challenges with 0.5 mm slot size screens at desalination facilities; however, based on existing literature and emerging data from WBMWD, desalination facilities should be able to function adequately using 1.0 mm slot size screens.
9.25	Pg 50, Section 8.3.1.2.3 [of the Staff Report with SED]- "Bestgen et al. 2001" The referenced study is a laboratory evaluation of a Coanda-effect screen. I am not aware of any seawater intakes using this type of screen; it is typically applied at hydroelectric projects, stormwater outfalls, agricultural diversions, etc. It is essentially a high velocity inclined profile-wire screen and has a fundamentally different hydraulic design. The following description is from the peer-reviewed paper describing the lab study: "High velocity profile-bar fish screens differ from traditional positive barrier configurations. Most barrier screen designs couple low approach velocities (velocity through the screen) with high sweeping velocities (across screen) to effect screening.....In contrast, inclined profile-bar screens have water delivered to the top of the screen via an overflow weir, which then flows over the screen face at a high 2-3-m/s velocity..... Thus, unlike traditional screens, fish behavior and swimming performance and approach and sweeping velocities are not design considerations for high-velocity inclined profile-bar screens." Including a review of this intake type is immaterial as it is an inappropriate technology for a seawater intake.	The paragraph referencing the study was removed from the Staff Report with SED.

Please note all tables and figures referenced are present at the end of this document

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9.26	Pg 50, Section 8.3.1.2.3 [of the Staff Report with SED]- "Laterally compressed fish like anchovies and flatfish typically will have higher entrainment rates than fish like sculpins or rockfishes of the same length because the anchovies and flatfish have smaller head capsule dimensions." Flatfish are not laterally compressed, they are dorsoventrally compressed.	Although it may seem like flatfish are dorsoventrally compressed, flatfish in the Order Pleuronectiformes are laterally compressed. Larval flatfish are laterally compressed and oriented as so in the water column. As flatfish undergo metamorphosis, one of their eyes will migrate to the other side of their body while the rest of the anatomy remains relatively in the same place. After metamorphosis, the flatfish settle to the benthic environment with the side with no eyes oriented down and the side with the eyes facing up. For example, the English sole, *Pleuronectes (Parophrys) vetulus*, is a right-eyed flatfish where the eye on the left side of the body migrates to the right side of the body during metamorphosis. The two eyes end up on the right side of the body, and the left side of the body is in contact with the benthic environment. Therefore, if the juveniles and adults appear to be dorsoventrally compressed, they are in fact laterally compressed. This video shows a side view of the flatfish metamorphosis process with eye migration: http://youtu.be/qePwW44HhNg, and this video is a frontal view of flatfish eye migration: http://youtu.be/mESrj3ZvSzA.
9.27	Pg 50, Section 8.3.1.2.3 [of the Staff Report with SED]- "Another study performed at the facility demonstrated that almost 100 percent of larvae over 10 mm were excluded from entrainment by a 1 mm wedgewire screen (EPRI 2003)" The EPRI 2003 study was conducted in a laboratory flume at Alden, not in the Chalk Point intake canal in Maryland where the Weisberg et al. study was done.	Language was updated in section 8.3.1.2.3 of the Staff Report with SED to reflect the study was done at AldenLabs.
9.28	Pg 50, Section 8.3.1.2.3 [of the Staff Report with SED] - "Screens with 1 mm slot size reduced entrainment of larvae with large head capsules, but did not reduce entrainment of eggs smaller than 2.3 mm in diameter. (EPRI 2005)." This is incorrectly cited. The SWRCB staff should have cited Hanson 1979 which was a lab, not a field, study.	The citation was changed to reflect the study was done by Hanson (1979).
9.29	Pg 50-51, Section 8.3.1.2.3 [of the Staff Report with SED] - "Entrainment and impingement were evaluated for 1 mm and 2 mm wedgewire screens on intakes at the Seminole Generating Station in Florida. The study showed there was virtually no impingement of organisms after screens were installed, and that larvae entrainment was reduced by 99 and 62	The reference Lifton 1979 was updated in the Staff Report with SED and corrected the information in the citation.

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	percent for the 1 mm and 2 mm screens, respectively, when compared to larger (9.5 mm) screen systems. (EPRI 1999)" This is incorrectly cited. The paper that should be referenced for this study is: Lifton, W. 1979. Biological Aspects of Screen Testing on the St. Johns River, Palatka, Florida. Prepared for Passive Intake Screen Workshop, Chicago, IL, December,1979. Furthermore, the results described here differ from those in the paper. Namely, Lifton concluded that "the 1-mm and 2-mm screens offered reductions of 66 and 62 percent of the unscreened (open pipe) intake entrainments, respectively. There were no statistically significant differences between the 1- and 2-mm screens in terms of densities of fish entrained. Nine (or 75 percent) of the entrainment collections through the 1- and 2-mm screens represented reductions of at least 50 percent over entrainments through the unscreened intake, and 10 (or 83.3 percent) of the 12 collections showed reductions of more than 30 percent."	
9.30	Pg 51, Section 8.3.1.2.3 [of the Staff Report with SED]- "Tenera 2013a" Relative to this reference, it is important to note that the theoretical reductions in entrainment calculated are based solely on physical dimensions of larvae and do not incorporate any benefits conferred by hydrodynamics and fish behavior (e.g., many later larval stages possess the ability to swim - something not accounted for in these estimates of exclusion). As such, the predictions are conservative and, in the field, a wedgewire screen will likely provide greater protection than that which can be estimated based on physical dimensions.	Language was added to section 8.3.1.2.3 of the staff Report with SED to clarify that the Tenera 2013a data may represent conservative estimates.
9.31	Pg 52, Section 8.3.1.2.3 [of the Staff Report with SED] - "The general estimates tor slot size......" This paragraph states the very well accepted concept that entrainment is site- and species-specific. Given that the SWRCB staff recognizes this in the Draft Staff Report, it should [not?] follow that a one-size-fits-all prescription for a certain screen mesh size for all intakes may not be appropriate.	The proposed Desalination Amendment is designed to allow for alternative screening technologies that are equally protective as the screen slot size the State Water Board ends up selecting. Setting a standard for screen slot size is important for statewide consistency and for setting a minimum level of protection. In terms of protection of marine life, smaller screen slot sizes are better. The State Water Board will select a standard screen slot size that maximizes protection of marine life while at the same time taking into consideration operational constraints of the small screen slot sizes. As mentioned in previous comments, entrainment is highly species and

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		life-stage specific. Tenera Environmental (2013a) modeled entrainment of a variety of fish species using screens with slot sizes of 0.75, 1, 2, 3, 4, and 6 mm. Below is Table 9 from the Tenera report, Table 9.31-1 in the list of Tables and Figures below. The table shows entrainment reduction ranges from 34.1 for flatfishes to 72.0 for kelpfishes when using a 0.75mm slot size screen. These numbers drop to 17.7 and 63.0 for flatfishes and kelpfishes respectively when using a 1 mm slot size screen and then even further to 0.2 and 21.8 percent reduction when using a 2 mm slot size screen. Based on Table 9.31-1, screens with slot sizes larger than 2.0 mm will not adequately protect marine life. Table 9.31-1 also shows there is a significant reduction in mortality for some species between the 0.75 mm and 1 mm slot sizes. It is important for the State Water Board to establish a standard screen slot size of no greater than 1.0 mm to ensure the protection of the beneficial uses of ocean waters.
9.32	Pg 52, Section 8.3.1.2.3 [of the Staff Report with SED] - "Additionally, even though wedgewire screens can reduce impingement mortality and entrainment loss of juvenile and adult fish, intake-related mortality will be site and species-specific." It is commonly accepted that impingement is essentially eliminated by a wedgewire screen designed for 0.5 ft/sec. The statement of impingement mortality being reduced is immaterial if it has been determined that impingement is essentially eliminated.	Language was updated to reflect that impingement can essentially be eliminated when using cylindrical wedgewire screens with a 0.5 ft/s through-screen velocity.
9.33	Pg 52, Section 8.3.1.2.3 [of the Staff Report with SED] - "scwd2 2010 and Tenera Environmental 2012" I cannot find the full citation for either of these references.	The scwd2 2010 citation was updated to the correct citation: Kennedy/Jenks Consultants. 2011. The Tenera 2012 citation was the date of the draft version of the report was updated to the final draft version, 2013a.
9.34	Pg 52, Section 8.3.1.2.3 [of the Staff Report with SED] - "The portion of organisms that are not entrained because of the wedqewire screen is relatively small compared to the number of organisms in the water. (Foster et al. 2012) Consequently, there is only an approximate one percent reduction in entrainment mortality between screened and unscreened intakes. (Foster et al. 2013)" It is important to note that although there are smaller organisms in the water column, designing screening systems to keep them out is impractical - mesh sizes can only	It is impractical to design surface intake screens to prevent entrainment of all forms of marine life. Even with screen slot sizes between 0.5 mm and 1.0 mm, there will still be entrainment of marine organisms. This is why subsurface intakes are the preferred technology. Subsurface intakes do not impinge or entrain marine life. Since subsurface intakes will not be feasible in all cases, screened surface water intakes will be considered; however, the screens should minimize intake and mortality of marine life to the maximum extent feasible.

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	get so small before head losses are so high as to render any intake infeasible from a design perspective. Raising the question of which species should be included in "entrainment" may be valid; though, being able to calculate the value of these species will be difficult. This is the first I've heard of other components of the plankton being included with "entrainables". Furthermore, if Foster et al (2013) concluded that a 1% reduction in entrainment is the maximum that can be expected for wedgewire intakes, it requires some explanation about which organisms are being included and which mesh size is being used.	WBMWD stated at the August 6th public workshop and at the August 19th public hearing that its preliminary studies on screen slot size have shown that 1.0 mm screens did not cause a significant reduction in intake capacity after being deployed in the marine environment for 18 months with no cleaning. WBMWD did express concerns about being able to maintain intake flow capacity with screens with smaller than 1.0 mm slot sizes. The amendment has been revised to require screens of 1.0 mm as a result of potential impacts to facility operations that could occur with smaller screens. Past entrainment studies, particularly those for CWA 316(b), have looked at fish and some species of meroplankton (typically shellfish species), but have not typically considered phytoplankton, zooplankton, or non-shellfish invertebrate larvae. This may be in part because it is assumed 100 percent of the plankton is entrained. Desalination intakes for new or expanded facilities will be regulated under Water Code section 13142.5(b) that requires consideration of all forms of marine life (please see responses to comments 6.7 and 6.8). The proposed Desalination Amendment does not require an owner or operator to count or calculate entrainment of all species at a facility's intake. The proposed Desalination Amendment requires an owner or operator to use the ETM/APF method to assess intake entrainment mortality for select species 300 microns and larger. The 300 micron size cutoff is based on current industry identification capabilities of marine life. (MBC 2014) The ETM/APF model provides mitigation for the species used in the analysis as well as the species not sampled in the analysis, including small planktonic organisms. Based on the information in Foster et al. (2013) and the Expert Panel Presentations at September 23, 2013 public workshop, the conclusion that there is a one percent reduction in entrainment is based on using 1 to 2 mm slot size screens and an evaluation of all forms of marine life.
9.35	Pg 52, Section 8.3.1.2.3 [of the Staff Report with SED] - "Other passive and active screens" Regarding the active intake screens - all of the types	Comment noted.

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	mentioned are considered modified traveling water screens, they simply represent different vendor-specific designs.	
9.36	Pg 53, Section 8.3.1.2.4 [of the Staff Report with SED] - "Velocity Caps" The description of how a velocity cap is designed to function is wrong. Intake velocities created at the entrance to the velocity cap need to be high enough for fish to sense and avoid; 0.5 ft/sec is not high enough to elicit an avoidance response. Velocity caps in southern California were originally designed with entrance velocities between 2 and 3.5 ft/sec (Weight, R.H. 1958. Ocean Cooling Water System for 800 MW Power Station. Journal of the Power Division of the American Society of Civil Engineers. Paper 1888.). Often, a velocity cap is designed with a series of coarse bars arranged in a vertical orientation around the opening of the cap. These bars act as a very coarse mesh trash rack in addition to providing stability to the cap itself. In southern California, the new OTC policy requires bars spaced at no greater than 9 inches to prevent entrapment of large organisms (e.g., seals, sea lions, and sea turtles). EPA provided a recent clarification regarding velocity caps in Federal Register/Vol. 77, No. 112, Monday, June 11, 2012/Proposed Rules, page 34320: "EPA is aware that low intake velocity is sometimes confused with velocity cap technologies, and EPA would like to clarify that these concepts are not the same. Most velocity caps do not operate as a fish diversion technology at low velocities, and in fact are often designed for an intake velocity exceeding one foot per second. Thus a velocity cap will not typically meet the low intake velocity impingement mortality limitation. The velocity cap is located offshore and under the water's surface, and uses the intake velocity to create variations in horizontal flow which are recognizable by fish. The change in flow pattern created by the velocity cap triggers an avoidance response mechanism in fish, thereby avoiding impingement."	This section of the Staff Report with SED was updated based on the information provided in this comment.
#10	**Paul Michel, NOAA, Monterey Bay National Marine Sanctuary**	
10.1	Staff at NOAA's Monterey Bay National Marine Sanctuary has reviewed the document titled Amendment to the Water Quality Control Plan for Ocean Waters of California to address Desalination Facility Intakes, Brine Discharges, and to Incorporate other Non-substantive Changes. The proposed Desalination Amendment consists of a uniform approach	Comment noted.

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	for protecting beneficial uses of ocean waters from degradation due to seawater intake and discharge of brine wastes from desalination facilities. The proposed amendment would protect and maintain the highest reasonable water quality possible for the use and enjoyment of the people of California while supporting the use of ocean water as an alternative source of water supply.	
10.2	8.1 [of the Staff Report with SED] What types of facilities should the amendment cover? We agree with staff in recommending Option 3; the amendment to cover desalination facilities and not all industrial facilities using seawater for cooling, heating or industrial processing.	Comment noted.
10.3	8.2 Should the proposed Desalination Amendment include definitions for new, expanded and existing facilities? We agree with staff in recommending Option 2; add definitions for new, expanded and existing desalination facilities to the amendment to promote consistency among regions and projects.	Comment noted.
10.4	8.3 [of the Staff Report with SED] Should the SWRCB identify a preferred method of seawater intake? We agree with staff in recommending Option 3; establish sub-surface intakes as the preferred technology for seawater intakes but allow surface intakes if sub-surface intakes are shown to be infeasible.	Comment noted.
10.5	It is our recommendation to require a 0.5mm screen slot size to minimize intake and mortality of marine life. However, we support some regulatory flexibility if the project proponent can demonstrate the use of additional technology, reduced flow velocity or special environment circumstances that ensure the same amount of protection of marine organisms while using a larger slot size not to exceed 1.0 mm in size.	Comment noted.
10.6	8.4 [of the Staff Report with SED] What siting considerations should the amendment address in order to minimize intake and mortality of marine life? We agree with staff in recommending Option 3; establish statewide requirements, guidelines, and considerations for Regional Board staff to use when evaluating the best site. The criteria identified are in alignment with the Guidelines for Desalination Plants in the Monterey Bay National Marine Sanctuary.	Comment noted.
10.7	8.5 [of the Staff Report with SED] Should the SWRCB provide direction in	Comment noted.

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	the Ocean Plan on mitigating for desalination- related impacts? We agree with staff in recommending Option 3; updating the Ocean Plan to provide statewide guidance on the appropriate methods for determining the nature and size of a mitigation project to ensure all desalination-related mortality is mitigated for a facility.	
10.8	8.6 [of the Staff Report with SED] How should the SWRCB regulate brine discharges? We agree with staff in recommending Option 5; an owner or operator must evaluate multiple brine disposal methods and then in combination with other project specifics, determine the best option that will minimize mortality of marine life.	Comment noted.
10.9	8.7 [of the Staff Report with SED] Should the SWRCB impose a receiving water limit for salinity, and if so, what should it be? We recommend Option 4 and not the staff recommendation of a hybrid of Options 4 and 6. We prefer Option 4; establish a maximum zone of initial dilution of 100 m from the point of discharge (recommendation from the Science Advisory Panel (Roberts et al. 2012) and a maximum daily concentration not to exceed 2.0 ppt above natural background salinity. This sets a clear point of compliance and does not allow for large areas where salinity is elevated to toxic levels. Option 6, in effect, allows for individual project proponent to repeat the studies commissioned by the SWRCB for their specific facility if they cannot meet the 2.0 ppt criteria. This scenario of also allowing for Option 6 will be difficult to regulate and ensure maximum protection of marine resources.	The receiving water limit of not exceeding 2.0 ppt above natural background salinity establishes a clear criterion for brine discharges that would protect water quality and related beneficial uses of ocean waters. Allowing individual project proponents to establish their own salinity limit is to allow opportunity for site-specific assessments. The flexibility in the alternative salinity receiving water limit will be granted if the project proponents demonstrate protectiveness of marine life and beneficial uses of ocean waters. The appropriate regional water board will evaluate the information received using specific criteria laid out in the amendment and will have discretion to approve the alternate salinity limit. This flexibility will determine whether specific discharge criteria within specific discharge locations are more appropriate than the established baseline condition, considering that the results may lead to require a more or less restrictive limit compared to the 2.0 ppt above natural background salinity limit.
10.10	Section 12.2 [of the Staff Report with SED] is the analysis of potential adverse environmental effects of some combination of two project alternatives based on results of the questions listed above. We support the staff recommendation of Alternative 2 for the proposed desalination amendment to the California Ocean Plan. It allows for flexibility of individual desalination facilities but will not allow for adverse effects to aquatic life beneficial uses as further described below. Alternative 2: (proposed Desalination Amendment): allows sub-surface or screened surface water intakes operated at low intake velocities, or intakes using an alternative method to prevent entrainment so long as it	Comment noted.

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	satisfies the same protection. Brine discharge would allow dilution through co-mingling, multi-port diffusers, or equivalent technology that provides a comparable level of protection.	
10.11	There is a typo on page 68, second paragraph [in the Staff Report with SED]. The sentence is not complete "... AEL and FH do not quantify the loss of organisms from an ecosystem standpoint and how they."	Comment noted. The following revision was made in the Staff Report with SED: "AEL and FH do not quantify the full extent of the loss of organisms from an ecosystem standpoint ~~and how they~~."
10.12	Overall, we feel the document was very well written and a comprehensive analysis of all aspects of desalination as they relate to intake and brine discharge. The SWRCB did a very good job commissioning the necessary studies and incorporating those findings in the justification of staff recommendations. We appreciate that the preferred alternative aligns with the Guidelines for Desalination Plants in the Monterey Bay National Marine Sanctuary. This is a document that sanctuary staff will reference in the future when reviewing and considering desalination facilities within MBNMS. We are grateful for this resource and strongly support the adoption of an amendment to the California Ocean Plan for desalination facilities.	Comment noted.
#11	**Joe Veytia, Salt of the Earth Energy, LLC**	
11.1	No Brine Discharge Exemption. Our company requests that desalination technologies with no brine discharge be exempted from the requirements of the proposed Amendment especially the extended permitting delays caused by unnecessary studies.	If a desalination facility does not discharge brine into ocean waters, chapter III.L.3 (Receiving Water Limitation for Salinity*) and chapter III.L.4 (Monitoring and Reporting Programs) of the proposed Desalination Amendment do not apply. However, an owner or operator of a new or expanded desalination facility using seawater would still need to submit a request for a Water Code section 13142.5(b) determination to the appropriate regional water board and all other provisions in chapters III.L.1 and III.L.2 would still apply. This is important to ensure the best available site, design, technology, and mitigation measures feasible are used to minimize intake and mortality of all forms of marine life.
11.2	Expedited Permitting. Our company suggests that permitting be expedited/accelerated for proposed zero brine discharge with subfloor intake desalination plants. For desal plants that have no brine discharge	While designing desalination facilities to use subsurface intakes that do not discharge to ocean waters is an environmentally preferable option, the regional water boards are required to issue permits and make Water

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	AND a subfloor intake system, our company requests that Desal Plant sizes not exceeding 5 MGD be statutorily required to be granted permits in no greater than 6 months.	Code 13142.5(b) determinations on a case-by-case basis. Even if a facility does not discharge brine, there may be other discharges associated with the facility that will require a Waste Discharge Permit or NPDES permit and any new or expanded facility using seawater would need a Water Code 13142.5(b) determination. In the future, if there are increases in desalination facilities that use subsurface intakes to withdraw less than 5 MGD and do not discharge brine into ocean waters, a general permit could be developed to apply to such facilities in order to expedite the permitting process. Note that the State Water Board cannot impose a statutory requirement. Such a requirement would need to be adopted by the Legislature.
11.3	Designated Best Available Desalination Technology. Our company requests that desalination technologies that have no brine discharge AND utilize subfloor intake systems be designated "State of the Art", "Best Available" and/or "Best Practices" for Desalination especially when their power requirements are less than conventional desalination methods.	Water Code section 13142.5(b) requires that the best available site, design, technology, and mitigation measures feasible shall be used to minimize the intake and mortality of all forms of marine life. Subsurface intakes are preferred and represent available best technology; however, it is important to recognize that the term “best available technology” is not used as equivalent to any specific standards set forth in the Clean Water Act for best available technology. The proposed Desalination Amendment recognizes that there are site-specific variables that will influence the best available site, design, technology, and mitigation measures feasible for each desalination facility. Consequently, the proposed Desalination Amendment provides flexibility when subsurface intakes are infeasible. Similarly, a “no discharge” option may be infeasible for some facilities. Furthermore, at this time there is not enough information on “no brine discharge” technologies and more data are needed before it can be included in the proposed Desalination Amendment.
11.4	1 MGD Limit for Temporary Plant with No Brine Discharge. Our company requests temporary desalination plants WITH NO BRINE DISCHARGE be granted a temporary plant size limit of up to 1 MGD provided a subfloor intake system is applied for within 6 months of commencement of operations and installed with 18 months of commencement of desalination operations. At which time the subfloor intake system is operational that such plants no longer be considered "Temporary" but instead permanent.	The proposed Desalination Amendment does not currently differentiate between a temporary plant and a permanent plant, nor is it defined. As mentioned in response to comment 11.3, at this time there is not enough information on “no brine discharge” technologies and more data are needed before these can be included in the proposed Desalination Amendment. Chapter III.L.1.a includes a potential for a temporary waiver of all or portions of the proposed Desalination Amendment for facilities that are operating as a critical short term water supply during a

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		state of emergency as declare by the Governor. Please see response to comment 11.2 regarding expediting permitting.
11.5	Sustainably Sourced Chloralkali Chemical Incentives and Requirements. Finally, we request that the Amendment set out some incentive(s) for water and wastewater plants as well as industry be given (a) some meaningful incentive(s) and (b) that large water users whose use is greater than 0.5 MGD that also use chloralkali chemicals be required to replace their current chloralkali chemical use with the use of chloralkali chemicals produced from sea salt harvested in the production of freshwater in the State of California. By enacting such incentives and requirements, California's chemical usage will incentivize the sustainable practice of using chloralkali chemicals derived from the salt harvested from desalination rather than solution mining or mined salt and thereby increase water availability with minimal environmental impact. Chloralkali chemicals derived from salt are: Chlorine (Cl_2), Chlorine Dioxide (ClO_2), Caustic or Sodium Hydroxide (NaOH, Hydrochloric Acid (HCl), and Bleach or Sodium Hypochlorite (NaOCl) Hydrogen gas (H_2) and Oxygen (02). Water and wastewater plants are major users of such chlorine products including bleach as biocides and disinfectants. Swimming pools are major users of chlorine products and HCl. VCM manufactured and used for producing PVC plastic production are also large consumers of chlorine products. Steel refining and fracking are large consumers of HCl. Caustic and Hydrogen are used in oil refining to remove sulfur (eliminating sulfur dioxide from the emissions of gasoline and other fuels) as well as aluminum refining to extract aluminum from bauxite ore. Both NaOH and HCl are used in numerous other industries including pharmaceuticals and food processing. Hydrogen is al so used in producing ammonia.	There is not enough information at this time regarding the process of or the benefits of using chloralkali chemicals harvested from sea salt to establish an incentive in the proposed Desalination Amendment. If more information becomes available and this process is more commonly used, the Ocean Plan may be amended.
11.6	Our rationale for all these requested revisions is simply that a combination of the desalination attributes of (1) no brine discharge and (2) a subfloor intake for desalination overwhelmingly achieves the spirit of sustainable, ecofriendly desalination without marine mortality and negligible environmental impact and thus should not be delayed by the same permitting delays and requirements of those desalination practices of the methods that elect not to be sustainable or ecofriendly.	Comment noted. The Water Boards are supportive of using ocean water as a reliable supplement to traditional water supplies while simultaneously minimizing intake and mortality of all forms of marine life, protecting water quality, and related beneficial uses of ocean waters. General permits may be considered in the future, but as mentioned in the responses above, at this time standard permitting procedures apply.

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11.7	By distinguishing and incentivizing use of chloralkali chemicals derived from desalination brine concentrate, California will increase demand in the marketplace for sustainable chemical production practices and increase water availability through environmentally sound desalination technologies. In addition, because the cost of desalination is spread out over the cost of chloralkali chemical production (with much higher profit margins), not only can the chemicals be produced very competitively but freshwater can be produced for less than 50% of the cost of conventional desalination. With water scarcity being a worldwide phenomenon and California being the undisputed leader in environmental thought, this desalination legislation offers California an opportunity to influence the worldwide direction into more sustainable desalination that minimizes environmental impacts and increases usage of sustainably derived chloralkali chemicals.	Comment noted. Please see response to 11.5. The matter currently before the State Water Board is a proposed water quality control plan with regulatory effect, implementing the State Water Board's authority pursuant to the Porter-Cologne Water Quality Control Act. Any legislation is beyond the scope of Water Board authority. However, the process of developing and refining the proposed Desalination Amendment has reflected and will continue to reflect an intent to support and encourage sustainability and efficient use of resources, including encouraging development of future technologies that may better reduce all environmental impacts.
11.8	Additional CARB Offset Credit Project 1. Pursuant to the California Global Warming Solutions Act (AB32) currently there are only 4 specific types of projects permitted to earn offset credits (a) Ozone Depleting Substances Projects (b) Livestock Projects (c) Urban Forest Projects and (d) US Forest Projects. It is suggested that low energy desalination projects become eligible to earn offset credits. The computation for such offset credits should be computed based on the difference in C02 emissions produced by the power requirements for CONVENTIONAL desalination and any byproducts such as salt, chloralkali chemicals and/or minerals rendered to saleable products COMPARED to the savings in power requirements and resulting C02 emissions to produce such desalinated water, chemicals and minerals using novel methods.	The comment is appreciated; however, implementation of the California Global Warming Solution Act (Assembly Bill 32) is not under the jurisdiction of the California State Water Resources Control Board. Therefore, we do not have the authority to allow low energy desalination projects to become eligible to obtain offset credits.
11.9	Additional CARB Offset Credit Project 2. Again pursuant to the California Global Warming Solutions Act (AB32) currently there are only 4 specific types of projects permitted to earn offset credits (a) Ozone Depleting Substances Projects (b) Livestock Projects (c) Urban Forest Projects and (d) US Forest Projects. It is suggested that chemical projects produced from desalination that are used to sequester C02 or destroy become	The comment is appreciated; however, implementation of the California Global Warming Solution Act (Assembly Bill 32) is not under the jurisdiction of the California State Water Resources Control Board. Therefore, we do not have the authority to allow chemical projects produced from desalination become eligible to earn double offset credit.

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	eligible to earn double offset credits. As described earlier, caustic (NaOH -sodium hydroxide) is a chemical that can be produced from brine concentrate. A derivative chemical that is produced with caustic is sodium carbonate. Sodium carbonate can be produced by combining caustic with C02. If such C02 were harvested from emission stacks then a major chemical would be produced from brine concentrate that would also be used to sequester C02. There are other combinations of brine concentrate sourced chemicals could be used to produce useful, saleable products that sequester C02 e.g. CaC03, MgC03, etc. CaC03 is often used in fresh water plants.	
#12	**Rebecca J. Bork, City of Santa Barbara**	
12.1	**12.1a:** Based on its plain language, Section 13142.5(b) . . . .only applies to a "new or expanded coastal powerplant or other industrial installation". Although not defined in Section 13142.5(b), the legislative history of the Coastal Act focuses on the siting of powerplants and liquefied natural gas facilities along the coast. In fact, Section 13142.5(a) and (f) speak separately to municipal facilities such as treatment plants, thus indicating that the Legislature knew how to distinguish between industrial installations and municipal facilities. At best, it is not clear that the Legislature intended a municipal desalination facility to fall within the ambit of an "industrial installation" and it does not appear that the State and Regional Board originally understood the statute to apply to such facilities. **12.1b:** Second, Section 13142.5(b) only applies when a qualifying facility uses "seawater for cooling, heating, or industrial processing ...." Again, the plain language appears to focus on the use of seawater as a part of the operations of a coastal powerplant or other industrial installation. Nothing on the face of the statute or in the legislative history appears to suggest an intent to treat the use of seawater for municipal water supply purposes as a use of seawater by an industrial installation as part of its industrial processing.	12.1a: Inclusion of "other" before "industrial installation" signals application to a broader class of structure than just power plants and energy facilities. Water Code §13142.5 sets forth a range of "policies of the state with respect to water quality as it relates to the coastal marine environment. . . ." The statute addresses wastewater discharges, including those from municipal treatment facilities, as well as industrial discharges into publicly owned treatment works (subsections (a) and (f), the latter not originally a part of the enacted legislation.) Other portions of the statute, however, appear to use "industrial" more broadly. In addition to subsection (b), section (e)(2) refers to "recycled water [] available for industrial use," suggesting that "industrial" is used generally rather than as an indicator of specific facility or discharge types, unlike the distinction between municipal and industrial discharges under the Clean Water Act. While those provisions carry specific and defined differences in the types of discharges and the type or level of treatment required, it is unclear what purpose the distinction between water intakes used for industrial and municipal desalination purposes would serve. Barring any clearer basis, a general use of the word is the more persuasive interpretation. See also, Response 12.1b, below. 12.1b: The statute is reasonably read to address the use of seawater for processing, without reference to a specified end use. The commenter suggests that the statute be read to limit its application to intake of seawater and use as part of industrial processing, although this is not

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		how the statute reads. "[U]se … for industrial processing" may include use in operations as well as processing for a separate use. Moreover, within the context of the statute and the aims of the Coastal Act in general, "industrial processing" is more reasonably interpreted to refer to a process that results in conversion of raw material to an end product, including desalination of seawater for other uses. Merriam-Webster's online dictionary defines "industry" to include the following meaning: the process of making products by using machinery and factories. Funk & Wagnall's Standard College Dictionary (1973) includes these meanings: "1. [a]ny specific branch of production or manufacture . . . 2. [m]anufacturing and productive interests collectively, as distinguished from agriculture and from labor." To infer that the Legislature intended the intake of seawater to require minimization of harm to marine life only if used on site as part of a larger process would not be consistent the larger goals of the Coastal Act. These include protecting, maintaining and, where feasible, enhancing and restoring the quality of the coastal zone environment and natural and artificial resources; and assuring orderly, balanced utilization and conservation of coastal zone resources, taking into account social and economic needs of the people of the state. Public Resources Code § 30001.5 Had the legislature intended that the statute's applicability be limited according to the intended end use of the processed water, more restrictive language was available to accomplish this purpose.
12.2	The legislative history of the Coastal Act, including Section 13142.5(b), also indicates that no new duties are required of the State Board to implement the provisions of the bill. This appears to undermine the interpretation of Section 13142.5(b) as creating new authority for the State and Regional Boards to regulate facilities such as the Existing Facility. It appears that the regional boards shared this original view of Section 13142.5(b) and did not immediately apply it directly to municipal desalination facilities. It is the City's understanding that it has only been more recently with facilities such as the Poseidon facility in Carlsbad that Section 13142.5(b) has been applied to desalination facilities.	The legislative history of the Coastal Act, of which Water Code section 13142.5(b) is part, indicates that the bill requires all state agencies to carry out their activities in conformity with the Act. Public Resources Code section 30412 (also part of the Coastal Act) specifically recognizes that Water Code section 13142.5 applies to the State Water Resources Control Board and regional water quality control boards. Any prior inaction in not applying Water Code section 13142.5(b) does not, by itself, indicate that the statute does not apply, nor does it support a finding that a facility, once built, is no longer subject to the statutory requirement. "[T]he mere failure to enforce the law, without more, will not estop the government from subsequently enforcing it." Feduniak v. California Coastal Commission (2007) 148 Cal.App.4th 1346, 1369.

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12.3	Because Section 13142.5(b) is not an authorization from the Legislature to "make law", the State Board cannot interpret Section 13142.5(b) in ways that conflict with the plain language of the statute or apply it in ways that are fundamentally at odds with the statute's intent. Ultimately, how the State Board elects to interpret Section 13142.5(b) will be subject to independent review by the courts. (Yamaha Corporation of America v. State Board of Equalization (1998) 19 Cal.4th 1, 3-4; Waterkeepers Northern California v. State Water Resources Control Board (2002) 102 Cal.App.4th 1448, 1458.) Only the courts can ultimately determine when and where Section 13142.5(b) applies and what it means.	The proposed Desalination Amendment does not conflict with the plain language of the statute, nor is the interpretation otherwise at odds with the statute's intent. In addition, Water Code section 13170 provides that the State Water Board may adopt water quality control plans in accordance with specified sections setting forth required procedures and substantive considerations. The State Water Board is further directed to formulate and adopt a water quality control plan for ocean waters of the state, requiring review every three years to guarantee that current standards are adequate and are not allowing degradation to indigenous marine species or posing a threat to human health. (Wat. Code section 13170.2) When the State Water Board adopts a water quality control plan, it is a rule of general applicability and is subject to limited review by the Office of Administrative Law pursuant to Government Code section 11353: "[OAL] shall review the regulatory provisions to determine compliance with the standards of necessity, authority, clarity, consistency, reference, and nonduplication set forth in subdivision (a) of Section 11349.1. . . ." (Wat. Code section 11353(b)(4)). In addition, "*Water quality control plans . . .are quasi-legislative . . . administrative actions subject to deferential review under the traditional mandamus standard. That standard asks whether the agency's action was arbitrary, lacking in evidentiary support, or contrary to law.*" (San Joaquin River Exchange Contractors Water Authority v. State Water Resources Control (2010) 183 Cal.App.4th 1110, 1117-1118)
12.4	The proposed Desalination Amendments seek to define the term "existing facility" in a way that would convert a facility that exists into a "new" facility subject to Section 13142.5(b) simply because certain determinations may not have been formally made by the regional water board at the time of permitting of the facility. Such an approach appears to be fundamentally at odds with the plain language of Section 13142.5(b) and the statute's intent. Such an approach would also undermine the goals of supporting the use of ocean water as a reliable supplement to traditional water supplies while protecting beneficial uses and promoting interagency collaboration since it could prevent the use of	Pursuant to the language of the statute, the State Water Board has a duty to apply it to any facility that was new or expanded after the requirements took effect. The requirement became effective in 1977, and those facilities constructed after that date for which no determination of the best site, design, technology and mitigation measures feasible to minimize the intake and mortality of all forms of marine life are not yet in compliance. See also, Response 12.3 above.

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	an existing facility and undo the interagency collaboration that led to the existing permitting of the facility. The City believes that the approach that is more consistent with Section 13142.5(b) would be, at a minimum, to consider facilities that have been constructed and are permitted as existing facilities not subject to Section 13142.5(b). The State Board could then apply its interpretation of Section 13142.5(b) prospectively to newly developed facilities.	
12.5	<u>12.5a:</u> The State Board's general approach to the application of Section 13142.5(b) is inconsistent with the language and purpose of the statute. In many ways, the State Board has turned the language of Section 13142.5(b) on its head. The State Board is applying the statute to municipal desalination facilities that supply potable water and that are not traditional industrial installations using seawater for cooling, heating, or industrial processing. At the same time, the State Board is not applying the section, as was noted by staff during the public workshop, to other traditional industrial facilities. In accordance with III.L.l.a and III.D.5.(b)(1)-(2), the Desalination Amendments and the State Board's interpretation of Section 13142.5(b) only apply to specified desalination facilities. <u>12.5b:</u> The State Board's interpretation and application of Section 13142.5(b) to facilities such as the Existing Facility appears to exceed the State Board's legal authority. The plain language of Section 13142.5(b) applies to each "new or expanded coastal powerplant or other industrial installation using seawater for cooling, heating, or industrial processing". The plain language of the statute does not apply to municipal desalination facilities that use seawater for municipal water supply, not for cooling, heating or industrial processing.	<u>12.5a:</u> See, Response 12.1b, above. The proposed Ocean Plan amendment addresses only desalination facilities, rather than other facilities that may be to subject to Water Code section 13142.5(b), because desalination facilities share common characteristics and present fewer unknowns than may be associated with other types of facilities with intakes subject to the statute. At this time, the State Water Board has very little information regarding what the commenter terms as “traditional industrial facilities” that may take in seawater for processing. The State Water Board and regional water boards will continue to apply the statute to other facilities using seawater for industrial processing on a case-by-case basis. <u>12.5b:</u> See Response 12.1b above. By its plain terms, the statute applies to any “other industrial installation … using seawater … for industrial processing.” While the City would posit that this precludes application to a facility processing seawater for later municipal water supply, the statute does not limit its application according to any end use of the water so processed, only to facilities using seawater for industrial processing. Use of “industrial” to describe the processing is not parallel to use of “municipal” in describing a water supply. The City does not propose use of seawater for a municipal drinking water supply without the interim step of processing to remove salts. The statutory use of “industrial” is reasonably read to refer to this process, rather than the end use.
12.6	It is true that in the Surfrider Foundation case the Court of Appeal assumed, without any analysis that Section 13142.5(b) applied to a desalination facilities that was designed to provide potable water for domestic use. However, that case involved a desalination facility that was	The *Surfrider* decision in no way conflicts with the State Water Board’s interpretation of Water Code section 13142.5(b) or prevents its application as set forth in the draft Ocean Plan amendment.

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	co-located with a coastal powerplant that used seawater for cooling. In addition, the parties to the case did not dispute the application of Section 13142.5(b). Therefore, while the Surfrider Foundation case provides important insights into the meaning of some of the words used in Section 13142.5(b), it does not support the State Board's general approach to the application of Section 13142.5(b) in the Desalination Amendments.	
12.7	Section III.L.1.a (page 28) [of the proposed Desalination Amendment]: The temporary waiver provisions for emergency declarations should be clarified. As explained by staff in the one-on-one meeting and in the workshop, this provision was originally intended to apply to earthquakes or similar natural disasters where desalinated water could supply an immediate, short-term water supply. However, staff at the public workshop acknowledged that it could apply to drought declarations. The City recommends that the provisions be amended to expressly include drought declarations	The temporary waiver provision does not limit the ability of the Executive Director to apply its provisions during an emergency drought declaration. The provision is drafted to provide maximum flexibility to the Executive Director in waiving some or all provisions, as appropriate. The Governor's drought proclamation on January 17, 2014, was titled a State of Emergency, thus allowing for the current drought conditions to be the basis for a waiver under the provisions as drafted.
12.8	In addition, at least for drought relief purposes, it is recommended that the waiver be automatic and not subject to the Executive Director's discretion. The Desalination Amendments should provide that when the Governor declares a state of emergency based on drought conditions, the Desalination Amendments are waived during that period for desalination facilities that are operating to serve as a critical short term water supply. Otherwise, it will be difficult to quickly bring such critical short term water supply facilities into production mode and their operations in critical periods will be subject to delays. The better approach is to make the waiver automatic when a declaration occurs. The Desalination Amendments could specify the facilities to which this automatic waiver applies.	Disagree. As written, the provision allows the Executive Director to use his discretion to temporarily waive requirements in accordance with a declared state of emergency. See, Response 12.7, above. An automatic waiver in cases of drought declaration would subvert the intent of the statute and of the proposed Desalination Amendment by lifting all requirements to use the best available site, design, technology and mitigation measures feasible to minimize intake and mortality of all forms of marine life throughout the duration of any declaration of drought emergency, which can last years. The proposed provision encompasses sufficient flexibility to accommodate critical short-term water supply needs.
12.9	The State Board lacks the legal authority to interpret state statutes in ways which conflict with the express terms of the statute. Facilities that exist and have permits to operate cannot reasonably be considered "new" or "expanded" as those terms are used in Section 13142.5(b). To the extent a definition of "existing facility" is required, that definition should include all currently permitted facilities which have commenced construction or operations in reliance on previously issued permits. It is	A facility constructed after the effective date of the statute and using an intake for industrial processing of seawater was subject to the statute. For the specified facility, there is no direct indication that the Regional Water Board concluded that Water Code section 13142.5(b) was inapplicable to the facility. Any prior inaction in not applying Water Code section 13142.5(b) does not, by itself, indicate that the statute does not apply, nor does it support a finding that a facility, once built, is no longer

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	suggested that the State Board simply list the existing facilities reflected on pages 13-15 (including Table 2-1 and Figure 2-1) of the Staff Report in the Desalination Amendments as "existing facilities" or as facilities to which Section IILL..2 [of the proposed Desalination Amendment] does not apply. It is noted that the Existing Facility is treated in the Staff Report as an existing facility but is treated differently under the definition of "existing facility" in the Desalination Amendments.	subject to the statutory requirement. "[T]he mere failure to enforce the law, without more, will not estop the government from subsequently enforcing it." Feduniak v. California Coastal Commission (2007) 148 Cal.App.4th 1346, 1369. See also, Responses 12.3 and 12.4, above.
12.10	Even if an express finding under Section 13142.5(b) was not made, previously permitted facilities should not be subject to Section III.L.2 if the history and record reflects that the board and the discharger assessed issues associated with the best available siting, design, technology and mitigation measures feasible. As was mentioned during the public workshop, the State Board could allow the regional board to determine that the CEQA review for the project was the equivalent of a Section 13142.5(b) determination. This approach is particularly appropriate given that regional boards did not expressly apply Section 13142.5(b) in the past to municipal facilities because they apparently did not believe it applied to such facilities.	Information included in the record as part of a CEQA review may be appropriate to make findings for any facility previously and inadvertently permitted without a Water Code section 13142.5(b) determination. Such an approach is better applied on a case-by-case basis, in order to allow for considerations that may be unique to each circumstance.
12.11	Section III.L.1.b.(2) (page 28) [of the proposed Desalination Amendment]: Greater clarity should be provided regarding the defined term "expanded facilities". As currently drafted, the term is ambiguous and possibly subject to broad interpretation inconsistent with the express language and intent of Section 13142.5(b). More specific thresholds for "increases" in the amount of seawater used or "changes" in design or operation should be included. As written, it would cover "any" increase or change which "could" increase intake or mortality of marine life. This might be interpreted as capturing any increase or change, however small, because most increases or changes "could" in theory have some increase in intake or mortality. More specific language is needed to prevent all changes from falling within the definition of the term "expanded facilities".	The term is drafted with the intent to allow a regional board to determine conditions under which an increased intake of seawater or changes in design or operation of a facility results in an increase in intake and mortality of sea life. Regional water board determinations would occur pursuant to a public process, such that any unsupported or unwarranted decision would be subject to standard administrative or judicial review procedures.
12.12	The State Board should also consider express exclusions for maintenance or improvement activities that apply new technology or maintain proper operations of the facility. Without such an exclusion and	The provision as drafted is intended to allow a regional water board determinations of conditions under which an expanded facility increases intake and mortality of marine life. See, Response 12.11,

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	without more clarity in this definition, activities that are required or that improve operations might be captured by this definition. This is particularly true because many of these maintenance activities are already authorized by existing permits. This approach might also address the comments made during the public workshop about "life of the project" and "improved technology" issues. A more specific definition of "expanded facilities" could provide an incentive to use improved technology when repair or maintenance activities occur by preventing such technology improvements from triggering the definition of "expanded facilities" and a new round of Section 13142.5(b) analysis.	above. Adding exclusions for "maintenance or improvement activities" to the definition of an expanded facility would add ambiguity to the definition and could prevent new assessments of design and operational changes with effects on intake and mortality of marine life. Moreover, while it is unclear what maintenance activities could result in an increase in intake and mortality of sea life, many improvement activities that increase intake and mortality would appear to fall within the intent of the statute to cover facility expansions.
12.13	Section III.L.1.c (page 28) [of the proposed Desalination Amendment]: Section III.L.2 should not apply to facilities that have been constructed or operated in accordance with previously issued permits. At a minimum, facilities that have been constructed and operated should not be subject to a new analysis under Section II.L.2. An abbreviated determination that relies on prior reports, assessment or CEQA determinations should apply to such facilities.	See Responses 12.9 and 12.10 above.
12.14	Section III.L.1.f (page 29) [of the proposed Desalination Amendment]: The consultation provisions of the Desalination Amendments blur the lines of decision making authority and undermine the statutory structure regarding challenges to regional board actions. They also threaten to create delay in the regional boards' processes, as regional boards are prohibited from making final determinations until consultation occurs. Rather than streamlining the process, the consultation provisions will create multiple layers of decision making. If the goal is to provide direction to the regional boards to implement Section 13142.5(b), the Desalination Amendments should establish the framework and the regional boards should implement the framework, subject to State Board oversight through the petition process.	The consultation provisions allow State Water Board staff to provide expertise in regional board determinations such that an additional step is not necessary to ensure that the most knowledgeable staff are involved with assessments of best available site, design, technology and mitigation measures feasible for minimizing intake and mortality of all forms of marine life. Rather than creating multiple layers of decision-making, the provisions may obviate the need for State Water Board review of regional water board actions. Contrary to the comment, a petition to the State Water Board would create far more additional delay.
12.15	Section III.L.2.a.(1) (page 29) [of the proposed Desalination Amendment]: The State Board's general approach to Section 13142.5(b) places too much of a burden on the regional boards to "conduct" the analysis rather than allowing the discharger to prepare the analysis and supporting reports and submit them for regional board review and	Please see response to comment 6.2.

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	approval. The approach places too much of a burden on regional boards and will prove unworkable in practice. It will lead to long delays and will overburden the already overburdened boards. From the workshop, it appears that the State Board's intent is that the discharger will prepare the analysis and submit it for regional board review. It is recommended that the language in this section better reflect this intent. In addition, the nature of the Regional Board's action should be more fully explained. Because Section 13142.5(b) addresses intakes (not discharges) in a way that is very different than the Regional Board's authority under the Clean Water Act, it may be appropriate to have the determination made separately from the NPDES permit.	
12.16	Section III.L.2.a.(l) (page 29) [of the proposed Desalination Amendment]: The consultation provisions will only add to the burden on staff and delay the process.	Please see response to comment 12.15.
12.17	Section III.L.2.a.(2) (page 29) [of the proposed Desalination Amendment]: The proposed separate and independent analysis of the "best" site, design, technology and mitigation measures is impractical and inconsistent with the statute. First, this section drops the key words "best available" and "feasible" from the analysis. Section 13142.5(b) requires an analysis of the "best available" site, design, technology and mitigation measures "feasible". In Surfrider Foundation, the Court of Appeal upheld the San Diego Regional Board's use for Section 13142.5(b) purposes of CEQA's definition of "feasible", which is "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social and technological factors." The State Board should include a feasibility analysis as part of its approach and should use CEQA's definition of the term. Second, the statutory factors cannot be viewed in isolation, but must be viewed in combination. Therefore, rather than an independent and separate analysis, the factors should be balanced to achieve the "best available" combination of factors that are "feasible". This approach is consistent with the judicial guidance from Surfrider Foundation and the express language of the statute. For example, in Surfrider Foundation, the Court stressed that the statute describes a "set of measures" which collectively reduce both intake and mortality of marine life. The Court further explained that the statute does	Please see response to comment 6.1 and 6.12.

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	not require that each measure individually minimize intake and mortality. Viewing each measure in isolation first appears inconsistent with this guidance from the Court.	
12.18	Section III.L.2.a.(4) (page 30) [of the proposed Desalination Amendment]: The role of other agencies should be clarified. This process should result in one set of measures that meets or is consistent with the requirements of all applicable agencies. Involving multiple agencies without ultimately establishing one set of measures will undermine the streamlining goals of the Desalination Amendments and will ultimately cause unnecessary delay and confusion. The City recognizes that the State Board cannot control the activities and final decisions of other agencies. However, consistent with the goal of promoting interagency collaboration, the State Board should work to establish a framework for true interagency collaboration that results in one set of measures, not multiple "bites at the apple".	The State Water Board is charged with determining best available site, design, technology and mitigation measures feasible to minimize intake and mortality of marine life associated with seawater intakes. Other agencies will apply their authorities in accordance with their statutory mandates and jurisdiction. While the State Water Board seeks to coordinate with and consider the findings of other agencies, an identical set of measures satisfying all regulatory agencies with varying authorities is not within the power of any single agency. The State Water Board lacks authority to establish any framework that directs other agency action, and does not propose deferring to other agency determinations that may not constitute best available site, design, technology and mitigation measures as set forth in the statutory directive. Also, please see response to comment 18.13.
12.19	Section III.L.2.a.(5) (page 30) [of the proposed Desalination Amendment]: The "future events" provisions are too broadly written. These issues should be left to project specific decisions and the unique situations of each project. As written, the provisions appear to authorize reopener provisions that undermine regulatory certainty. The State Board should either delete these provisions or make them specific to limited situations where reopener may be required.	Disagree. The draft amendments allow for conditional permitting in order to allow permitting of a desalination facility built under circumstances that are known to potentially change. Conditions would be specified as part of a Water Code section 13142.5(b) determination. A regional water board decision to permit a facility only conditionally is subject to the board's discretion and, for any project proponent objecting to the condition, may be reviewed by the State Water Board subject to Water Code section 13320.
12.20	Section III.L.2.b.(1) (page 31) [of the proposed Desalination Amendment]: This section does not address site conditions. Rather, it addresses water supply planning documents that are unrelated to the site. This provision, particularly the last sentence, should be deleted. The City understands the comments made at the public workshop that design capacity should not be "gamed" to exclude the feasibility of subsurface facilities, but the ability of subsurface facilities to achieve needed capacity within a balanced water supply portfolio should be a consideration.	Comment noted. The siting consideration in chapter III.L.2.b.(2) (formerly (1)) requires an owner or operator to demonstrate there is a regional need prior to siting a desalination facility at a given site. This provision is included to ensure that the proposed desalination facility will have a design capacity that is in line with the regional need for desalinated water as demonstrated through water supply planning documents. Also, please see response to comment 18.14.
12.21	Section III.L.2.d.(1).(a).(i) (page 33) [of the proposed Desalination Amendment]: The State Board should not mandate the use of subsurface	The proposed Desalination does not mandate the use of subsurface intakes, but states that;

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	intakes. Rather, the regional boards should consider the full range of factors contained in Section 13142.5(b) and determine the "best available" combination of factors that are "feasible" to minimize intake and mortality. The pros and cons of subsurface intakes should be weighed against the pros and cons of other options. As written, the Desalination Amendments ignore the impacts of subsurface facilities and only focus on the impacts of other approaches. This is inconsistent with the statute and a full balancing of all factors. This need for a full balancing of factors should consider the type and duration of use of the facility. For a facility that may only be used intermittently, the balance may be different than for a facility that is used at all times .	"Subject to Section L.2.a.(2), the regional water board shall require subsurface* intakes unless it determines that subsurface* intakes are infeasible based upon an analysis of the factors listed below, in consultation with State Water Board staff."
12.22	Section III.L.2.d.(1).(a).(ii) (page 33) [of the proposed Desalination Amendment]: This section should be deleted or clarified significantly. Any required combination of surface and subsurface intakes should be reasonable and "feasible." The State Board should consider establishing more specific percentages or thresholds of reasonability. Also, this section should not apply to existing facilities that use surface intakes already. This provision, coupled with the broad definition of "expanded facilities", creates concerns about how the mandate for use of subsurface intakes might apply to existing facilities that use screened intakes.	Please see response to comment 15.3 regarding the preference for subsurface intakes to be reasonable and 6.12 for determining feasibility.
12.23	Section III.L.2.d.(1).(c).(ii) (pages 33-34) [of the proposed Desalination Amendment]: The City supports the use of intake screens of 1.0 mm or larger. The City does not support the use of intake screens less than 1.0 mm because there is a lack of scientific data to support screen sizes smaller than 1.0 mm. Based on the information presented at the public workshop by West Basin, screen size below 1.0 mm are subject to fouling that actually increases the through screen velocity and potentially increases the likelihood of impingement. There also does not appear to be a statistically significant reduction in entrainment for reducing screen size lower than 1 mm, even though the statement was made at the workshop that "small is better". Screen sizes of 1.0 mm or larger appear to be a reasonable approach that takes into account operational realities.	Comment noted. For additional information on screen slot size, please see response to comment 15.4.
12.24	Section III.L.2.d.(2).(a) (page 34) [of the proposed Desalination Amendment]: The phrase "that would otherwise be discharged to the	Please see response to comment 6.6.

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	ocean, unless the wastewater is of suitable quality and quantity to support domestic or irrigation uses" should be deleted or qualified. This phrase as written could be interpreted to negate the preferred technology of commingling brine with wastewater because almost all wastewater could be made suitable for domestic or irrigation uses but there might not be an economically feasible option to reuse that wastewater. This approach also does not take into account changes in technology and/or regulatory restrictions on the use of wastewater for domestic or irrigation purposes. The City recognizes that Water Code section 106 declares that the use of water for domestic and irrigation purposes are the highest uses of water, and the City does recycle its wastewater as feasible. Deleting or modifying this phrase would accommodate the preferred technology of commingling brine with wastewater without undermine the policy reflected in Water Code section 106.	
12.25	Section III.L.2.e.(1).(a) (page 37) [of the proposed Desalination Amendment]: The 36 month entrainment study, the additional sampling using a 200 micron mesh and the 90 percent confidence level all appear excessive and not based on science. A 12 month study using 335 micron mesh size and a 50 percent confidence level are standard.	Please see responses to comments 15.48 (200 micron requirement), 21.90 (90 percent confidence level), and 15.5 (36-month long study).
12.26	Section III.L.2.e.(3).(b).(ii) (page 39) [of the proposed Desalination Amendment]: Mitigation requirements should be fixed and not ongoing. Mitigation for entrainment between 200 and 335 microns should not be required.	The amount of mitigation required will be based on the Marine Life Mortality Report as required in chapter III.L.2.e.(1) of the proposed Desalination Amendment. Even though marine life mortality associated with a facility may be ongoing (e.g. entrainment through a surface water intake), this is a "fixed" mitigation requirement that will compensate for mortality of all forms of marine life associated with a desalination facility throughout its operational lifetime. If a facility is conditionally permitted or expands, then additional mitigation for marine life mortality may be required. Regarding the 200 micron requirement, please see response to comment 15.48.
12.27	Section III.L.2.e.(3).(c) (page 39) [of the proposed Desalination Amendment]: The mitigation plan should consolidate mitigation requirements of all applicable agencies and should be used by the agencies for all mitigation requirements.	As stated in response to comment 18.13, each agency is responsible for implementing requirements, including mitigation requirements, based on their individual authorities. The proposed Desalination Amendment encourages interagency collaboration and the Water Boards will consider findings made by other agencies, including

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		mitigation requirements, when making their determinations. However, the determinations made by the regional water boards must be consistent with their authorities. The regional water board is tasked with requiring mitigation for mortality of all forms of marine life associated with a desalination facility. Other agencies may have requirements that are different than that requirement. Requiring the regional water boards to make their mitigation requirements consistent with other agencies would constitute an unacceptable delegation of authority to other agencies with different mandates. Unless otherwise directed, the State and regional water boards may not defer to other agencies in requiring protection of beneficial uses of waters of the state.
12.28	Section III.L.3.c (page 41) [of the proposed Desalination Amendment]: The requirements for an alternative salinity receiving water limitation study appear excessive. Is a 36-month baseline required?	An owner or operator applying for an alternative receiving water limitation for salinity would be required to perform additional studies per chapter III.L.3.c. The study duration has been reduced to 12 months. Please see response to comment 15.5.
12.29	The species identified for the WET tests [in the proposed Desalination Amendment] should not be mandatory; species found in the area in question should be used.	Please see response to comment 6.10.
12.30	Definition of "Brine Mixing Zone" (page 44-45) [in the proposed Desalination Amendment]: The last two sentences of this definition should be deleted, as they negate or undermine the purpose and intent of a mixing zone. Standard definitions of mixing zones should apply regarding acute toxicity.	Please see response to comment 6.11.
12.31	Definition of "Desalination Facility" (page 45) [in the proposed Desalination Amendment]: This definition does not address or explain how public facilities that are providing potable water for domestic use are treated as industrial facilities subject to Section 13142.5(b).	See, Responses 12.1a, 12.1b, 12.5a and 12.5b above. In the current draft, “Desalination Facility” is defined as “an industrial facility that processes water to remove salts and other components from the source water to produce water that is less saline than the source water.” A public facility providing potable water for domestic use is not otherwise subject to this definition unless it processes seawater to remove salts and other components from the source water in accordance with the definition. The commenter has not explained any intent to use seawater for domestic use without such processing.

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12.32	Definition of "Seawater" (page 49) [in the proposed Desalination Amendment]: This definition is too broad and might capture inland desalination facilities that are not covered by Section 13142.5(b).	Disagree. The definition of seawater is salt water that is in or from the ocean and is limited to waters that are tidally influenced (e.g. coastal estuaries and lagoons) and to underground salt water beneath the seafloor, beach, or other contiguous land with hydrologic connectivity to the ocean. If an "inland" desalination facility is withdrawing water that is in or from the ocean, then Water Code section 13142.5(b) applies. There is a boundary where an inland facility with an intake will no longer be withdrawing water that is in or from the ocean (i.e., seawater); however, the location of that boundary will vary depending on the local hydrology of a location. The definition of seawater is broad enough to cover any desalination facility withdrawing water in or from the ocean without specifying exactly how far inland the facility is. Furthermore, we did not want to define seawater based on the salinity of the water because salinity can be highly variable among sites and can also be highly variable at a specific facility (see Figures 8-5 and 8-6 of the Staff Report with SED). If seawater is defined using the lowest salinity in the state, it may unintentionally include brackish desalination facilities. Whereas seawater is defined using the average salinity in the state, it may unintentionally exclude seawater desalination facilities that are in locations with naturally low natural background salinity. The existing definition of seawater can be applied statewide.
12.33	Definition of "Subsurface" (page 50) [in the proposed Desalination Amendment]: This definition is too broad, particularly the phrase that subsurface includes "beneath the surface of the earth inland from the ocean." As written, this would appear to be a limitless definition that could include all of planet earth.	Comment noted. The definition of subsurface was revised to "subsurface intake" and was limited to intakes withdrawing seawater from the area beneath the ocean floor or beneath the surface of the earth inland from the ocean. Subsurface intakes come in a broad range of types and designs and consequently a fairly broad definition is needed to be comprehensive. The definition was crafted to include not only offshore subsurface intakes, but also subsurface intakes that are installed on shore or on the beach. The definition was revised to limit the subsurface intakes to those that are withdrawing seawater. While the definition of subsurface intakes would permit the installation of a subsurface intake withdrawing seawater anywhere beneath the surface of the earth, realistically, an owner or operator will install a subsurface intake in a logical, cost-effective, and feasible location.
12.34	Appendix G:(page G-22) [of the Staff Report with SED]: The economic	The economic analysis is not required to assess actual costs for specific

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	analysis fails to assess actual cost increases to facilities such as the Existing Facility that have been permitted and operated but to which the Desalination Amendments might apply. The study assumes a zero cost increase which does not appear supportable if the Desalination Amendments require the City to engage in a full Section 13142.5(b) analysis (including possible new mitigation).	facilities or even an extensive analysis of all facility costs, but rather a reasonable range of economic factors associated with reasonably foreseeable methods of compliance with the proposed Desalination Amendment. See, Public Resources Code section 21159(c) Title 23, Calif. Code of Regs., sec. 3777(c). See also, Response 13.38.
12.35	Appendix G (page G-31) [of the Staff Report with SED]: The economic analysis underestimates the capital costs for subsurface facilities because it assume that no pretreatment will be required. This is not supported in all cases. In general, the study underestimates the costs of subsurface intakes.	Please see responses to comments 12.34 and 13.38.
12.36	Appendix G (page G-31-32) [of the Staff Report with SED]: The economic analysis should assess whether the Desalination Amendments constitute an unfunded state mandate that requires a subvention of funds from the state. As the documents admit, the Desalination Amendments do not implement federal requirements. The purported authority for the Desalination Amendments is state law, and the State Board's interpretation of Section 13142.5(b) appears to represent a new program or higher level of service imposed on public agencies. The overall costs to the State to implement this program should be assessed in light of this unfunded state mandate requirement.	The proposed Ocean Plan amendments do not constitute an unfunded local government mandate subject to subvention under Article XIIIB, Section (6) of the California Constitution, for several reasons, including, but not limited to, the following: local agency obligations to analyze and utilize best available site, design technology and mitigation measures feasible are similar to the obligations of non-governmental owners or operators who are subject to the same obligations when seeking approval of a desalination facility using seawater. Further, to the extent that the owner or operator is a municipality, local agencies have the authority to levy service charges, fees, or assessments sufficient to pay for compliance with any requirements associated with the proposed Desalination Amendment. The Desalination Amendments do not mandate a higher level of service but rather provide that any public or private entity otherwise seeking to build a desalination facility using seawater analyze the prescribed factors to minimize intake and mortality of all forms of marine life.
12.37	This portion of the Staff Report properly characterizes the Existing Facility as an existing facility. This approach in the Staff Report should be carried over into the Desalination Amendments.	Although permitted and constructed in the 1990's, the facility has never been the subject of a formal determination by the regional water board as to the "best site, design, technology, and mitigation measures feasible . . . to minimize the intake and mortality of all forms of marine life." While there is no indication that the regional water board made findings at the time the facility was originally permitted, there is no question that the facility was "new" within the meaning of the statute at

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		the time it was constructed. See also, Response to 12.9.
12.38	Chapter 6.2 (page 28-29) [of the Staff Report with SED]: This portion of the Staff Report must be revised to more fully explain the State Board's legal authority to interpret and seek to apply Section 13142.5(b) to municipal desalination facilities that supply domestic potable water, especially those facilities - such as the Existing Facility - designed to operate in drought conditions. Nothing in Section 13142.5(b) directly applies to such facilities, but the Staff Report concludes without any citation to specific legal support that Section 13142.5(b) "gives the State Water Board authority to regulate intakes from new or expanded desalination facilities." A full discussion of the express language of the statute should be provided, as well as a discussion of the one relevant judicial interpretation of the statute. Such an analysis will demonstrate that the express terms of Section 13142.5(b) have no direct application to facilities such as the Existing Facility. While, as was the case in Surfrider Foundation and as may also be the case with Section 316(b) of the Clean Water Act, desalination facilities that are co-located with coastal powerplants may fall within the regulatory scope, and facilities such as the Existing Facility do not.	Water Code section 13142.5(b) applies to a “coastal power plant or other industrial installation using seawater for cooling, heating, or industrial processing . . . .” A desalination facility, including those operated by municipalities, constitutes an industrial installation using seawater for industrial processing. The City does not propose use of seawater for a municipal water supply without first treating it through industrial processing. See also, Responses 12.1a and 12.1b, above. The fact that a facility is designed to operate during drought conditions has no bearing on these conclusions.
12.39	Chapter 8.1.1 (page 40-43) [of the Staff Report with SED]: This section of the Staff Report must be revised to more fully explain the State Board's legal authority to interpret and seek to apply Section 13142.5(b) to municipal desalination facilities that supply domestic potable water, especially facilities - such as the Existing Facility - designed to operate in drought conditions.	See, Response 12.38 above.
12.40	Chapter 8.2 (page 43-44) [of the Staff Report with SED]: This section of the Staff Report should explain the State Board's legal authority to define terms such as "new" or "expanded" and to define terms such as "existing" that are not used in the statute. This section should also explain the State Board's legal authority to apply these new definitions to a facility such as the Existing Facility that has been designed, constructed and fully permitted since the early 1990s.	See Responses 12.3, 12.9, and 12.37, above.
12.41	Chapter 8.3.3 (page 57-58) [of the Staff Report with SED]: The legal	See, Responses 12.1a, 12.1b, and 12.38, above.

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	support for categorizing all desalination facilities as "industrial installations" should be provided. It is also noted that the statute only applies to "industrial installations" that use seawater for "cooling, heating or industrial processing." An explanation of how a facility that provides a water supply for domestic use in drought conditions qualifies as the use of seawater for "industrial processing" should be provided.	
12.42	Chapter 8.6.2.1 (page 83-84) [of the Staff Report with SED]: This portion of the Staff Report should be revised to reflect that the Desalination Amendments designate commingling with wastewater as a preferred approach. The analysis in this portion of the Staff Report appears to undermine this preferred approach.	From the perspective of minimizing intake and mortality of all forms of marine life, commingling brine with wastewater is the preferred technology. However, the intent of this language is to ensure that wastewater that could be recycled is not designated for brine dilution simply because it is the preferred technology and we recognize there are other alternatives for brine dilution (e.g., multiport diffusers). The State Water Board supports the use of recycled water and chapter III.L.2.d.(2)(a) is not intended to take wastewater away from water recycling efforts. The phrase “not be of suitable quality or quantity for domestic or irrigation uses” was deleted from the Staff Report with SED. The sentence now reads, “To ensure the wastewater is being used for the highest purpose, wastewater used for brine dilution should be wastewater that would otherwise be discharged into the ocean.” Other revisions were also made in the documents to clarify that while commingling with wastewater is the preferred alternative, the amendment does not prevent wastewater recycling.
12.43	Project Description: The SED fails to present a stable and fixed project description. Rather than describing the project as the proposed Desalination Amendments and assessing the environmental impacts of that project, the SED merely assesses the pros and cons of desalination. A fixed project description must be used that reflects the changes made by the Desalination Amendments to the Ocean Plan and then the impacts of those changes must be assessed. In particular, the environmental impacts associated with applying the Desalination Amendments to a facility such as the Existing Facility must be analyzed.	The Staff Report with SED does present a stable, fixed and adequate project description. Appendix A of the Staff Report with SED provides a complete copy of the Ocean Plan with proposed changes in underline strike-out. This provides the reader an exact description of the changes that would be made to the Ocean plan. In addition, the project description is summarized In the Introduction (Section 1), Section 4 (Project Summary), and again as alternative 2 in Section 12. In addition, the impacts analysis did analyze, at a programmatic level, potential environmental impacts from the proposed Desalination Amendment. As noted in the beginning of section 12, the impact analysis section of the document was organized in two parts. The first part (section 12.1) discussed the types of impacts that are seen from desalination facilities in general as identified through the readily

Please note all tables and figures referenced are present at the end of this document

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		available, previously approved EIRs found for existing desalination facilities. As noted in the introduction to Section 12, that information was presented for purposes of full disclosure in order to fully inform the decision-maker of the potential impacts of desalination projects in general, and to provide a baseline against which project specific impacts could be judged. The second part, section 12.2 through section 12.4 of the Staff Report with SED discusses project alternatives and the potential impacts associated with each alternative. While the analyses in section 12.1 are quantitative and detailed, the analyses in Section 12.4 are necessarily less detailed and more qualitative. This is appropriate for a programmatic level CEQA analysis where site, design, technology, and mitigation are not known.
12.44	Air Quality: The SED does not assess the air quality impacts resulting from its preference for subsurface intakes. Such intakes will have an increased power demand that will create larger air quality impacts. Also, the air quality impacts associated with construction of subsurface intakes should be assessed.	The fifth paragraph of section 12.4.2 of the Staff Report with SED, beginning at the bottom of page 181, clearly addresses the potential increase in power demand from subsurface pumps and the subsequent increase in emissions. The 5 to 10 percent increase in energy demand by subsurface pumping over surface pumping is offset by the 13 percent energy savings from lower pretreatment requirements for subsurface intakes. Overall, there will be a net decrease in emissions from subsurface intakes over surface intakes.
12.45	Biological Resources: The SED does not assess the biological resource impacts resulting from its preference for subsurface intakes. Such impacts from the construction and operation of such intakes should be assessed.	Potential impacts to biological resources are discussed in sections 8.3.2, 12.1.4 and 12.4.3 of the Staff Report with SED.
12.46	Geology and Soils: The SED does not consider that placement of subsurface intakes involves risks associated with geologic hazards that would be caused by the project because it requires the use of subsurface intakes. These impacts must be analyzed. More generally, the environmental impacts associated with mandatory subsurface intakes must be assessed. As written, the SED merely assumes without analysis that surface intakes are superior and have fewer impacts than surface intakes.	The proposed Desalination Amendment does not “require” the use of subsurface intakes in all circumstances. If a project proponent can show that a subsurface intake is infeasible, the Desalination Amendments allow for the use of surface intakes, with certain conditions. A geologic hazard may be a cause for a finding of infeasibility; however, this analysis should be conducted during the project-level evaluation.
12.47	Greenhouse Gases: The GHG analysis only identifies construction	See response to comment 12.44.

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	impacts, not operational impacts. Because the SED acknowledges that alternatives would require substantially more energy usage, thus increasing GHG emissions, the SED must also analyze operational impacts.	
12.48	Noise: The project's preference for subsurface intakes will result in additional pumping noise which is not currently analyzed. Noise impacts due to additional pumping at subsurface intakes must be assessed.	The Environmental Checklist (Appendix B of the Staff Report with SED) determined that potential noise impacts associated with the Desalination Amendments were no different than those associated with normal construction and operation of desalination facilities. These impacts are discussed in section 12.1.12 of the Staff Report with SED. Pumping stations for surface intakes are located on shore, the same as subsurface pumps. Potential noise impacts would be similar between the two methods and the noise abatement methods that could be employed would be similar. Since the locations and types of pumps are unknown at this time, it would be speculative to determine potential impacts at this programmatic level. Project-level impacts should be evaluated during the environmental review of individual projects.
12.49	Recreation: The SED fails to address impacts to recreational beach use, limitations on recreational fishing or impacts to boat anchoring from construction, operation and maintenance of subsurface intake systems. These impacts are a direct or indirect result of the project and must be analyzed.	The Environmental Checklist (Appendix B of the Staff Report with SED) determined that "(t)he proposed Desalination Amendment would not directly or indirectly cause increased use of regional parks or recreational facilities or require construction or expansion of new facilities because the scope of the Water Board's action relates only to the intake of seawater and discharge of brine in the coastal ocean environment. As determined on a case-by-case basis, the siting, construction and operation of individual desalination facilities will need to consider any potential impacts to recreation; however, these impacts would not be caused directly or indirectly by the State Water Board's proposed Desalination Amendment. In the interest of full disclosure, potential impacts that may occur from approval of a particular desalination facility and the potential impacts to recreation are discussed in section 12.1.15 of the Staff Report with SED."
12.50	Transportation and Traffic: The SED fails to assess the increased traffic associated with subsurface intake construction that will be a direct or indirect result of the project.	The commenter fails to explain how subsurface intake construction requires more traffic than surface intake construction. Both require construction of pipelines and either a pumping station (surface) or a pump associated with a well (subsurface). The Environmental Checklist

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		(Appendix B of the Staff Report with SED) determined that "(t)he proposed Desalination Amendment would not cause directly or indirectly conflicts with applicable traffic plans, policies, or ordinances nor would it conflict with traffic management plans, or increase traffic and associated hazards because the scope of the Water Board's action relates only to the intake of seawater and discharge of brine in the coastal ocean environment. As determined on a case-by-case basis, the siting, construction and operation of individual desalination facilities will need to take into account for potential impacts to traffic; however, these impacts would not be caused directly or indirectly by the State Water Board's proposed Desalination Amendment. In the interest of full disclosure, potential impacts that may occur from approval of a particular desalination facility during construction and operation are discussed in section 12.1.16 of the Staff Report with SED.
12.51	Utilities and Service Systems: The SED fails to assess the increased power required to operate the subsurface intakes that will be required by the project.	See response to comment 12.44.
12.52	Alternatives: In an SED, the Regional Board is required to include "[a]n analysis of reasonable alternatives," which must include "the exploration of feasible less damaging alternatives to the proposed...project." (Cal. Code Regs., tit. 23, § 3777(b)(3); Friends of the Old Trees, supra, 52 Cal.App.4th at 1403-1405; Env'l Protection Info., supra, 170 Cal.App.3d at 610.) The State Board should include an alternative under which facilities such as the Existing Facility would not be treated as a "new or expanded coastal powerplant or other industrial installation using seawater for cooling, healing or industrial processing ..."	The proposed project and the identified alternatives address the issues of seawater intake and brine disposal, and their associated impacts. While classifying individual facilities as either new or existing facilities will change which aspect of the plan will be applied, the specific categories do not change potential adverse impacts to the environment resulting from requirements for intake of seawater and/or brine disposal. Reclassifying individual facilities is not a viable project alternative. However, even were reclassifying individual facilities a viable project alternative, it would not change the environmental impact assessment. Existing facilities that do not expand within the meaning of the amendments will not be affected by the portions of the amendment that deal with Water Code section 13142.5(b) determinations. For the purposes of this CEQA analysis, such existing facilities will not be required, by this amendment to take actions that would result in a physical change to the environment. Existing facilities may still be affected by the discharge requirements if upgrades are necessary to bring them into compliance with the requirements of the amendment. However, in that case, the impacts would be equivalent

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		to or less significant than those of new facilities.
12.53	If the drought conditions continue, the Existing Facility will need to play the vital supplemental water supply role that the City has always envisioned for it and for which it was built. The City's ability to use the Existing Facility should not be undermined by the Desalination Amendments, which has as one of its stated goals to support the use of ocean water as a reliable supplement to traditional water supplies while protecting beneficial uses.	Comment noted.
#13	**Diane C. De Felice, Brownstein Hyatt Farber Schreck, LLP on behalf of Mesa Water District**	
13.1	Mesa Water recognizes and appreciates the enormous task that the State Board and Staff have undertaken in this effort, and understands that the intent was to create guidance that is protective of the environment and "seeks to ensure an efficient approach to permitting desalination facilities to address needed water supplies," with the limited resources at the Regional Water Board level. However, Mesa Water believes that, if the Amendment to the Ocean Plan is adopted "as is", the unintended effect of the Regulations would result in greater regulatory burden at the State and local Regional Water Board level, as well as conflict with other relevant State policies related to water supply planning. Among these are various existing and proposed policies including those set forth in the 2013 California Water Plan Draft Update, excerpted below: "Policy 1 - The State recognizes that desalination is an important water supply alternative and, where economically, socially and environmentally appropriate, should be part of a balanced water supply portfolio, which includes other alternatives such as conservation and water recycling." "Policy 6 - Desalination should be evaluated using the same well-established planning criteria applied to all water management options, using feasibility criteria such as: water supply need within the context of community and regional planning, technical feasibility, economic feasibility, financial feasibility, environmental feasibility, institutional feasibility, social impacts, and climate change. The California Desalination Planning Handbook published by DWR should be one of the	Water Code section 10004 states that the California Water Plan is a “plan for the orderly and coordinated control, protection, conservation, development, and utilization of the water resources of the state.” The statute and those following describe a process and considerations for formulating long-term policy with regard to water resources. The Final California Water Plan Update 2013 describes itself as “a resource and tool to guide investment priorities and legislative action and ensure resilient and sustainable water resources moving forward based on decades of scientific data and analyses, nearly 40 State agency plans, and the voices of hundreds of stakeholders.” By contrast, Water Code section 13142.5(b) is a statute specifically requiring the best available site, design, technology and mitigation measures feasible to minimize intake and mortality of all forms of marine life. While the Plan update may be instructive for planning the use of desalination as part of California’s water resources, the State Water Board is not required to ensure that Ocean Plan amendments implementing provisions of the Porter-Cologne Water Quality Control Act be consistent with recommendations and strategies contained therein.

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	resources used by water supply planners ..." "Policy 8 - DWR, in collaboration with regulatory agencies, should lead an effort to create a coordinated streamlined permitting process for desalination projects. Because of the many regulatory agencies involved in desalination of ocean, bay or estuarine waters, a coordinated framework to streamline permitting approvals without weakening environmental and other protections should be explored. Establishing an appropriate sequencing of approval by the various agencies may be appropriate. The Ocean Protection Council may be appropriate for the role of coordinating regulatory reviews and guiding project sponsors through the regulatory process ..."	
13.2	The below highlights the SR/SED's inadequate analysis of the Amendment, which violates the California Environmental Quality Act ("CEQA"), the State Board's SED regulations and the California Coastal Act. This conclusion is supported by an analysis from experts at MBC Applied Environmental Sciences that address the SR/SED's (and supporting documentations) technical analysis of impacts to marine life. As more fully discussed below, the SR/SED fails as an informational document. Specifically, it fails: (1) to adequately define the Project as it does not accurately reflect the actual intended action of the regulations nor their reasonably foreseeable future effects;…	This introductory comment is addressed below in the specific comments.
13.3	...(2) to analyze all significant environmental impacts of the Project as it is limited to a less than one page discussion for five topical impacts; …	This introductory comment is addressed below in the specific comments.
13.4	...and (3) to properly analyze Project alternatives. Stated differently, the SR/SED's analysis is deficient because it omits relevant data and rather than thoroughly analyzing the proposed Amendment's environmental impacts, it analyzes desalination projects in general and then frames the Project as an alternative with only a cursory analysis of its impacts.	This introductory comment is addressed below in the specific comments.
13.5	For example, the SR/SED fails to adequately discuss the various types of construction/operational impacts associated with subsurface intakes or the magnitude of those impacts in any detail…	This introductory comment is addressed below in the specific comments.

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13.6	Specifically, the SR/SED fails to adequately consider recent coastal desalination projects which have readily available scientific literature and environmental documents. By failing to conduct this analysis, the State Board has created a conclusory document which supports its Proposed Amendment instead of complying with CEQA and providing an analysis of environmental impacts that the State Board must consider before approving or denying the Amendment.	This introductory comment is addressed below in the specific comments.
13.7	In addition, the SR/SED and Amendment contain inaccurate definitions, mischaracterizations, incorrect or unclear citations to technical literature and unsupported claims. (See Exhibits A [Comments on Ocean Plan Amendment, pp. 18-21] and B.)	This comment is addressed below in the specific comments.
13.8	Mesa Water disagrees that: (1) subsurface intakes are by default the preferred technology for seawater intakes for all new or expanded desalination facilities; …	Comment noted. The information for why subsurface intakes are the preferred technology is located in section 8.3.1.2.3 of the Staff Report with SED. A further explanation as to why the proposed Desalination Amendment does not take a technology neutral approach for intakes is explained in response to comment 15.2.
13.9	...and (2) the guidelines for brine discharges should be set at a limit of 2 ppt above the natural background salinity at 100 meters from the point of discharge.	Comment noted. Please see response to comment 13.154.
13.10	Mesa Water recommends that the Proposed Amendment be revised to provide applicants with greater site design flexibility in selecting what is most appropriate for new projects including the latest available technology for new desalination projects.	The proposed Desalination Amendment maintains an appropriate balance of flexibility for site-specific considerations and implementing statewide standards. There are multiple opportunities for an owner or operator to seek an alternative compliance pathway in the proposed Desalination Amendment. Furthermore, the regional water boards will conduct a Water Code section 13142.5(b) determination on a project-specific basis for all new and expanded desalination facilities. This process will determine the best available site, design, technology, and mitigation measures feasible for minimizing intake and mortality of all forms of marine life. This determination will take into account project-specific conditions.
13.11	Further, the SR/SED arbitrarily chooses subsurface intakes to the exclusion of analysis of other demonstrated methods. As described	The preference for subsurface intakes is not arbitrary. Please see response to comment 13.8

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	below, desalination projects require site-specific analysis instead of a one-size-fits-all approach.	
13.12	Accordingly, Mesa Water respectfully requests that the entire SR/SED and Regulations be revised to include a more robust discussion of the potentially significant environmental impacts of subsurface intakes, as well as reflecting the potentially benign effects of properly designed passive screened surface intakes. Alternatively, the SR/SED should be revised to include a full analysis of the impacts of subsurface intakes and then be recirculated for public comment.	See, response to comment 13.75 below.
13.13	SED Requirements Although the SED is, by definition, a substitute environmental document, the Board must comply with the requirements of CEQA when adopting water quality control plans. Environmental review documents prepared by certified programs may be used instead of environmental documents that CEQA would otherwise require. Documents prepared by certified programs are considered the "functional equivalent" of documents CEQA would otherwise require. When conducting its environmental review and preparing its documentation, a certified regulatory program is subject to the broad policy goals and substantive standards of CEQA. In a certified program, an environmental document used as a substitute for an EIR [such as the SED in this case] must include "[a]lternatives to the activity and mitigation measures to avoid or reduce any significant or potentially significant effects that the project might have on the environment[.]' (CEQA Guidelines, §15252(a)(2)(A).)" (City of Arcadia v. SWRCB, (2006) 135 Cal.App.4th 1392, 1421-1422.) "A regional board's submission of a plan for State Board approval must be accompanied by a brief description of the proposed activity, a completed environmental checklist prescribed by the State Board, and a written report addressing reasonable alternatives to the proposed activity and mitigation measures to minimize any significant adverse environmental impacts." (Id. at 1423, citing Cal. Code Regs., tit. 23, § 3777(a).)	Pursuant to Public Resources Code, section 21080.5, a certified regulatory program, such as the State Water Board's Water Quality Control Program, is exempt from chapters 3 and 4, and section 21167 of CEQA and the corresponding sections of the CEQA Guidelines. The Secretary for Resources has identified the Water Quality Control Planning Program of the State and Regional Water Boards as a certified Regulatory Program (Cal. Code Regs., tit, 14, §15251). The State Water Board has developed Substitute Environmental Documentation as provided in CEQA section 21080.5 and CEQA Guidelines section 15252. The documentation requirements for substitute environmental documents are governed by the State Water Board's CEQA regulations (Cal. Code Regs., tit, 23, §3777), which are consistent with the requirements of California Code of Regulations Section 15252. All of the specific elements identified by the commenter and required by the State Water Boards' CEQA Regulations are included in the Staff Report with SED for the proposed Desalination Amendment.
13.14	Standard of Review CEQA has two primary purposes. First, CEQA is designed to inform decision-makers and the public about the potential, significant	Public Resources Code section 21168.5 applies to State Water Board planning functions and provides that in an action for review of "a determination, finding, or decision of a public agency on the grounds of

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	environmental effects of a project, (CEQA Guidelines, §15002(a)(1).) "Its purpose is to inform the public and its responsible officials of the environmental consequences of their decisions before they are made. Thus, the EIR 'protects not only the environment but also informed self-government.'" (Citizens of Goleta Valley v. Board of Supervisors (1990) 52 Cal. 3d 553, 564.) For the first time in May 2014 in an unpublished decision, a California appellate court reviewed the adequacy of a SED prepared by the State Board for an amendment to the Water Quality Control Plan for the San Francisco Bay Region Water Quality Control Board. (Living Rivers Council v. State Water Resources Control Board, 2014 WL 1813289 (1st Dist., May 7, 2014) ("Living Rivers").) While non-precedential, this case is instructive in that the Court explained the standard of review for a SED is that set forth by the California Supreme Court in Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova (2007) 40 Cal.4th 412 ("Vineyard Area Citizens"): "[A]n agency may abuse its discretion under CEQA either by failing to proceed in the manner CEQA provides or by reaching factual conclusions unsupported by substantial evidence. (§ 21168.5.) Judicial review of these two types of error differs significantly: while we determine de novo whether the agency has employed the correct procedures, 'scrupulously enforc[ing] all legislatively mandated CEQA requirements' [citation], we accord greater deference to the agency's substantive factual conclusions. In reviewing for substantial evidence, the reviewing court 'may not set aside an agency's approval of an EIR on the ground that an opposite conclusion would have been equally or more reasonable,' for, on factual questions, our task 'is not to weigh conflicting evidence and determine who has the better argument.' "In evaluating an EIR for CEQA compliance, then, a reviewing court must adjust its scrutiny to the nature of the alleged defect, depending on whether the claim is predominantly one of improper procedure or a dispute over the facts. For example, where an agency failed to require an applicant to provide certain information mandated by CEQA and to include that information in its environmental analysis, we held the agency	noncompliance with this division, the inquiry shall extend only to whether there was a prejudicial abuse of discretion. Abuse of discretion is established if the agency has not proceeded in a manner required by law or if the determination or decision is not supported by substantial evidence." As noted, the 2014 case cited is unpublished.

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	'failed to proceed in the manner prescribed by CEQA.' [citation]. In contrast, in a factual dispute over 'whether adverse effects have been mitigated or could be better mitigated' [citation], the agency's conclusion would be reviewed only for substantial evidence." (Vineyard Area Citizens, 40 Cal.4th at 435.) In the sole SED case, the Court carefully reviewed the SED for compliance with the SED regulations and CEQA requirements. Unlike here, the amendment at issue in Living Rivers sufficiently evaluated vineyard drainage, and did "extensive analyses of the potential environmental impacts caused by requiring compliance with the 125 percent of background TMDL." (2014 WL 1813289 at 6.)	
13.15	The SR/SED Fails to Include an Executive Summary Missing from the Introduction section is an executive summary which is fundamental to assisting the public in understanding the key impacts and areas of controversy associated with the Amendment. Without this explanation or summary, it is difficult to digest the myriad of documents, which are lengthy and randomly organized. For example, it is unclear what is actually being analyzed, what the significant impacts are, and where the Staff Report ends and the SED begins.	As noted in response to comment 13.13, the Desalination Amendments are part of a certified Regulatory program that is exempt from the requirement to prepare an EIR. Instead, the documentation requirements, including organization of the SR/SED, are determined by the State Water Board's regulations (Cal. Code Regs., tit, 23, §3777). While the regulations do not require an executive summary. Section 1 of the Staff Report with SED has been amended to include one.
13.16	To avoid this problem, the CEQA Guidelines require that an EIR contain a brief summary of the proposed project and its consequences, using language that is as clear and simple as is reasonably practical. (CEQA Guidelines, § 15123(a).) The summary should normally not exceed 15 pages. (CEQA Guidelines, § 15123(c).) Under CEQA Guidelines section 15123(b), an EIR summary must identify: - Each significant environmental effect of the project and proposed mitigation measures and project alternatives that would reduce or avoid each effect; - Areas of controversy that are known to the lead agency, including issues raised by other agencies and issues raised by the public; and	See response to comment 13.15. Note that section 15123(b) of the CEQA guidelines applies to a summary required for an EIR, not an SED.

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	- Issues to be resolved, including the choice among project alternatives, and whether or how to mitigate the project's significant effects. To assist the public, Mesa Water recommends that the SR/SED be revised to include an executive summary that complies with CEQA.	
13.17	The Background on "Seawater Desalination In California" Contains Inaccuracies (Section 2) Section 2 of the SR/SED, entitled "Seawater Desalination in California," contains inaccuracies and lacks relevant analysis, and therefore should be revised to correct those statements. Specifically, the following revisions are recommended: Page 12, Paragraph 4 : The references to impingement should be deleted or clarified as none of the proposed coastal desalination facilities listed in Table 2-2 would have impingement impacts due to the facilities' low intake velocity.	The intent of the language in the Staff Report with SED is to identify potential factors that may harm aquatic life beneficial uses. Impingement is highlighted here as a potential threat and then methods of reducing or eliminating impingement are described later in the document.
13.18	Page 12, Paragraph 5 [of the Staff Report with SED]: The statement that "few impingement or entrainment studies are available" is misleading as the SR/SED does not include the extensive analysis conducted by various ocean desalination proponents. The SR/SED and proposed Amendment should be revised to include and consider the information contained in the impingement/entrainment studies conducted at pilot and demonstration plants, including at minimum the following locations: - Carlsbad (Poseidon Resources) - Camp Pendleton (San Diego County Water Authority) - Redondo Beach (West Basin Municipal Water District) - Santa Cruz (City of Santa Cruz and Soquel Creek Water District) - Marin (Marin Municipal Water District)	Table 2-1 contains the list of existing desalination facilities in California. The studies listed, with the exception of the Marin desalination facility, are pilot studies and not for fully operational desalination facilities. The language in the Staff Report with SED adequately represents the state of the science in this field.
13.19	[Page 12 - Continuing to Page 13 [of the Staff Report with SED]: The discussion beginning on the bottom of page 12 and continuing to page 13 regarding "cooling water intakes" (OTC) is inappropriate and should be	Please see response to comment 20.1. As mentioned in response to comment 13.18, the data for impingement and entrainment at seawater desalination facilities in California is not abundant. Surface intakes from

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	deleted. Desalination intakes draw in substantially less volume than typical OTC plants. In addition, the proposed desalination plants would utilize modern intake structures, likely either subsurface intakes or passive ocean intakes, which effectively eliminates impingement and substantially reduces entrainment. In general, the Amendments should entirely avoid, or clearly distinguish, references to OTC in these documents.	desalination facilities entrain organisms in the same manner as OTC facilities. The volume of intake water for a desalination facility will be less than an OTC facility; however, the data from the OTC facilities can be used to estimate impacts at desalination facilities by assuming that the relationship between intake volume and entrainment is linear.
13.20	Page 13, Paragraph 1 [of the Staff Report with SED]: The last sentence of the first full paragraph, the reference to a two to four ppt salinity range tolerance, should be clarified to indicate which indigenous species showed effects at this level and should state that depending on site-specific conditions, proposed desalination plant discharge locations may not affect these sensitive species.	The intent of Section 2.2 of the Staff Report with SED is to provide a high level discussion of the potential impacts to aquatic life related beneficial uses. The details of the Phillips et al. (2012) study are provided in Appendix F of the Staff Report with SED. The specific species that showed the effects at the lower level is insignificant because the species used in the study serve as model species and representatives of their broader taxa. Phillips et al. (2012) conducted a study of the effects of hyper-salinity on all seven toxicity test organisms from the Ocean Plan. For example, mussels and oysters are in the Class Bivalvia, which includes clams, oysters, cockles, mussels, and scallops. Even though a facility may not have mussels at their discharge site, a benthic infaunal clam species may be present and mussels and clams have identical developmental stages through the veliger larval phase. (Shanks 2001) The toxicity results from the mussels or oysters can be used as an indicator of toxicity for all other related species without having to perform studies for each species. For a further discussion on why 2 ppt above natural background salinity was determined to be an appropriate receiving water limitation, please see Section 8.7 and 8.7.4. For a further discussion on using model species rather than wild-caught or indigenous species for toxicity testing, please see response to comment 6.10.
13.21	Page 14, Table 2-1 [of the Staff Report with SED]: This should be updated to reflect the current status of Duke Energy (Station ID 5) as "Inactive" and Santa Barbara (Station ID 8) as "Pursuing Reactivation."	The status of the City of Santa Barbara was changed to temporarily idle. The City of Santa Barbara may or may not pursue reactivation. Please see response to comment 12.37. Regarding the Duke Energy desalination facility, we would appreciate if the commenter could provide a reference for this information.

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13.22	Page 17, Table 2-2 [of the Staff Report with SED]: This should be updated to reflect the current status of proposed coastal desalination facilities. At minimum, the table should be corrected as follows: - Station ID Nos. 4 and 5 are mutually exclusive, meaning either one or the other may be built, but it is unlikely that both will be built. - Add an entry for "Monterey Peninsula Water Supply Project, California American Water," listing the Location as "TBD," Production Capacity as "6.4-9.6 MGD," and Intake as "Subsurface, Commingled." - Station ID No. 10 (West Basin Municipal Water District) should list Location as "Redondo Beach/El Segundo," and Production Capacity as "20-80 MGD."	We would appreciate if the commenter could provide a reference for the information that Station ID Nos. 4 and 5 are mutually exclusive. Even though the projects may be mutually exclusive, they are both proposed desalination projects in California. Regarding the Monterey Peninsula Water Supply Project, California American Water provided us with the correct information to update Table 2.2. Regarding West Basin Municipal Water District's planned desalination facility; there is no reference to support that their production capacity will be between 20 and 80 MGD. Furthermore, their comment letter did not request this change to the table.
13.23	The SR/SED Contains an Inadequate Project Description and Goals (Section 4) The SR/SED's half-page Project Description (Section 4.2) fails to accurately set forth the elements of the Amendment, as required by CEQA. An "accurate, stable and finite project description is the sine qua non of an informative and legally sufficient EIR." (County of Inyo v. City of Los Angeles (1977) 71 Cal.App.3d 185, 193.) An inaccurate or truncated project description is prejudicial error because it fails to "adequately apprise all interested parties of the true scope of the project." (See City of Santee v. County of San Diego (1989) 214 Cal.App.3d 1438, 1454-55.) An EIR is therefore flawed when an "enigmatic or unstable project description draws a red herring across the path of public input," because "[o]nly through an accurate view of the project may affected outsiders and public decision-makers balance the proposal's benefit against its environmental cost." (County of Inyo, 71 Cal.App.3d at 198, 192.) Here, the Project Description describes the "components" of the Amendment in vague terms without clearly identifying the changes the Amendment would make to the Ocean Plan. Not until Chapter 8 (Issues Considered In the Development of the Proposed Desalination	The Staff Report with SED does contain an adequate project description. Appendix A of the Staff Report with SED provides a complete copy of the Ocean Plan with proposed changes in underline strike-out. This provides the reader an exact description of the changes that would be made to the Ocean plan. In addition, the project description is summarized In the Introduction (Section 1) Section 4 (Project Summary), and again as Alternative 2 in Section 12. There is no mischaracterization of the proposed project such as in *County of Inyo v. City of Los Angeles*, as the reader has been directed to the detailed amendment. See also response to comment 12.43.

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	Amendment) are the elements of the Amendment finally revealed: (1) defining the type of facilities to be covered by Amendment policies; (2) developing definitions for new, expanded and existing facilities; (3) identifying a preferred method of seawater intake; (4) establishing statewide guidelines for evaluating site alternative; (5) establishing statewide mitigation guidelines for desalination-related impacts; (6) establishing guidelines for regulation of brine discharge; and (7) developing a receiving water limit for salinity. None of these elements are called out in the Project Description in a way that enables the public to understand the scope of the Amendment.	
13.24	More importantly, the inaccurate and vague Project Description fails to disclose that the Amendment is designed to discourage or preclude open ocean intakes in favor of subsurface intakes	The project description clearly states that, *"The proposed Desalination Amendment would protect and maintain the highest reasonable water quality possible for the use and enjoyment of the people of the state while supporting the use of ocean water as an alternative source of water supply."* Subsurface intakes are the preferred intake technology for the reasons stated in section 8.3. The second item in section 4.2, also clearly states that the regional water boards will evaluate the best available site, design, technology, and mitigation measures feasible to minimize intake and mortality of all forms of marine life. Chapter III.L.2.a.(2) of the proposed Desalination Amendment expands on how the four factors are evaluated: *"The regional water board shall conduct a Water Code section 13142.5(b) analysis of all new and expanded desalination facilities.* A Water Code section 13142.5(b) analysis may include future expansions at the facility. The regional water board shall first analyze separately as independent considerations a range of feasible* alternatives for the best available site, the best available design, the best available technology, and the best available mitigation measures to minimize intake and mortality of all forms of marine life.* Then, the regional water board shall consider all four factors*

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		collectively and determine the best combination of feasible alternatives to minimize intake and mortality of all forms of marine life.* The best combination of alternatives may not always include the best alternative under each individual factor because some alternatives may be mutually exclusive, redundant, or infeasible in combination."*
13.25	Further, it is unclear whether the Amendment governs only desalination projects using ocean water, or whether it proposes to regulate brackish water desalter facilities that discharge brine into the ocean.	Please see response to comment 8.1.
13.26	The SR/SED's nebulous Project Description is problematic as the adequacy of an EIR's analysis of significant environmental effects is closely linked to the adequacy of its project description. An EIR must contain a project description that is sufficient to allow an adequate evaluation of the project's environmental impacts. (Dry Creek Citizens Coalition v. County of Tulare (1999) 70 Cal.App.4th 20, 27.) A failure to adequately describe anticipated project operations can also result in a flawed impact analysis. (See San Joaquin Raptor Rescue Ctr. v. County of Merced (2007) 149 Cal.App.4th 645 [project description for mining project failed to describe increase in levels of production that would occur under new permit].)	See responses to comments 13.23 and 12.43.
13.27	Even if the Project Description was amended to accurately reflect the Amendment's key purpose, which is to promote subsurface intakes, there is insufficient analysis provided to support Staff's recommendation and conclusions that this method is the environmentally superior alternative to justify it being mandated unless proven infeasible. (See Alternatives discussion detailed in SR/SED Section 12.4.) As a threshold matter, the term "infeasible" in the SR/SED should be specifically defined as it is unclear what would need to be shown to demonstrate that a subsurface intake is infeasible.	Please see response to comment 6.12.
13.28	The Project Objectives Fail to Contain All of the Amendment's Goals A legally sufficient project description also must include a "clearly written statement of objectives" that accurately explains "the underlying purpose of the project." (CEQA Guidelines, §15124(b).) Misleading project	The project goals are clearly stated in section 4.3 as: (1) Provide a consistent statewide approach for minimizing intake and mortality of marine life, protecting water quality, and related beneficial uses of ocean waters, (2) Support the use of ocean water as a reliable supplement to traditional water supplies while protecting beneficial uses

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	objectives give "conflicting signals to decisionmakers and the public about the nature and scope of the activity being proposed." (San Joaquin Raptor Rescue Ctr., 149 Cal.App.4th at 655-56.) The SR/SED's Project Goals (Section 4.3) are analogous to project objectives in an EIR, are part of the project description, and should accurately explain the underlying purpose of the Project (i.e., adoption of the Amendment). The Project Goals are narrowly focused on minimizing mortality of marine life and fail to include, among other things, minimizing onshore impacts. As the SR/SED makes clear, a primary purpose of the Amendment is to establish a regulatory preference for use of subsurface intakes over open ocean intakes and to require desalination facilities to use subsurface intakes to the greatest extent possible. The Amendment's goal of establishing this preference and the other policies reflected in Section 8's Staff Recommendation for each element should be clearly stated as Project Goals in order to accurately reflect the true scope of the Amendment.	and (3) Promote interagency collaboration for siting, design, and permitting of desalination facilities and assist the State and regional Water Boards (Water Boards) in regulating such facilities. One of the project goals is not, as the commenter states, to establish a preference for subsurface intakes. However, as thoroughly discussed in sections 8.3 and 8.4 of the Staff Report with SED, use of subsurface intakes is superior to other forms of intakes as a way to achieve the stated goal of "minimizing intake and mortality of all forms of marine life." The requirements outlined in the proposed Desalination Amendment are a means to achieve that goal, not an objective of the project.
13.29	The Project Goals should also include a statement reflecting the State Board's desire to adopt Amendments that are consistent with applicable State policy and regulations, including the California Water Plan and the Governor's California Water Action Plan (discussed above). Each identified "Option" discussed in the SR/SED and each Alternative identified in Section 12.4 should be evaluated in light of the Project Goals and consistency with other existing State policies, plans and regulations.	The project goals are clearly stated in the Staff Report with SED (see response to comment 13.28). Determining consistency with State policy and regulations is part of the evaluation process for a project. The Staff Report with SED contains discussions on regulatory consistency in chapters 5 and 6. Further, the Environmental Checklist contained in Appendix B of the Staff Report with SED determined that the proposed Desalination Amendment would: • Not conflict with existing zoning or cause rezoning. • Not conflict with any local policies or ordinances protecting biological resources • Not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. • Not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. • Not conflict with any applicable land used plan, policy, or regulation adopted for the purpose of avoiding or mitigating an

Please note all tables and figures referenced are present at the end of this document

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		environmental effect. • Not conflict with an applicable transportation plan, ordinance or policy. • Not conflict with an applicable congestion management plan. • Not conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities. • Not conflict with federal, state, and local statutes and regulations related to solid waste.
13.30	The SR/SED Fails to Establish an Accurate Baseline for the Project (Section 7) The baseline environmental setting of the SR/SED does not accurately describe the environmental setting. An "environmental setting," is defined as "the physical environmental conditions in the vicinity of the project." CEQA Guidelines provide that the existing physical conditions in the vicinity of the project "will normally constitute the baseline physical conditions by which a Lead Agency determines whether an impact is significant." (CEQA Guidelines, § 15125(a).) While the SR/SED sets forth a general overview of marine ecosystems in California, it should note that the identified sensitive species and habitats are site-specific, and that some proposed desalination facilities may have intake and/or discharge facilities proposed in relatively benign locations such as sandy substrates.	The Staff Report with SED is a programmatic document analyzing the potential environmental impacts of a statewide amendment. As such, there are no specific “physical environmental conditions in the vicinity of the project”. The Staff Report with SED provides an adequate description of marine ecosystems in California along with a discussion of sensitive species and habitats. Further, special emphasis should be placed on environmental resources that are rare or unique (CEQA Guidelines §15125(a)). The Staff Report with SED acknowledges that potential impacts to marine resources are site specific and that location can affect the level of potential impacts (see Sections 7.1 [especially 7.1.6], 8.4, 12.1.4, and 12.4.3 of the Staff Report with SED). When desalination facilities are proposed, the environmental documentation developed for each project should contain a project-specific “environmental setting” by which to determine the potential environmental impacts of each individual facility.
13.31	In addition, as identified in Exhibit A, there are several inaccuracies in the Environmental Setting's description of Kelp Beds, Surfgrass and Eelgrass Beds, Sensitive Habitats, Broadcast Spawners and Larval Recruitment, and Fisheries in California. (See Exhibit A, pp. 2-4; see, e.g., SR/SED, pp. 33-38.) These inaccuracies should be corrected in the recirculated SED.	The alleged inaccuracies have been addressed in the specific subsequent comments.
13.32	In addition, Section 7 of the SR/SED (and other sections) repeatedly refers to The Brine Panel Report as "Roberts, et al. 2012." This is not a valid citation; and because it is referenced so often in the document, it should be cited property. The title page of The Brine Panel Report appears in Attachment 1, and a proper citation by authorship is:	This is not a comment on an environmental issue. Roberts was the panel chair and was consequently cited as the first author. This approach was taken for all of the Expert Panel reports.

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	Jenkins, S. A., J. Paduan, P. Roberts, D. Schlenk, and J. Weis, "Management of Brine Discharges to Coastal Waters; Recommendations of a Science Advisory Panel", submitted at the request of the California Water Resources Control Board, Southern California Coastal Water Research Project, Tech. Rpt. 694, March, 2012, 56 pp. + App.	
13.33	By mutual agreement of the Brine Panel members, the order of authorship was by alphabetical order, although by page and figure count, the contributions by Jenkins and Roberts was roughly equal. Since this document was released as a technical report of the Southern California Coastal Water Research Project (SCCWRP) an appropriate alternative for referencing this document would be: SCCWRP (2012), Management of Brine Discharges to Coastal Waters; Recommendations of a Science Advisory Panel," submitted at the request of the State Water Resources Control Board by the Southern California Coastal Water Research Project, Costa Mesa, CA, Technical Report 694, March 2012, 56 pp. + App.	Please see response to comment 13.32.
13.34	Comments on "Issues Considered in the Development of the Proposed Desalination Amendment" (Section 8 [of the Staff Report with SED]) Section 8 of the SR/SED, entitled Issues Considered in the Development of the Proposed Desalination Amendment contains multiple inaccuracies and should be revised to correct those statements. Page 62, Paragraph 1: The second sentence of paragraph 1 reads "The absence of sensitive species in an area can be used [as] an indicator of pollution...." This sentence should be modified to clarify that the absence of sensitive species may also simply reflect the nature of the underlying benthic environment, such as sandy substrates.	The Staff Report with SED language identified is true as stated. Species will vacate an area if water quality conditions are outside of their tolerance threshold. Sensitive species have a narrower tolerance range and are usually the first to leave an area if water quality conditions change. The assumption that sensitive species do not reside in habitats with sandy substrates is unfounded.
13.35	Page 62, Paragraph 2: This section reflects a bias in the documents against Once-Through Cooling (OTC), which occurs when desalination facilities are co- located with power plants and other industrial cooling water intakes. Although loss of the OTC source water flow creates a	In the past, collocating desalination facilities with OTC facilities was an environmentally preferred options for the reasons stated in comment 13.35. However, as power plants come into compliance with the OTC Policy, many of the benefits of collocating will be eliminated. Once the

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	"stand alone" condition for a co-located desalination facility, these documents (SR/SED and Regulations) underplay or omit the remaining potential benefits of a co-located desalination facility, which should be factored into facility siting and intake/discharge considerations. These potential benefits include, but are not limited to: - Existing intake/discharge infrastructure minimize additional marine environment construction impacts; - Existing developed site, typically zoned for industrial use, minimizes potential land use conflicts; - Existing infrastructure such as electrical, gas, access, wastewater connections, etc.; - Opportunities to create GHG friendly hybrid water/power facilities through such technologies as thermal distillation; - Opportunities for reduced electricity costs; and - Accordingly, all references to OTC data should be deleted or carefully distinguished from desalination Impingement/Entrainment effects.	benefits of co-location are eliminated, the long-term-stand-alone facility may be sited at a location that is no longer the best available site to minimize intake and mortality of marine life, but it may be impractical to move the facility. We caution against siting a future desalination facility next to a power plant that is not yet in compliance with the OTC Policy solely to receive the short-term benefits listed in comment 13.35. It is prudent to consider the long term amount of intake and mortality of marine life for a site and consider what the impacts will be from the desalination facility after the OTC plant reduces the intake volume. There are clear distinctions between OTC and desalination in the Staff Report with SED, but to further clarify, additional information is provided here: It is important to include the OTC Policy in the desalination discussion because the Policy was used in partas the basis for the language in the Draft Desalination Amendment to the Ocean Plan because of the similar environmental impacts that occur during operation of the facilities' changes. Even though the volume of water withdrawn from desalination facilities is typically significantly lower than the water withdrawn by OTC facilities, impingement and entrainment or marine life will still occur at desalination facilities using screened surface intakes. The purpose of the OTC Policy was to eliminate or significantly reduce the intake of seawater at facilities in order to prevent marine life mortality, in accordance with the requirements set forth in Clean Water Section 316(b). Even though it may not seem like it, "seawater… is not just water. It is habitat and contains an entire ecosystem of phytoplankton, fishes, and invertebrates." (York and Foster 2005) These small organisms form the base of the marine food web and are a vital part of the marine ecosystem. In addition, desalination facilities have impacts to marine life from the brine discharges that do not occur with OTC facilities. New and expanded seawater desalination facility intakes will be regulated under California Water Code section 13142.5(b) rather than

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		316(b), which by its own terms is applicable only to cooing water intake structures. Water Code section 13142.5(b) requires that facilities use the best available site, design, technology, and mitigation measures feasible to minimize the intake and mortality of all forms of marine life. Since the desalination process requires the use of water, the intake of seawater cannot be completely eliminated. But requiring compliance with the provisions in California Water Code section 13142.5(b) will support the same goals of the OTC Policy by ensuring desalination facilities are constructed and operated in the most protective manner prior to requiring mitigation.
13.36	Page 64, Paragraph 2 [of the Staff Report with SED]: The fourth sentence of paragraph 2 reads - "All other things being equal, locations where subsurface intakes are feasible would be considered the best..." This sentence should be modified to allow evaluation of intake options on a site-specific basis, recognizing that some subsurface intake locations could have significant environmental impacts, while ocean intakes in certain environments could have relatively nominal impacts or impacts that can be readily mitigated to less than significant levels.	The Staff Report with SED language identified is correct as stated. Subsurface intakes would be sited where they would have the least amount of environmental impacts. The proposed Desalination Amendment requires consideration of the best available alternative for each individual factor and then the regional water board will determine the best combination of alternatives to minimize intake and mortality of all forms of marine life. Chapter III.L.2.e defines mitigation as the replacement of all forms of marine life or habitat that is lost due to the construction and operation for a desalination facility *after* minimizing mortality of all forms of marine life through the best available site, the best available design, and the best available technology measures. Even though the impacts from a surface water intake could be mitigated, the goal is to avoid impacts requiring mitigation in the first place.
13.37	In addition, this section [of the Staff Report with SED] should be updated to reflect the extensive work done to date studying desalination facilities' potential use of subsurface intakes (at Doheny and Marina) and passive wedgewire intakes (at Camp Pendleton, Redondo Beach, Santa Cruz and Marin). Further, because of the length of the technical comments and suggested edits to Section 8, they are not included here but are discussed in detail in Exhibit A. (Exhibit A, pp. 4-17.)	While staff reviewed the environmental documentation from a wide variety of desalination facilities, the review was not, and did not need to be exhaustive. The purpose of the review was to identify the typical range of environmental impacts that could be expected from the construction and operation of a desalination facility in general. Although the listed documents were not cited in the Staff Report with SED, staff is aware of and has reviewed them. No changes to the Staff Report with SED are required as a result of that review of those documents.
13.38	The SR/SED'S Economic Analysis Is Inadequate Because it is Based on	CEQA does not require an extensive economic analysis in an SED.

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	a Narrow Data Set that Does Not Include Data for all Existing Seawater Desalination Plants thus Excluding Analysis of both Potential Physical Impacts and Impacts to Ratepayers (Section 9 & Appendix G) While an EIR must evaluate a project's physical impacts on the environment, consideration of a project's economic and social impacts are appropriate when determining whether a project's physical impacts are significant. Though "[e]conomic and social changes" are not themselves significant effects on the environment, "economic and social effects of a physical change may be used to determine that the physical change is a significant effect on the environment." (CEQA Guidelines,§ 15064(e).) "If the physical changes cause adverse economic or social effects on people, those adverse effects may be used as a factor in determining whether the physical change is significant." (CEQA Guidelines,§§ 15064(e), 15832; 1 Kostka & Zischke, Practice Under the California Environmental Quality Act (2d ed. Cal CEB 2014), §§ 6.36, 6.52.) As discussed above, the SR/SED's failure to address environmental impacts, specifically the inland impacts to water supply and water quality likely to result from requiring subsurface intakes, leads to the omission of associated economic costs (e.g., increased well drilling/maintenance costs, impairment of water supply, etc.) from the Economic Analysis found in Appendix G (Appendix G Economic Analysis). Accordingly, the Economic Analysis is inaccurate and potentially undervalues the extent of economic costs associated with subsurface intakes. This omission prevents a fair comparison of the scope of costs associated with subsurface intakes relative to costs for open ocean intakes. For example, the costs for subsurface intakes are likely to be greater than simply the capital costs of constructing a subsurface intake at a desalination facility and will include the costs associated with the environmental impacts that flow from use of that method.	State Water Board regulations governing requirements for substitute environmental documentation supporting adoption or approval of plans or policies require only that the environmental analysis in the SED "take into account a reasonable range of environmental, economic and technical factors . . ." Tit. 23, CCR, § 3777(c). See also, Response 12.34. Consideration of the economic effects associated with proposed amendments to a water quality control plan is required only in specified circumstances and to a limited extent. Water Code section 13241 requires economic considerations as part of adopting any water quality objective in a water quality control plan. The proposed Desalination Amendment does not involve the adoption of any new water quality objectives and consequently is not subject to the requirements of Water Code Section 13241. Nevertheless, while not required, staff contracted Abt Associates Inc. to provide an economic analysis with cost estimates for methods of compliance with the requirements set forth in the proposed Desalination Amendment, in order to more fully inform public comment and the decision-making process. The economic analysis was not required to provide an extensive analysis of the potential costs associated with the Desalination Amendment, nor was there any requirement to consider costs when determining the significance of physical impacts. Commenter has not shown that costs associated with reasonably foreseeable methods of compliance would lead to any potentially significant physical effect on the environment. The report provided by Abt Associates Inc. provided sufficient cost estimates to constitute a reasonable range of economic factors associated with reasonably foreseeable methods of compliance with the proposed Desalination Amendment and does not require the addition of "significant new information." See, Pub. Resources Code §21159(c).
13.39	To exacerbate the inadequacy of Section 9 Economic Analysis [of the Staff Report with SED], it simply incorporates the Appendix G Economic Analysis without providing any substantive or contextual discussion of the Amendment's total costs or the relative costs of subsurface versus	Please see response to comment 13.38.

Please note all tables and figures referenced are present at the end of this document

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	surface water intakes for new facilities and the associated financial considerations.	
13.40	Further, the analysis also fails to account for the potential economic costs created by the greater regulatory burden and compliance requirements associated with implementing subsurface intakes. The increased duration of the permitting and approval periods impacts the timing of construction, which in turn has financial implications for financing and construction costs, none of which are reflected in the Economic Analysis. These considerations should be discussed in Section 9 and analyzed in the Appendix G Economic [of the Staff Report with SED] context as required.	Please see response to comment 13.38.
13.41	P. G-8 [of the Staff Report with SED]: States "when compared to the cost of surface water intakes, subsurface intakes could decrease total project capital costs by 2% to 9% due primarily to reduced pretreatment costs." This statement as a generalization is misleading. While it is true that subsurface intakes may reduce pretreatment costs, it is not necessarily true that pretreatment can be eliminated. Further, assuming that site specific geology exists to even consider subsurface intakes, a capital cost comparison of subsurface intakes with surface intakes must consider not only the differences in pretreatment costs (which do favor subsurface intakes) but also the differences associated with the configuration, number, sites, and site access characteristics of the intakes (which generally do not favor subsurface intakes, particularly at larger capacity desalination plants). Each site and situation requires a specific site specific analysis, and it is inaccurate to state that total project capital costs will be reduced in all cases for desalination projects using subsurface intakes.	Please see response to comment 13.38.
13.42	P. G-27 [of the Staff Report with SED]: States that subsurface intake wells are generally associated with higher capital and construction costs than open or screened ocean intakes and with higher land acquisition costs because subsurface intakes require larger footprints than open ocean intakes. It further notes that subsurface intakes have much lower operating costs due to reductions in feedwater pretreatment, biofouling and mitigation costs. (Id.)	Please see response to comment 13.38.

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	Exhibit 12-4, which compares the total capital costs for subsurface and surface intake structures for two proposed projects (taking into account differences in pretreatment), shows lower total capital costs for the subsurface intake option on both projects relative to surface intakes. (Appendix G, Economic Analysis, pp. G28-29.) The Economic Analysis does not explain why these projects do not fit the norm of having higher capital costs for subsurface intakes.	
13.43	The Economic Analysis provides no cost analysis or discussion of operation and maintenance (O&M) costs (including pretreatment) associated with the two projects. The appendix to the Economic Analysis contains several charts that appear to estimate operation and maintenance (O&M) costs but there is no discussion of the significance of those costs relative to total overall project costs (capital + O&M costs). (See Appendix G, Economic Analysis, pp. G-35 to G-46.)	Please see response to comment 13.38.
13.44	In short, the Economic Analysis makes general assertions but then fails to marshal data supporting those assertions or provide why real world data contradicts its assertions. Such inconsistencies and omissions of relevant data cast doubt on the credibility of the document and the appropriateness of basing decisions on its analysis.	Please see response to comment 13.38.
13.45	Analysis [in the Staff Report with SED] contains only 5 of 18 resource categories Fundamentally, an EIR must be prepared with a sufficient degree of analysis to provide decision-makers with the information needed to make an intelligent judgment concerning a project's environmental impacts. (CEQA Guidelines, § 15151; Napa Citizens for Honest Gov't v Napa County Bd. of Supervisors (2001) 91 Cal.App.4th 342, 356 ("Napa Citizens").) An EIR should, when looked at as a whole, provide a reasonable, good faith disclosure and analysis of the project's environmental impacts. (Laurel Heights I, 47 Cal.App.3d at 392.)	As noted in the introduction to Section 12, the CEQA analysis was arranged in two parts. Section 12.1 describes potential environmental impacts from the construction and operation of desalination facilities in general (p. 116). This discussion is on the overall impacts of desalination facilities and provides a baseline with which the proposed project and project alternatives may be compared. Section 12.4 analyzes the additional reasonably foreseeable environmental impacts associated with and specific to the State Water Board's proposed Desalination Amendment (p. 177). While the analyses in section 12.1 are quantitative and detailed, the analyses in Section 12.4 are necessarily less detailed and more qualitative. This is appropriate for a programmatic level CEQA analysis where site, design, technology, and

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	In contrast to these standards, the majority of SR/SED analysis of potential adverse impacts concentrates on those which "generally occur from construction and operation of a coastal desalination facility, without regard to the requirements set forth in the State Water Board's proposed Desalination Amendment." (SR/SED, p. 115.) The SR/SED's analysis of desalination projects generally covers 18 resources areas. (SR/SED, pp. 121-172.) However, here the analysis of the "Project" specifically was arbitrarily limited to 5 resources areas: aesthetics, air quality, biological resources, greenhouse gas emissions and hydrology and water quality. Surprisingly, each impact assessment is less than 1 page in length (SR/SED, pp. 177-192.) By analyzing the Amendment as an alternative (Alternative 2) the SR/SED avoided the comprehensive analysis required under the SED regulations and CEQA - an EIR must set forth the bases for its findings on a project's environmental impacts; a bare conclusion without an explanation of its factual and analytical basis is not a sufficient analysis of an environmental impact. (Laurel Heights I, 47 Cal.App.3d at 404; City of Maywood v. Los Angeles Unified Sch. Dist. (2012) 208 Cal.App.4th 362, 393.)	mitigation are not known. The programmatic nature of the Staff Report with SED allows the State Water Board to consider broad policy alternatives and program-wide mitigation measures. Each proposed desalination facility will require the preparation of environmental review documentation, which will be the appropriate time for site-specific, project-level review. In addition, the CEQA discussion was not arbitrarily limited. There are only five resource areas discussed in Section 12.4 because the other 13 resource areas were found to be not significantly affected by the proposed Desalination Amendment in the Environmental Checklist (Appendix B of the Staff Report with SED) and were therefore not discussed in detail in Section 12.4 (see §15128 of the CEQA Guidelines). See also response to comment 13.48.
13.46	The truncated analysis was further complicated by the SR/SED only analyzing the Amendment as Alternative 2 in Section 12.4. (See further discussion of alternatives detailed in Section H.) Contrary to law, the SR/SED states that "[s]ince the project alternatives only describe activities related to the coastal and nearshore intakes and outfalls, only those issues potentially affected are included in this analysis of project alternatives." (SR/SED, p. 177.) While alternatives may be described in less detail than the impacts analysis for the Proposed Project, the impact analysis for the Project must contain an explanation of the reasoning supporting the EIR's impact findings, and of the supporting evidence. (Association of Irritated Residents v. County of Madera (2003) 107 Cal.App.4th 1383; Napa Citizens, 91 Cal.App.4th at 359.) Had the SR/SED used the general analysis as a foundation for an in-depth analysis of the Amendment, it might have avoided these deficiencies.	The fact that the proposed Desalination Amendment is identified as Alternative 2 in the Staff Report with SED is an artifact of project/document development and has no bearing on the level of analysis conducted. While CEQA does allow for a less detailed impact analysis for project alternatives, it is not relevant here since the Staff Report with SED provides an equal, programmatic analysis of all of the alternatives' potential environmental effects on those resources identified in the Environmental Checklist as being potentially affected by the proposed Desalination Amendment (see response to comment 13.45). Further, the Staff Report with SED should be considered in its entirety when making decisions, rather than focusing on individual sections.
13.47	No analysis of impact of subsurface intakes on coastal areas	The proposed Desalination Amendment does establish a preference for

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	As explained on page 25 of the SR/SED, a SED is required to conduct an "environmental analysis of the reasonably foreseeable methods of compliance" with the Regulations. As noted below, the SR/SED does not evaluate the potential environmental impacts of imposing new regulations favoring subsurface intakes over screened ocean intakes, which is the clear intent and likely outcome of the Amendment.	subsurface intakes, as these types of intakes are the most effective at meeting the Water Code section 13142.5(b) objective of minimizing the intake and mortality of all forms of marine life. However, the proposed Desalination Amendment does provide for use of surface intakes where subsurface is not feasible. See response to comment 15.2. The potential environmental impacts of subsurface intakes are evaluated in the document in three ways. First, the environmental impacts for desalination facilities in general (including those that use subsurface intakes) were identified in Section 12.1 of the Staff Report with SED. In Section 12.2, two project alternatives are introduced that contain subsurface intakes. Alternative one assumes an amendment that allows for only subsurface intakes. Alternative 2 (the proposed project) considers amendments that allow for subsurface or surface intakes. The environmental impacts of both of these alternatives are evaluated in Section 12.4. While the analyses in section 12.1 are quantitative and detailed, the analyses in Section 12.4 are necessarily less detailed and more qualitative. This is appropriate for a programmatic level CEQA analysis where the site, design, technology, and mitigation measures are not known for all projects. A site-specific analysis for individual projects should be done during the environmental review of those projects, not in this programmatic Staff Report with SED.
13.48	Biological Resources (Section 12.1.4) The SR/SED fails to adequately describe the types of organisms, numbers of organisms, area or type of habitat that could be affected during construction, operation and maintenance of a subsurface system. (SR/SED, pp. 184-189; Exhibit A, pp. 17-18).) Alternative 2 (Project) includes only a brief list of construction related impacts from subsurface intakes to onshore habitats such as "[c]onversion of riparian or wetland habitat supporting a variety of resident and migratory species," "[a]dverse impacts to migratory bird nesting and feeding habitat," and "[d]isturbance of marine and onshore habitat through generation of noise and vibration." (SR/SED, p. 186.) These and other impacts should be further developed for an adequate Project-related impact analysis. In addition, we invite the State Board to consider the results of the 2005 Cumulative Impacts Study prepared as a Conditions of Certification for the AES HBGS Retool	The Staff Report with SED is a programmatic environmental document and adequately describes the potential impacts of the proposed Desalination Amendment. The commenter appears to expect a site-specific, project-level review which is unreasonable in this context and beyond the scope of the Staff Report with SED. The Staff Report with SED has identified, in general, the types of habitats that may be encountered during the installation of intake and discharge infrastructures for desalination facilities (see Section 7 of the Staff Report with SED), as well as impacts resulting from reasonably foreseeable methods of compliance with the proposed action (adoption of a statewide water quality control plan). The programmatic nature of the Staff Report with SED allows the State Water Board to consider broad policy alternatives and program-wide mitigation measures. Each proposed desalination facility will require the preparation of environmental review documentation, which will be the appropriate time

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	Project as described on page 18 (Section 12.1.4 Biological Resources) of Exhibit A.	for site-specific, project-level review, including a description of the types of organisms, numbers of organisms, and the types of habitats that may be affected by an individual project.
13.49	Hydrology and Water Quality Perhaps the most profound example of inadequate analysis is the one paragraph purporting to contain the entire hydrology and water quality impact analysis for Alternative 2 (Project). As explained below, this section must be augmented to include impacts from subsurface intakes on: (a) groundwater supplies; (b) drainage patterns; and (c) water quality. (See CEQA Guidelines, Appendix G, § IX [Hydrology and Water Quality].) Some of the impacts resulting from subsurface intakes are discussed in Alternative 1. For example, the SR/SED explains that it is "possible that a subsurface intake could cause or exacerbate saltwater intrusion into freshwater wells" and recognizes that "pumping from the subsurface intakes has the potential to alter groundwater flow to freshwater aquifers and wells." (SR/SED, pp. 190-191.) However, it fails to include a more comprehensive discussion of the consequences of saltwater intrusion, and the types of impacts normally discussed for hydrology and water quality, which then lead to the appropriate mitigation which may be required.	Discussion of impacts to hydrology is not, as the commenter suggests, limited to a single paragraph. Potential impacts to hydrology and water quality are identified in sections 12.1.9 and 12.4.5 in the Staff Report with SED. Further, there is an extensive discussion of potential impacts to hydrology and water quality in Section 8 including the proper siting of intake facilities to prevent salt water intrusion (see Section 8.4.2). Specifically within Section 12, potential impacts to hydrology and water quality are identified in sections 12.1.9 for desalination projects that have already conducted project level CEQA. Based on the evaluation found in the CEQA checklist (Appendix B), staff determined that additional evaluation was required to address the potential impacts to groundwater resources. In Section 12.4.5, staff evaluated which (if any) of these impacts would be different, or if there might be new impacts resulting from the proposed amendment. The discussion for Alternative 2 references the same potential impacts as identified in Alternative 1. While the analyses in section 12.1 are quantitative and detailed, the analyses in Section 12.4 are necessarily less detailed and more qualitative. This is appropriate for a programmatic level CEQA analysis where the site, design, technology, and mitigation measures are not known for all facilities. A site-specific analysis for individual projects should be done during the environmental review of those projects, not in this programmatic Staff Report with SED.
13.50	To illustrate this point, if a desalination facility's use of its subsurface intake infrastructure (e.g., slant wells) interferes with production of neighboring wells in an inland groundwater basin, the well owner may sue the desalination plant to protect its rights. In order to bring a well interference claim or injunction to stop interference with a superior water right, the complaining party must simply demonstrate that she possesses a senior water right and that the junior user- - here the desalination plant - is impairing the use of that senior water right. (Peabody v. City of Vallejo (1935) 2 Cal.2d 351, 374-375; Monolith Portland Cement Co. v. Mojave Public Utility District (1970) 4 Cal.App.3d 840, 847-48.)	Comment noted. However, this is not a comment on the environmental effects of the proposed project. While potential adverse impacts to groundwater levels are an environmental issue, the legal remedies for adversely affecting a senior water right are not. Further, whether there is an impact to senior water rights is situation dependent. In general, pumpers who use water on lands that overlie the source groundwater basin have a higher priority water right than pumpers who export water to lands that do not overly the basin. Within a basin, competing overlying users have a correlative right, meaning that they must share any deficits in supply according to their need. Overlying pumpers can

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	If operation of a desalination plant's subsurface intake wells interferes with an overlying or appropriative right holder's extraction of groundwater pursuant to those valid rights, the desalination plant could face litigation. The fundamental remedies available to the holder of that primary and paramount right are damages, injunction and declaratory relief.	experience some reasonable inconvenience without having their underlying rights impaired. If, during the environmental review of an individual desalination plant it is determined that a new well will adversely affect existing wells, either mitigation will need to be developed or another course of action taken to avoid the impact.
13.51	Six (6) Additional Unidentified Impacts Require Analysis for Subsurface Intakes In addition to providing additional analysis for biological resources and hydrology and water quality, the SR/SED's impact analysis should be revised to depict known potential impacts based on review of available environmental documents (including those noted in Section III.B), as well as consider the potential subsurface intake issues. Specifically, the SR/SED and Regulations' environmental findings rely in part on 9 past desalination projects spanning from 2006-2013, the majority of which are over 5 years old, but omit, or fail to adequately consider, more recent coastal desalination projects which demonstrate there are at least 6 additional impacts requiring analysis for subsurface intake. It would benefit the SR/SED to have Staff review and note subsurface intake impacts from publicly additional available CEQA documents, including those for: (1) Camp Pendleton (feasibility study); (2) Doheny (MND and permits for a pilot plant, now built); (3) Long Beach (EA/FONSI for subsurface pilot project); (4) Cambria (EA/FONSI for beach geotechnical sampling program, and EIR for full-scale project); (5) Sand City (full scale EIR, project now built); (6) Monterey Peninsula Water Supply Project (full scale EIR, test well MND-in process); and (7) dozens of subsurface intake facilities around the world.	While staff reviewed the environmental documentation from a wide variety of desalination facilities, the review was not, and did not need to be exhaustive. The purpose of the review was to identify the typical range of environmental impacts that could be expected from the construction and operation of a desalination facility in general. Although the listed documents were not cited in the Staff Report with SED, staff is aware of and has reviewed them. No changes to the Staff Report with SED are required as a result of that review of those documents.
13.52	Coastal Hazards (Hydrology & Water Quality) Subsurface intakes may be more susceptible to coastal hazards due to the need to be in close proximity to the ocean. These potential hazards are well documented in the Coastal Commission's Draft Sea Level Rise Guidance document (although the potential severity of these hazards is	The comment raises an issue that is a potential hazard to a proposed desalination facility, but is not a potential impact to the environment. If during the development of an individual project it is discovered that required infrastructure (whatever it may be) will be susceptible to coastal hazards, it would be prudent of the project proponent to redesign the project or find an alternate location. In addition, both

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	conservatively estimated and therefore likely overstated). As noted in the CalAm Coastal Water Project Final EIR for the Monterey Peninsula Water Supply Project (Monterey EIR), flooding due to potential sea level rise could occur under some conditions. (Monterey Peninsula Water Supply Project, CalAm Coastal Water Project Final EIR (Monterey EIR), pp. 4.1-11' 6.1-20.)	subsurface and surface intakes require close proximity to the ocean. Thus, to the extent that susceptibility to coastal hazards may be found to constitute an impact under CEQA, a surface water intake would not reduce any such potential impact. Intake pipelines will need to cross over or under the beach or shoreline and be subject to the same forces as a subsurface diversion wellhead. It is unclear what constitutes a coastal hazard to which subsurface intakes would be more susceptible than a surface water intake, nor does the commenter clarify how any other alternative would have less significant environmental impacts within the meaning of CEQA. Moreover, while staff reviewed the environmental documentation from a wide range of desalination facilities, the review was not, nor need it be, exhaustive. The purpose of the review, set forth in section 12.1, was to identify and disclose the typical range of environmental impacts that could be expected from the construction and operation of a desalination facility in general, as distinguished from impacts expected to result from the proposed Desalination Amendment.
13.53	Groundwater (Hydrology & Water Quality) Subsurface intakes could be sited further inland to reduce coastal hazard issues, although this may raise other issues, including the likelihood of drawing in a higher percentage of groundwater. This may in turn create impacts related to groundwater rights, groundwater quality, existing public or private groundwater wells, etc. For example, as described above, in California if a desalination well threatens to interfere with priority water rights, such as in the case of well interference issues, the fundamental remedies available to the holder of a primary and paramount right are damages, injunction and declaratory relief. This could subject a desalination facility to additional legal challenges.	See responses to comments 13.49 and 13.50 and 13.52.
13.54	The Camp Pendleton Seawater Desalination Feasibility Study notes that use of a subsurface intake approach is more susceptible to local hydrogeology. (Camp Pendleton Seawater Desalination Feasibility Study (Pendleton Study), p. 8-17.) Specifically, the Pendleton Study states that pumping from coastal wells could potentially invoke a negative impact on	Comment noted. The Staff Report with SED acknowledges that subsurface intakes are not always going to be feasible at a given location and the proposed Desalination Amendment allows for alternative intake methods. These are good examples of site-specific environmental impact analyses of the kind that will need to be

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	nearby fresh groundwater aquifers, especially in light of the increased quantity of traditional onshore groundwater wells in confined coastal aquifers. (Pendleton Study, p. 3-31.) One of the possible impacts is saltwater intrusion. If the freshwater aquifer is depleted without being recharged through natural processes, saltwater intrusion from the ocean may occur. (Id.) Desalination has often been cited as a way to reduce saltwater intrusion by producing potable water without disturbing freshwater aquifers. (Id.) However, depending on the local groundwater profile, beach wells to supply the desalination plant could exacerbate intrusion problems. (Id.) The Monterey EIR notes similar potential impacts due to construction and operation of one type of subsurface intake, slant wells. In this case, the EIR acknowledges that construction of subsurface wells (slant wells) may intercept shallow or perched groundwater. (Monterey EIR, pp. 4.1-32 to 4.1-33.) Operations of those slant wells are also expected to pull water from adjacent aquifers and to cause a local depression in groundwater level around the wells and within the shallow aquifer. (Monterey EIR, pp. 4.2-44 to 4.2-45, 4.2-48.) Neighboring wells screened in the same aquifer and within the local groundwater depression could be impacted by causing physical damage to the well if groundwater levels drop below the screens of neighborhood wells and/or by lowering the well yield of neighboring wells. (Monterey EIR, p. 4.2-45.) The Monterey EIR also explains the risk of increasing saltwater intrusion into the groundwater aquifer as a result of slant well operation. (Monterey EIR, p. 4.2-51.)	undertaken by project proponents. This type of project level analysis is not appropriate for a programmatic level CEQA analysis as neither site, design, technology, nor can mitigation measures be known for new facilities. However, a representative range of impacts from existing facilities is discussed in Section 12.1, and section 12.4 discusses at a programmatic, qualitative level how those impacts might be different as a result of the proposed Desalination Amendments. The Staff Report with SED also identifies in the hydrology section the potential for saltwater intrusion and other potential impacts to groundwater. The Staff Report with SED also states that it is unlikely that a Regional Water Board would approve a project that adversely affects groundwater resources.
13.55	A more recent slant well test study stated that a subsurface intake system related to desalination facilities in the Monterey area could cause drawdown of freshwater supplies and potentially interfere with water levels in neighboring wells. (Draft Initial Study and Mitigated Negative Declaration for the California American Water Slant Test Well Project (May 2014), pp. 112-113.)	See response to comment 13.54
13.56	Similarly, the Draft Environmental Impact Report for the Sand City desalination plant also acknowledged the potential for use of the subsurface intake method to cause saltwater intrusion. (Sand City Desalination Facility, Draft Environmental Impact Report, p. 49.) The test	See response to comment 13.54

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	well assessment for the Doheny Ocean Desalination Project indicated that operation of the subsurface intake slant wells could induce increased saltwater intrusion into the adjacent coastal aquifer. (Final Summary Report, Doheny Ocean Desalination Project, Phase 3 Investigation, Extended Pumping and Pilot Plant Test Regional Watershed and Groundwater Modeling Full Scale Project Conceptual Assessment (Jan. 2014) (Doheny Report), p. 22.)	
13.57	Water Quality (Hydrology & Water Quality) Subsurface intakes, while generally found to reduce pretreatment requirements, may in some cases have greater water quality impacts than an ocean intake, and require additional pretreatment or result in additional environmental impacts. Potential water quality impacts include marine water quality impacts associated with potentially lower dissolved oxygen, potential for groundwater contaminants, and potential for pumping "ancient water" or water with otherwise higher levels of iron, manganese or other constituents.	The scenarios described in the comment (lower dissolved oxygen, potential groundwater contaminants, “ancient water”, or water with high levels of iron, manganese or other constituents) are all issues that may affect the operation of a desalination facility. Poor source water quality does not translate into adverse water quality impacts on marine waters since the facility operators will need to comply with their NPDES permits as it relates to discharge requirements. As noted in comment 13.59, in many cases, these potentially low quality source waters would be pumped out and replaced with ocean water and pretreatment would no longer be needed. However, the Staff Report with SED has been revised to acknowledge that reduced pretreatment requirements are only the typical case for subsurface extraction and not an absolute case.
13.58	Installation of the extraction wells and related infrastructure has the potential to impact water quality and the marine environment by introducing boring spoils, mechanized equipment, and hydrocarbons into the nearshore marine environment. (California Coastal Commission, Substantial Issue and De Novo Staff Report, Sand City Desalination Facility (May 2005), p. 56.)	The Staff Report with SED acknowledges these potential impacts in general terms and discusses potential mitigation. (see Sections 8.3.2, 12.1.8 and 12.1.9). In addition, the staff report section 8.3.2 has been revised to explicitly include the impacts referenced by the commenter.
13.59	Differing levels of water quality were found during pumping of a test slant well related to development of the Doheny Ocean Desalination Project. It was discovered that the water extracted contained a high level of dissolved iron and manganese contained in the pocket of old marine groundwater that lies under the ocean. This water was anoxic (devoid of oxygen) and slightly acidic, and was found to be about 7,500 years old. The initial groundwater modeling work suggested that under full production capacity, the old marine groundwater would be mostly	See response to comment 13.57.

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	pumped out and replaced by ocean water within a year or so. (Doheny Report, pp. 13-14, 15-16.) Therefore, until the initial period of pump out of the old marine groundwater, it would be necessary to install a system to remove iron/manganese to levels that can meet discharge requirements through the ocean outfall. (Id. at p. 20.)	
13.60	Nearshore Freshwater Bodies (Hydrology & Water Quality) Subsurface intakes have the potential to create a drawdown upon nearby freshwater bodies, such as estuaries, lagoons or rivers. For example, the Pendleton Study notes that operation of slant wells (subsurface intake method) could have the indirect effects of dewatering an adjacent river estuary, which could be a concern for freshwater aquatic species and anadromous fish. (Pendleton Study, p. 3-31.)	The Staff Report with SED acknowledges these potential impacts (see Sections 8.3.2, 8.5.1.3, 12.1.4, and 12.1.9.
13.61	Sensitive Coastal Habitat and Species (Biological Resources) Subsurface intakes located on or near the beach may affect sensitive coastal habitat or species, including coastal dunes, snowy plover, etc. As noted in the Pendleton Study, the subsurface intake option involves installing infrastructure in close proximity to the coastal dunes and the Santa Margarita River, where several sensitive bird species have been identified. (Pendleton Study, p. 8-17.)	The Staff Report with SED acknowledges these potential impacts (see Sections 8.3.2 and 12.1.4).
13.62	Local Coastal Program Consistency (Land Use & Planning) Because subsurface intakes represent "new construction" and are by nature located in the Coastal Zone, they may create additional potential for conflict with Coastal Act or LCP policies, including but not limited to: - Proximity to environmental sensitive habitat areas (E.S.H.A.) - Coastal Access - Visual Impacts - Coastal parking facilities (for intakes sited in parking lots) - Agricultural Land Impacts - subsurface intakes sited off of the beach, to reduce coastal hazard issues, may require agricultural land or otherwise adversely affect agricultural interests through groundwater or other	These are all site-specific issues related to individual desalination facilities. The Staff Report with SED acknowledges these potential impacts and has described them at a programmatic level (see Sections 8.3.2, 12.1.1, 12.1.2, 12.1.4, and 12.4.5). The specific potential environmental impacts related to individual desalination facilities will need to undergo site-specific, project-level review.

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	effects. Accordingly, the SR/SED fails to "demonstrate to an apprehensive citizenry that the agency has, in fact, analyzed and considered the ecological implications of its action, "especially as they relate to subsurface intakes. (Laurel Heights I, 47 Cal.3d at 392.) Not only is the SR/SED an accountability document, but it serves to protect the environment and foster "informed self-government." (Id.)	
13.63	The SR/SED Errs by Analyzing the Project (Amendment) as an Alternative and by Not Analyzing a Reasonable Range of Alternatives (Sections 12.2, 12.3 and 12.4) For unknown reasons, the SR/SED analyzes the Project as an Alternative, rather than as the project, and thus is missing a comparison of each alternative to the Project. The SED regulations require an "analysis of reasonable alternatives to the project...to avoid or reduce any significant or potentially significant adverse environmental impacts." (Cal. Code Regs., tit. 23, § 3777(b)(3), emphasis added.) It does not allow short-cutting a complete project analysis by erroneously including the proposed project as an alternative (less in depth analysis) to avoid the required comprehensive environmental review. To be clear, the SR/SED should be revised to analyze the Project against the alternatives instead of classifying the Project as an alternative. (The "Project" alternative did not receive full analytical treatment in the SR/SED (detailed in section 12.4).)	The Staff Report with SED provides an equal level of analysis between the alternatives. There is no “short-cutting” or “less in depth analysis”. See response to comment 13.46.
13.64	To compound the issue, the proposed Project is not accurately described in Alternative 2. (SR/SED, pp. 174-175 [identifying Alternative 2 as the Project (Amendment)].) Specifically, Alternative 2 is described as "an amendment to the Ocean Plan that would allow greater flexibility in intake and discharge methods than identified in Alternative 1. Facilities could use subsurface intake, surface intakes screened and operated at low intake velocities, or intake using an alternative method...." (SR/SED, p. 174.) It further states that this alternative would require that brine discharge achieve a receiving	The description of Alternative 2 in section 12.4 is just a short summary of the proposed Amendment, which is included in its entirety in Appendix A of the Staff Report with SED and to which readers of the Staff Report with SED have been directed multiple times in the document (see response to comments 12.43, 13.23). Furthermore, the description is not misleading and does accurately describe the proposed project in that the amendment, regardless of preference, does allow both surface and subsurface. As a result, Alternative 2 considers impacts from both surface and subsurface intakes (See response to comment 13.28).

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	water limit of no more than 2 ppt above background salinity. (Id.) This description is misleading as the actual proposed Amendment establishes subsurface intakes as the preferred technology and provides that surface intakes will only be allowed if subsurface intakes are shown to be infeasible. (See SR/SED, p. 58 [describing Option 3].) While Mesa Water agrees that Alternative 2 as written is more reasonable than the actual Amendment, the SR/SED should be revised to accurately characterize the Project.	
13.65	In addition, Alternative 2 (Project) [in the Staff Report with SED] states that it "would require desalination facilities to fully mitigate for all marine life mortality associated with construction and operational activities." (SR/SED, p. 175.) The requirement for "full" mitigation contradicts the SR/SED elsewhere, including existing State policy which only requires "minimizing" adverse effects (Coastal Act and Porter-Cologne), and CEQA, which requires mitigation to "less than significant" levels. (Pub. Resources Code, § 30231 [Coastal Act]; Wat. Code, § 13142.5(b) [Porter-Cologne provision that applies to coastal power plants and other industrial facilities that use seawater, including desalination]; CEQA Guidelines, § 15370; Pub. Resources Code, § 21000(g); Friends of Mammoth v. Bd. of Supervisors (1972) 8 Cal.3d 247, 254-56.) It would be helpful to clarify the Board's intent and regulatory basis regarding "full mitigation."	The sentence following the one cited, clearly directs the reader to section 8.5 of the Staff Report with SED for a thorough discussion of the mitigation requirements of the proposed Desalination Amendment, including the regulatory basis thereof. Moreover, as the commenter notes, Water Code section 13142.5(b) includes required mitigation as one of four elements, requiring “best available site, design, technology, and mitigation measures feasible . . . to minimize the intake and mortality of all forms of marine life.” The statute does not direct that intake and mortality be reduced to a level that is less than significant. Merriam-Webster defines “minimize” to mean: “To make (something bad or not wanted) as small as possible.” The Random House College Dictionary defines “minimize” as: “to reduce to the smallest possible amount or degree.” The implication that a requirement to “minimize” intake and mortality should mean the same as “reduce to less than significant” and does not support a requirement for full mitigation is neither supported nor tenable.
13.66	The three underlying Project goals preclude a more appropriate range of alternatives to the project. The range of alternatives presented in the SR/SED is not reasonable, and violates CEQA and the SED regulations. The SED regulations require an "analysis of reasonable alternatives to the project...to avoid or reduce any significant or potentially significant adverse environmental impacts." (Cal. Code Regs., tit. 23, § 3777(b)(3).) "A major function of an EIR is to ensure that all reasonable alternatives to proposed projects are thoroughly assessed by the responsible official." (Save Round Valley Alliance v. County of Inyo (2007) 157 Cal.App.4th 1437, 1456.) Likewise,	The State Water Board is responsible for protecting water quality and related beneficial uses. The first objective clearly seeks to address this responsibility. The selection of project goals or objectives is not an issue of impact avoidance, but rather an identification of the underlying reasons for carrying out an action. The CEQA guidelines provide that an environmental document “describe a range of reasonable alternatives to the project . . . which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant impacts of the project . . . ” Tit. 14, CCR sec. 15126.6 (a). The selection of project alternatives is based first on whether an alternative can meet the project goals, and second on whether the

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	an EIR must "describe a range of reasonable alternatives to the project ... which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives." (CEQA Guidelines, § 15126.6(a); see also Pub. Resources Code, § 21001(g).) In evaluating whether there are an adequate range of alternatives, a review of the three underlying Project goals illustrates their narrowness and precludes an adequate range of alternatives. The first objective is to "[p]rovide a consistent statewide approach for minimizing intake and mortality of marine life, protecting water quality, and related beneficial uses of ocean waters." (SR/SED, p. 21.) This objective ignores onshore impacts and by so doing, elevates the importance of marine impacts. A lead agency may not preordain the outcome of the alternative analysis by defining the project's objectives in an unreasonably restrictive manner. (See County of Inyo v. City of Los Angeles (1981) 124 Cal.App.3d 1, 9; Remy, Thomas, Moose, Manley, Guide to CEQA (Solano Press 11th ed., 2006) p. 589 ["The case law makes clear ... that overly narrow objectives may unduly circumscribe the agency's consideration of project alternatives."].)	alternative can lessen or avoid identified impacts. "CEQA does not restrict an agency's discretion to identify and pursue a particular project designed to meet a particular set of objectives." San Diego Citizenry Group v. County of San Diego (2013) 219 Cal.App.4th 1, 14. In *County of Inyo v. City of Los Angeles*, the Court found that the project description was too narrow (increasing the groundwater extraction by 51 cfs) when the "recommended project" was "a vastly enlarged concept" including long-term average pumping rate of 140 cfs and a high-year average of 315 cfs. Further the Court found the EIR inadequate because the City of Los Angeles compared its project alternatives to the "impermissibly truncated project for increasing the groundwater extraction by 51 cfs." The State Water Board's project is clearly defined (the proposed Desalination Amendment) and the project alternatives are compared to this.
13.67	The second and third goals are fundamental - "support the use of ocean water as a reliable supplement to traditional water supplies and promote interagency collaboration for siting, design, and permitting of desalination facilities" (see SR/SED pp. 22-23) - but cannot overcome the effect of avoiding onshore impacts necessarily excludes other viable alternatives.	See response to comment 13.66.
13.68	Courts have found that when a project and its objectives are defined too narrowly, an EIR's treatment of alternatives is inadequate. (See City of Santee, 214 Cal.App.3d at 1455 [inadequacy of the project description caused the EIR to discuss inadequate, unduly narrow project alternatives]; Rural Land Owners Association v. City Council of Lodi (1983) 143 Cal.App.3d 1013, 1024 [respondent agency defined its project too narrowly and thus avoided analyzing the full range of impacts that would follow from the proposed action].) There is a direct relationship between project objectives and the formulation of alternatives. The court in Kings County Farm Bureau v. City of Hanford (1990) 221 Cal.App.3d	The commenter seeks avoidance of onshore impacts as an objective of the project. The objectives of the proposed Desalination Amendment are clearly defined and are based on the State Water Board's statutory authority as well as the State Water Board's responsibility for coordination and control of water quality. See, Water Code sec. 13001. "CEQA does not restrict an agency's discretion to identify and pursue a particular project designed to meet a particular set of objectives." *San Diego Citizenry Group v. County of San Diego* (2013) 219 Cal.App.4th 1, 14. The issue of impact avoidance is one of the purposes of environmental review and the Staff Report with SED

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	692, held that an agency cannot "avoid an objective consideration of an alternative simply because, prior to commencing CEQA review, an applicant made substantial investments in the hope of gaining approval for a particular alternative...." (Id. at 736.)	adequately describes the potential environmental impacts of the proposed Desalination Amendment. The court cases cited are not relevant to this issue and do not alter the State Water Board's discretion to identify and pursue amendments that will meet objectives and directives set forth in Porter-Cologne, in accordance with the requirements for State Water Board adoption of water quality control plans. See, Water Code §§13170, 13240 et. seq.
13.69	The SR/SED's lack of a reasonable range of alternatives ensures that Alternative 2 (Project) is chosen as the preferred alternative. For example, while Alternative 1 purports to lessen the significant effects of the project by requiring subsurface intakes and thereby resulting in the "least intake and discharge related aquatic life mortality," the analysis demonstrates that subsurface impacts will increase onshore construction impacts. (SR/SED, p. 174.) The analysis of Alternative 1 throughout this section supports Mesa Water's position that subsurface intakes may have numerous onshore impacts, and therefore should not be identified as the preferred method of ocean water intake. (See SR/SED, pp. 174, 184, 190.) Alternative 1 is also closer to the actual Project, which mandates subsurface intakes unless infeasible.	The Staff Report with SED provides a reasonable range of project alternatives. The State Water Board has determined that subsurface intakes provide the highest level of protection marine aquatic life, at all life stages. As such, it is the preferred method of intake for desalination facilities. The State Water Board also recognizes that subsurface intakes may not be feasible for all projects and allows for the use of ocean intakes when subsurface intakes are shown to be infeasible. The Staff Report with SED identifies potential impacts associated with subsurface intakes that may make them infeasible, including onshore impacts. Alternative 1 is not closer to the "actual Project" since Alternative 2 is clearly identified as the proposed Desalination Amendment.
13.70	In addition, Alternative 3 - which boldly provides that new facilities would use an open, unscreened ocean intake - is a strawman. (SR/SED, p. 175-176.) This alternative is flawed by design, unreasonable and as written would not meet the main Project goals of safeguarding marine life or protecting water quality and related beneficial uses of ocean waters. The basis for this alternative is not substantiated, as a more appropriate version of this alternative could either be inferred from the various coastal desalination facilities being planned, or simply assumed and required as part of the alternative for State Board consideration. As explained in the SR/SED, "[t]here are numerous technologies that can help reduce or avoid impingement and entrainment of marine life, including intake structure design, configuration of screening systems, passive intake system, and fish diversion and avoidance technologies." (SR/SED, p. 46.) The inclusion of a clearly infeasible alternative allows the State Board to reject this alternative and choose the Project alternative. This violates the informational purpose of this document, and transforms it to	Alternative 3 was included in the analysis and not discarded outright because this type of intake has been proposed for a planned desalination facility (DeepWater Desal). As such, the State Water Board included it in the range of alternatives examined.

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	one of advocacy.	
13.71	An appropriate alternative for consideration, which meets the third goal of taking into consideration siting, design, and permitting, would be to allow the applicant flexibility in determining whether to use a surface or subsurface intake. This simple addition would have been more viable and created a meaningful option for decision makers to consider in light of all three goals of the Project. Given CEQA Guidelines section 15204(a) states that comments on an EIR are particularly helpful if they suggest "additional specific alternatives or mitigation measures that would provide better ways to avoid or mitigate the significant environmental effects," Mesa Water respectfully requests consideration be given to evaluate this as a new alternative, or modify Alternative 3, to allow for the best site, design and technology on a site-specific basis. This alternative is feasible, satisfies most of the Project objectives, is environmentally responsible, and makes rational sense. An alternative is feasible if it is "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors." (CEQA Guidelines, § 15364.) For analysis purposes, this alternative could include use of either subsurface intakes, or use of appropriately designed ocean intakes, including use of a passive wedgewire screen. The discharge can be assumed as either commingled with wastewater and/or dispersed via a diffuser jet.	The proposed Desalination Amendment (Alternative 2) already allows the flexibility to use surface intakes, but only after it has been demonstrated that subsurface intakes are infeasible. While this does not allow applicants to choose surface water intakes initially, it does allow for their use when the most protective intake method (subsurface) is infeasible. As a result, the impacts from the alternative proposed by the commenter would be equivalent to those identified for Alternative 2.
13.72	The SR/SED Fails to Harmonize the Coastal Act with the Amendment Everyone in the State of California - including the State itself - is subject to the Coastal Act (Act) (Pub. Resources Code, § 21066, 30111, 30600; see also 65 Ops. Atty.Gen. 88). This includes all public agencies. (Pub. Resources Code, § 30003.) While the SR/SED includes a policy discussion of the Act, as well as a few brief references elsewhere in the document, it fails to discuss the fundamental ways in which the amendment could harm local land planning by mandating only one intake method unless proven infeasible. Nor does the SR/SED provide guidance to those agencies on how infeasibility can be shown to satisfy the Amendment's preference for a	There is no requirement for an analysis of local land planning effects resulting from proposed regulations in a statewide programmatic Staff Report with SED, nor is it clear how such an analysis would proceed. The requirement to use a subsurface intake unless found not feasible will vary in relation to land use planning issues raised at different sites and areas considered for potential construction of desalination facilities. The chapter III.L.2.d.(1)(a) of the proposed Desalination Amendment includes a lengthy list of considerations in determination feasibility of subsurface intakes, including: geotechnical data, hydrogeology, benthic topography, oceanographic conditions, presence of sensitive habitats, presence of sensitive species, energy use; impact on freshwater aquifers, local water supply, and existing water users; desalinated water conveyance, existing infrastructure, design

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	single preferred intake method. Therefore, while it acknowledges that new desalination facilities in the coastal zone will require a Coastal Development Permit (at page 31), there is no analysis environmentally or otherwise as to demonstrate when "infeasibility" would occur.	constraints (engineering, constructability), and project life cycle cost. While the commenter claims that the Staff Report with SED fails to provide guidance to public agencies implementing the Coastal Act in demonstrating infeasibility, there is no explanation of how these factors explicitly listed in the draft amendment are insufficient. There is no CEQA requirement to provide an environmental analysis of a negative determination, other than an analysis of the resulting reasonably foreseeable means of compliance. The Staff Report with SED provides such an analysis.
13.73	Similarly, at page 57, under the heading "Should the State water board identify a preferred method of seawater intake?", the SR/SED again acknowledges that the Act requires issuing a permit, without any discussion of how mandating one technology (subsurface intake) may conflict with other applicable Act requirements dealing with ESHA, visual impacts, coastal access, coastal parking, and site-specific Local Coastal Program requirements.	The Staff Report with SED, a programmatic analysis of the State Water Board's proposed Desalination Amendment, is not required to address site-specific effects that may result. CEQA does not require an analysis of site-specific regulatory requirements applicable under other laws when an agency considers the adoption of a statewide water quality control plan and analyzes significant or potentially significant adverse environmental effects of the proposed project, reasonable alternatives to the project, and reasonably foreseeable methods of compliance.
13.74	These two points illustrate how the SR/SED violates the essential principle of the Act which is the importance of public participation in planning decisions involving the coast: "The Legislature further finds and declares that the public has a right to fully participate in decisions affecting coastal planning, conservation, and development; that achievement of sound coastal conservation and development is dependent upon public understanding and support; and that the continuing planning and implementation of programs for coastal conservation and development should include the widest opportunity for public participation." (Pub. Res. Code, sec. 30006). This principle is a fundamental part of the Coastal Commission's regulations for public works projects (14 Cal. Code Regs., sec. 13353.5), which require that a local public hearing on a public works plan be held "within a reasonable time prior to submission of the plan ... such that the public is afforded an adequate and timely comment period on the proposed plan....." By remaining silent on environmental analysis which should be	The commenter provides no support for the proposition that an environmental analysis of proposed statewide regulatory requirements must comply with Coastal Commission or other requirements for a local public hearing. Public participation requirements applicable to the State Water Board when adopting water quality control plans have been met, including those set forth in Porter-Cologne, the Government Code and CEQA.

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	considered to demonstrate infeasibility, the standards for public participation have not been met.	
13.75	Recirculation is Required Because the SR/SED Failed to Evaluate the Substantial Environmental and Economic Impacts of the Project Required by Law Specifically, as set forth above, the SR/SED did not adequately analyze the potential impacts associated with the Amendment's onshore environmental impacts and the economic cost when determining the significance of physical impacts and when considering feasible mitigation measures and alternatives. This information should be included and the Draft SED recirculated so informed decision making can occur. Further, Mesa Water has provided additional information about desalination projects using environmentally sensitive ocean water intakes and the potential adverse impacts of subsurface intakes on coastal areas. This significant new information must be incorporated into the SR/SED and recirculated for public review. Conclusion Mesa Water believes that by addressing its substantive concerns the SR/SED can be redrafted to fully disclose all impacts of the Project to the public. As presently drafted, the Amendment could adversely impact development of desalination projects in California. Therefore, the SR/SED should be revised to fully address the responses to comments, provide the required additional analysis, and include the missing analysis of impacts where absent. It should then be recirculated for the benefit of the community and decision-makers.	CEQA does not require an extensive economic analysis in an SED. State Water Board regulations governing requirements for substitute environmental documentation supporting adoption or approval of plans or policies require only that the environmental analysis in the SED "take into account a reasonable range of environmental, economic and technical factors . . ." Tit. 23, CCR, § 3777(c). See also, Response 12.34. Further, the proposed Desalination Amendment does not involve the adoption of any new water quality objectives and consequently is not subject to the requirements of Water Code Section 13241. Nevertheless, while not required, staff contracted Abt Associates Inc. to provide and Economic Analysis with some cost estimates for comparative purposes. The economic Analysis did not provide an extensive analysis of the potential impacts associated with the proposed Desalination Amendment's onshore environmental impacts and the economic cost when determining the significance of physical impacts and when considering feasible mitigation measures and alternatives since those costs are extremely difficult to estimate. The report provided by Abt Associates Inc. provided sufficient cost estimates and does not require the addition of "significant new information." Recirculation is required under CEQA if "significant new information" is added. However, that requirement is not triggered where information added merely clarifies or amplifies the environmental document. "Significant new information" would include: a showing that a new significant environmental impact would result from the project or from a new mitigation measure proposed; a substantial increase in the severity of an environmental impact would result unless mitigation measures are adopted that reduce the impact to a level of insignificance; a feasible project alternative or mitigation measure different from those previously analyzed would clearly lessen the significance of environmental impacts of the project, but proponents decline to adopt it; or the draft EIR was so fundamentally and basically inadequate and conclusory that meaningful public review and comment was precluded. Tit. 14, Code of

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		Calif. Reg., sec 15088.5 (a)(1) – (4). The commenter does not explain why the significant new information would lead to new significant impacts or other information set forth in section 15088.5 that would require recirculation. Also please see response to comment 13.38.
13.76	Section 2.2 [of the Staff Report with SED] Impacts to Aquatic Life Related Beneficial Uses "No direct estimates exist for the amount of invertebrate larvae, zooplankton, or phytoplankton entrained within this same period, although the numbers are likely orders of magnitude larger (on a per organism basis) based on the relative abundance of plankton in seawater compared to fish larvae." This is incorrect, and we note that this assertion is repeated in Section 8.3.1.1.2. We recommend deleting this sentence. The year-long entrainment studies conducted at most of California's power plants analyzed effects due to entrainment of "target" invertebrate species (e.g., market squid, California spiny lobster, rock crabs, etc.). These direct estimates were published in reports and submitted to multiple agencies, including Regional Water Quality Control Boards. Entrainment studies for Los Angeles area power plants can be viewed online at: http://www.waterboards.ca.gov/losangeles/water_issues/programs/power_plants/ "In addition to impacts from the intake of ocean water, the discharge from a desalination facility can also impair beneficial uses." The text following this statement provides no supporting information on what beneficial uses are impaired, or how these impairments occur. Industrial service supply (IND) is also considered a beneficial use. We recommend deleting this sentence.	The Staff Report with SED language stating that there are no direct estimates . . . within this time period. . .” is correct as stated. The studies referenced in the link are from 2007 whereas the data in the Staff Report with SED language is from 2013. The proposed Desalination Amendment is an amendment to the Ocean Plan. Therefore, when the Staff Report with SED mentions “beneficial uses” it is in the context of beneficial uses to ocean waters, which are listed in chapter I.A. of the Ocean Plan. This definition was added to the Staff Report with SED, and provided here for your convenience: *“I. BENEFICIAL USES* *A. The beneficial uses of the ocean* waters of the State that shall be protected include industrial water supply; water contact and non-contact recreation, including aesthetic enjoyment; navigation; commercial and sport fishing; mariculture*; preservation and enhancement of designated Areas* of Special Biological Significance (ASBS); rare and endangered species; marine habitat; fish migration; fish spawning and shellfish* harvesting.”*
13.77	Section 6 [of the Staff Report with SED] Regulatory Setting for Desaliantion in Ocean Water "Desaliantion" is spelled incorrectly. The correct spelling is	Thank you for identifying this error. The spelling of desalination was corrected.

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	"Desalination".	
13.78	Section 6.2 [of the Staff Report with SED] Porter-Cologne Authority over Seawater Intakes "The Porter-Cologne provision is both broader and narrower than CWA section 316(b), which governs cooling water intake structures. Section 13142.5(b) addresses only new or expanded facilities, unlike CWA section 316(b), which does not differentiate between new or existing intakes." This is incorrect. The §316(b) rule that was released in May 2014 applies to existing facilities, including new units at existing facilities. However, new facilities are still regulated by the Phase I §316(b) rule that was enacted in 2001. The compliance pathways are different between the two phases. We recommend deleting the two sentences excerpted above.	The statement is correct. Water Code section 13142.5(b) is broader than CWA section 316(b) in that it applies to a “coastal power plant or other industrial installation using seawater for cooling, heating or industrial processing . . .” In contrast, section 316(b) is limited in its application to “cooling water intake structures.” The state law provision is also narrower in that it applies to “new or expanding” facilities. As noted by the commenter, section 316(b) applies not just to new, but also to existing intakes.
13.79	Section 7.1.1 [of the Staff Report with SED] Kelp beds "Kelp beds are common in areas with rocky substrates because kelp often attaches to hard substrates. Kelp reproduces by releasing spores into the water column that are carried by currents before the spores settle to the bottom and geminate. Giant kelp, Macrocystis pyrifera, releases spores continuously from spring to fall in California's coastal waters. The spores differentiate into sperm and eggs and fertilization occurs in the water column. Many of the spores, sperm, and eggs become food for other organisms in the marine food web. The planktonic reproductive life stages of kelp are at risk of entrainment in surface water systems. Fertilized eggs that avoid predation and entrainment develop into the adult organisms that make up kelp beds." The last sentence is incorrect and should be deleted. Not all eggs that avoid predation and entrainment develop into adult kelp. Only those that first settle onto suitable substrate (i.e., cobble or rocky reef) that is not already colonized have the potential to develop into adult kelp plants. While spore supply could potentially limit growth of kelp beds, this would be more likely to occur during years when kelp beds are eliminated due to	The Staff Report with SED was revised to say, “Fertilized eggs that avoid predation and entrainment, and settle on suitable substrate develop into the adult organisms that make up kelp beds.”

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	prolonged warm-water events (such as during 1983-4 and 1997-8), and there is no local supply of spores. Note that the San Onofre kelp bed, which is just downcoast from the intake structures at San Onofre Nuclear Generating Station, reached a larger size in 2008 (when the plant was operating) than it did in the 1960s and 1970s before the plant was operating.	
13.80	Section 7.1.2 [of the Staff Report with SED] Surfgrass and Eelgrass Beds "Seagrass beds are critical near shore habitats for a variety of species because the beds serve as nursery grounds for many invertebrates and fishes. (Larkum et al. 2006)" In order to fully inform the governing board and the public, it should be clarified that seagrass (Phyllospadix) and eelgrass (Zostera spp.) beds are very limited in their distribution in California due to the specific habitat requirements of each. We recommend adding the following: "However, seagrass and eelgrass have specific habitat requirements that generally limit their distribution in California."	Regardless of the habitat requirements that may limit the distribution of surfgrass and eelgrass beds, they are still critically important habitats in California. Seagrasses are some of the most sensitive species to elevated brine (Roberts et al. 2012) and other water quality changes. The absence of surfgrass and eelgrass may be indicative of poor water quality, which may contribute to their limited distribution.
13.81	Section 7.1.6 [of the Staff Report with SED] The Need for Special Considerations or Protections of Sensitive Habitats "Eggs, larval organisms, and juvenile organisms are at the highest risk of entrainment at surface intakes. Most larval and juvenile organisms are not developed enough to swim and avoid entrainment and may be susceptible to entrainment through even small slot sized intake screens." We recommend deleting the first sentence. The proposed policy has not yet defined by Section 7.1.6 what a "surface" intake is, but we presume it is an intake above the seafloor (i.e., such as a vertical riser or bulkhead intake). There is no known data to support the statement that eggs and larvae "are at the highest risk of entrainment at surface intakes". To our knowledge, there have been no published studies in California examining the biological effects (or potential effects) due to the operation of a subsurface intake. Fish and invertebrates that use the seafloor (such as	The terms surface intake, open-water intake, and open-ocean intake are used interchangeably throughout the document. They are defined as intakes above the ocean floor. Eggs, larval organisms, and juvenile organisms are at the highest risk of entrainment through surface intakes relative to the larger adult organisms. This is because of the size of the eggs, larval organisms and some of the smaller juveniles relative to the screen openings. The probability of entrainment is directly related to the size of an organisms and the species' morphology. (Tenera et al. 2013b; Weisberg 1987) Adults of most species are too large to fit through intake screens and are at significantly lower risk of entrainment relative to the smaller life stages. As stated in Section 8.3.2 of the Staff Report with SED, subsurface intakes collect water through sediment, which acts as a natural barrier to organisms and thus eliminates impingement and entrainment. (MWDOC 2010; Missimer et al. 2013; Hogan 2008; Pankratz 2004;

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	gobies) could be more susceptible to entrainment/impingement depending on the intake design.]	Water Research Foundation 2011).
13.82	Section 7.2.1 [of the Staff Report with SED] Broadcast Spawners and Larval Recruitment "Dispersal of larvae from spawning grounds occurs via ocean currents and the planktonic stage can be as short as a few days or as long as a month depending on the species, meaning larvae can travel many miles away from where they were originally spawned. (Strathmann 1993; Swearer et al. 1999)" Larval duration - the period of time larvae can potentially be susceptible to entrainment - has exceeded one month. For example, the Probability of Mortality (PM) for northern anchovy at the AES Huntington Beach Generating Station was estimated (based on the range of larval sizes and published growth rates) to be 38 days (MBC and Tenera 2005). We recommend changing "as long as a month" to "to more than one month"	Comment noted.
13.83	Section 7.2.2 [of the Staff Report with SED] Fisheries in California "Additionally, squid larvae have a high probability of entrainment through screened surface intakes due to their small size. Consequently, squid nurseries should be protected from unnecessary environmental disturbances to ensure the sustainability of the market squid fishery" Note that market squid fishery landings increased almost ten-fold - from 12,000 metric tons in 1977 to 119,000 metric tons in 2000 - during which time cooling water flows from coastal power plants and wastewater discharges from POTWs increased. The market squid is managed under a fishery management plan that regulates the fishery, including among other restrictions the implementation of fishery closures to ensure uninterrupted spawning (Sweetnam 2007). The seasonal catch limit in California's Market Squid Fishery Management Plan (CDFG 2005) is 118,000 tons (236 million pounds). There are no population estimates available for market squid, but the fishery has been sustained for the last nine years under the limits of the Fishery Management Plan. We	The information provided in this comment strengthens the importance of protecting market squid. The market squid fishery has been a part of California's economy since the 1860's and market squid continue to be one of the top landed and valued marine species in California. (CDFG 2006; CalCOFI 2013) Additionally, market squid serve as an important link in the offshore marine food web. Species like salmon, swordfish, tuna, and certain sea birds and marine mammals all rely on market squid as a critical component of their diets. (Morjohn et al. 1978; Vojkovich 1998; CalCOFI 2013) Adding brine discharges in areas where market squid spawn and deposit eggs could negatively affect larval squid hatching and development, which could result in a decline in the market squid population and fishery. The decline in the market squid population could have a cascade effects on other species in the marine food web.

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	recommend deleting all discussion pertaining to the special status of market squid and their spawning areas.	
13.84	The SED does not provide a reference for the statement in the SED "...spawning grounds commonly occur within a few hundred meters of the same location year after year" and on review appears to be a misstatement of work by Young et al. (2011). The actual wording in Young et al. (2011) is: ".. it is clear that while D. opalescens do return to spawn in the same general area each year, the precise location (i.e. within a few hundred meters) of their egg laying within the well--known historical spawning area off of Monterey cannot be predicted in advance" and "Because they do not show a strong association with specific habitat features, we are unable to predict exactlv where thev will spawn each vear" (our emphasis). There is no mention of spawning site fidelity in the State Market Squid Fishery Management Plan (CDFG 2005) or the Coastal Pelagic Species Fishery Management Plan (PFMC 1998). We recommend deleting all discussion pertaining to the special status of market squid and their spawning areas.	Spawning aggregations of market squid are predictable enough in California that fishing fleets can target spawning adults in limited geographic areas. (CDFG 2006) These geographic areas can be identified by benthic mapping and used to inform the siting of desalination intakes and discharges. The Staff Report with SED was updated to reflect that “although squids lay their eggs in the same general location, the exact area of egg deposition within the spawning grounds may change on an annual basis.” (Young et al. 2011)
13.85	The assertion that "brine discharge associated with desalination facilities has the potential to significantly impact the viability and survivorship of squid offspring" is unsupported and should be deleted. The statement is based on email communication without supporting evidence. If toxicity evaluation work has been conducted to support this claim the results should be presented, the protocols used need to be made available to evaluate methods and techniques, and statistical evaluation of multiple tests needs to be referenced to make a claim of "potentially significant impact". Yang, et al. (1986) were able to raise California market squid from eggs to successfully reproductive mature individuals in laboratory conditions in water that ranged in salinity from 34 to 37 ppt. This range is within the limits proposed by this amendment, suggesting that squid do not need special consideration for brine impacts at the levels proposed in the policy.	The study by Yang et al. (1986) involved optimizing culture methods and laboratory conditions for rearing market squid. The success of the rearing and culturing of the squid was attributed largely because the water quality was “consistently good throughout both experiments.” The salinity of the seawater ranged from 34 to 36 parts per thousand, which is considered natural background salinity for many of California’s coastal marine habitats. As mentioned in Section 8.7.2 of the Staff Report with SED, Figures 8.5 and 8.6 provide representative graphs of natural background salinity for Northern and Southern California. The highest natural salinity at the Crescent City station was 34.3 ppt and 35.6 at the Huntington Beach station. This would be the salinity of the intake water for a desalination facility, not the brine discharge. The receiving water limitation is 2 PSU above natural background salinity to be met at the boundary of the brine mixing zone, but the area within the brine mixing zone may be 2 PSU above natural background salinity. Water Code section 13142.5(b) requires considerations of all forms of

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		marine life, including those within the brine mixing zone. Undiluted brine discharges will be approximately twice the salinity of the intake water, assuming a 50 percent production efficiency. Using the data in Figures 8.5 and 8.6, the salinity of the brine would be 68.6 ppt at the Crescent City facility and 71.2 ppt at the Huntington Beach facility using the maximum intake salinity and 61.4 ppt and 67.04 ppt respectively using the average salinity. This means organisms within the brine mixing zone could be exposed to toxic concentrations of brine. Yang et al. (1986) did not look at the effects of brine on market squid hatching and development. Data from a preliminary study showed a decrease in percent hatching when salinity reached 45 ppt relative to ambient seawater (34 ppt) and that less than 20 percent of squid larvae hatched when exposed to 50 ppt ($p<0.001$ Holm-Sidak method). (Reeb 2011) A study on the hatching rates of a related species of squid, Loligo vulgaris, when incubated in salinities of 32 to 42 g/L (ppt). (Sen 2005) The goal of the study was to identify optimal salinity conditions for rearing the squid. But the study results demonstrated a significant reduction in the total hatching (TH=[number of hatching eggs (premature and swimming paralarvae at nearly the water surface)/number of incubated eggs] x 100), and hatching success (HS=[number of healthy and swimming paralarvae at nearly water surface/number of incubated eggs] x 100) of squid when incubated in 42 ppt water. The total hatching was between 92 and 100 percent for treatments from 32 to 40 ppt, but dropped to only 3 percent when salinity was 42 ppt. Hatching success ranged from 87 to 96.7 percent for treatments between 32 and 38 ppt, but dropped to 65.3 percent when salinity was 40 ppt. Hatching success dropped to zero percent for squid incubated in 42 ppt. (Sen 2005) Short-term larval development tests on red abalone larvae demonstrated larvae were sensitive to salinity changes as low as 1.6 ppt (LOEC). (Phillips et al. 2012) Red abalone and market squid are both in the Phylum Mollusca and the larvae undergo developmentally identical stages through the paralarval stage. Consequently, the data from the red abalone toxicity can be applied to market squid and other molluscs. Ideally, salinity sensitivity studies would be done on all

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		species present at a discharge; however, model species are a time- and cost-effective means of measuring salinity sensitivity for a few species and applying the data to many other related species.
13.86	The citation for Hixon (1983) (p. 38) is not included in the References section [of the Staff Report with SED]. This citation should be added to the References.	The following citation was added to the reference section: Hixon, R. F. 1983. *Loligo opalescens*. In Cephalopod life cycles, vol. I, species accounts, 475 p. Academic Press, London.
13.87	The citation for Young (2011) (p. 38) should be "Young, et al. (2011)". This citation should be corrected.	Comment noted.
13.88	Section 8.1 [of the Staff Report with SED] What Types of Facilities Should the Amendment Cover? "Oil and gas refineries, pulp and paper mills, iron and steel manufacturers, and OTC facilities are well established in California and the number of these industrial facilities is not expected to increase dramatically in coming years. However, the number of desalination facilities in California is expected to more than double in the near future." While the number of OTC facilities is not expected to increase dramatically in the coming years, the volume of cooling water used will be substantially reduced to comply with the State Water Resource Control Boards' OTC policy. Power plants at El Segundo, Redondo Beach, Long Beach, and Huntington Beach have all proposed compliance measures that eliminate the use of ocean water for cooling. It is therefore misleading to state that the number of facilities is not expected to increase with the knowledge that cooling water withdrawal and discharge will substantially decrease. We recommend modification as follows: "... and OTC facilities are well established in California and the number of these industrial facilities is not expected to increase dramatically in coming years. However, OTC use will be substantially reduced in the near future (10-15 years) as facilities comply with the State's OTC policy."	Comment noted. The proposed revision was not included in the Staff Report with SED as suggested because it does not add information that is not already include in other places in the document (e.g. section 6.4.2, 8.3, 8.4.8) where the information is more appropriate.
13.89	Section 8.1.2 [of the Staff Report with SED] Options "Option 2 would result in clear and consistent application of the Amendment among all regions and facilities. However, there is not	The scope of the proposed Desalination Amendment was determined by public scoping meetings in 2007 and 2012 and it was decided the scope would include (1) the intakes for desalination facilities; (2) the brine discharges from desalination facilities; and (3) other brine

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	enough information about the types of impacts from all industrial facilities using seawater for cooling, heating, or industrial processing. There is a risk that the Amendment provisions would be inappropriately applied to non-desalination facilities in a way that could lead to unintended consequences for facility operations or ineffective regulatory controls. The Amendment may restrict specific needs or prohibit necessary steps in a facility's process. Given the currently available information, it would not be appropriate to broadly apply the Amendment to all facilities using seawater for cooling, heating, or industrial processing." The justification for eliminating Option 2 is not clear. The State Board should be a little more open about what restricting specific needs or prohibiting necessary steps in a facility's process means. An example of the prohibition of "necessary steps in a facility's process" would be useful in determining why this option is not feasible.	discharges from sources such as groundwater desalting plants. Furthermore Desalination and Brine Discharges was identified as a Board priority during the 2011 Ocean Plan Triennial Review. The scoping meetings and Board direction clarified that the scope should be focused on desalination facilities and not on other industrial facilities using seawater for cooling, heating, or non-desalination industrial processing. Consequently, staff focused their research on desalination facilities and there is not enough information about the other types of industrial facilities to even characterize their specific needs or steps in their processes. Also, see response to comment 12.5a.
13.90	Section 8.3 [of the Staff Report with SED] Should the State Water Board identify a preferred method of seawater intake? "In 2005, coastal facilities in California withdrew approximately 12.5 billion gallons of seawater per day. More than 95 percent of that water was used for power plant cooling purposes, with the remainder used by other industrial sources such as desalination facilities. (Kenny et al. 2009)." The authors (Kenny et al.) noted the level of precision in their estimates varied, and their listed sources (US Census Bureau, US Dept. of Agriculture, etc.) would probably not provide reliable estimates of actual cooling water used. The Regional Water Quality Control Boards require discharge volumes to be reported by coastal power plants; the State Board could gather that information and compile it for a more accurate estimate of cooling water use.	The suggestion is appreciated but is out of the scope of this project.
13.91	"The OTC Policy establishes a technology-based standard for power plants, allows for no impingement, and requires a 93 percent reduction of the intake flow rate."	The swim speed studies conducted by U.S. EPA are used in several federal regulations, including the U.S. EPA 316(b) rule making as the basis for determining that a 0.5 feet per second through-screen velocity will reduce impingement. The through-screen intake velocity standard

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	The State's OTC Policy allows for impingement. The policy requires reduction in the intake velocity to 0.5 feet per second, which is presumed to lower impingement. To accurately and completely inform the Board and the public, the phrase "allows for no impingement" should be replaced with "requires an intake velocity of 0.5 feet per second or less, or a reduction in impingement" to a level that could be achieved through conversion to a closed-cycle cooling system. However, there is no scientific information presented in the policy to indicate that a reduction in velocity to 0.5 feet per second would reduce (or eliminate) impingement In EPA's Phase II regulations, they state: "As discussed in that notice, EPA compiled data from three swim speed studies (University of Washington study, Turnpenny, and EPRI) and these data indicated that a 0.5 ft/s velocity would protect at least 96 percent of the tested fish. As further discussed, EPA also identified federal documents (Boreman, DCN 1-5003-PR, Bell (1990), and National Marine Fisheries Service (NMFS), (1997)), an early swim speed and endurance study performed by Sonnichsen et al. (1973), and fish screen velocity criteria that are consistent with this approach." The proposed policy does not indicate if any of the species in these three studies are from the West Coast, or if the data are applicable to fish species in California. The Board should determine if the swim speed studies used as the basis for this requirement were derived from any species in California, and if not, why the species used are applicable.	of 0.5 feet per second is also used in the OTC Policy. The swim speed studies established that reducing the flow to 0.5 feet per second will allow most fish to swim away from the pull of the intake, provided that there are also sufficient ambient currents present. The results from the U.S. EPA's studies have been used to set federal standards for intake flow velocity and are used throughout the United States, including California. Also see response to comment 21.61 and section 8.3.1.2.2 of the Staff Report with SED for more information.
13.92	Section 8.3.1.1 [of the Staff Report with SED] Effects of surface water intakes on the intake and mortality of marine life "Construction-related intake and mortality of marine life is relatively limited, and can be minimized if construction occurs away from sensitive habitats and areas of high habitat productivity." This section does not identify what the components of a surface intake include, how they would be constructed, over what time frame they would be constructed and the types of "marine life" considered in the State's analysis.	They are defined as intakes above the ocean floor. This broad definition includes a wide variety of possibilities for intake configurations. Language was added to section 8.3.1.1.1 to clarify that the components of a surface intake will vary among projects as will the duration of the construction and extent of the construction-related impacts. The impacts are relative to all forms of marine life per Water Code section 13142.5(b). The proposed Desalination Amendment defines all forms of marine life as all life stages of all species present in ocean waters.
13.93	"During 2000 to 2005, power plants in California annually entrained on	Comment noted.

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	average 19.4 billion fish larvae with estimated intakes of 78-2,670 MGD. (SWRCB 2010)...During the same time period, approximately 2.7 million fish (84,250 pounds) annually were impinged at power plants, along with a number of marine mammals and sea turtles. (SWRCB 2010)" These estimates are now 9 to 14 years old. With the retirement of San Onofre Nuclear Generating Station Units 2 and 3, it is likely impingement and entrainment are substantially lower. For instance, SWRCB (2010) reported that San Onofre accounted for roughly 40% of the estimated impingement abundance and 31% of the impingement biomass. Likewise, entrainment at San Onofre represented about one-third of the state-wide estimate. However, both Units 2 and 3 have since been retired from service. Three of the four units at El Segundo Generating Station have also been retired. Therefore, the estimates listed in the proposed policy are misleading and do not represent current conditions. We recommend adding the following sentence above: "However, these estimates are now 9-14 years old, and many of the generating units have since been removed from service or retired, including the two units at San Onofre, which accounted for roughly 40% of the state-wide impingement and about one-third of the state-wide entrainment" The entrainment and impingement estimates should also be placed into context. Nineteen billion fish larvae seems like a large number, but a single female California halibut (*Paralichthys californicus*) can produce more the 50 million eggs per year, and captive females can spawn 13 times per season (which would be equivalent to 650 million eggs, so only 30 individuals could potentially produce more than 19 billion eggs in a single year). Likewise, the 84,000 pounds of fish impinged is a small percentage of the commercial fish landed in California. In 2012 alone, there was almost 353 million pounds of fish/invertebrates landed commercially in California (more than 4,000 times higher than the statewide impingement).	
13.94	Section 8.3.1.2 [of the Staff Report with SED] Approaches to Reduce Impingement and Entrainment at Surface Water Intakes "There are numerous technologies that can help reduce or avoid	This reference was added to the Staff Report with SED.

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	impingement and entrainment of marine life, including intake structure design, configuration of screening systems, passive intake systems, and fish diversion and avoidance technologies. (US. EPA 1976)." This statement is correct. However, the document cited from 1976 is outdated, and was updated as part of EPA's §316(b) Phase I and Phase II regulation processes. The performance/efficacy and feasibility information in the 2004 document would be more applicable. The 2004 Technical Development Document can be viewed online at: http://water.epa.gov/lawsregs/lawsguidance/cwa/316b/upload/Cooling-Water_Phase-2 _TDD_2004.pdf. [note: link is incorrect]	
13.95	Section 8.3.1.2.2 [of the Staff Report with SED] Reducing Through-Screen Intake Flow Velocity "Based on many swim speed studies, the State Water Board's OTC Policy also requires that through-screen velocities must be limited to 0.5 ft/s (0.15 m/s) or less for existing power plant seawater or estuarine water intakes in order to reduce impingement mortality." EPA's 0.5 feet per second criteria was indeed based on available information regarding swimming speed of fishes. However, it is not clear if any of the species included in that analysis occurs in California. The State's OTC Policy mirrored the EPA criterion of 0.5 feet per second, but it was not based on any relevant swimming speed data. The State's OTC Policy explains "The 0.5 ft/sec threshold is based on numerous swim speed studies and has been used in several federal regulations, including the Phase I rule." There is no evidence that reducing intake velocity to 0.5 feet per second would reduce or eliminate impingement mortality. We recommend deleting "Based on many swim speed studies,".	Comment noted.
13.96	Section 8.3.1.2.3 [of the Staff Report with SED] Installing Intake Screens "While fine-meshed screens can reduce entrainment of adult and juvenile fish, they still allow phytoplankton, zooplankton, eggs, and fish and invertebrate larvae to pass through." Fine-meshed screens would eliminate entrainment of adult and juvenile	Please see response to comment 9.14.

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	fish; these fish would be impinged. However, fine-meshed screens can be equipped with mesh as fine as 0.5-mm, which could retain most larvae at some facilities. We recommend modifying the sentence as follows: "While fine-meshed screens can reduce entrainment, they still allow some phytoplankton, zooplankton, and ichthyoplankton to pass through."	
13.97	"The only pilot study that has implemented wedgewire screens on an intake is at West Basin Municipal Water District's (WBMWD) pilot desalination facility. (Tenera Environmental 2013b)" Wedgewire screens were also tested at the scwd2 (San Cruz Water Dept. and Soquel Creek Water District) intake site. Results can be viewed online at: http://scwd2desal.org/documents/Draft_EIR/Appendices/AppendixG.pdf [note: page link is incorrect] The section on wedgewire screens is fairly long, lists a lot of information from studies, and concludes with the following statement "Consequently, there is only an approximate one percent reduction in entrainment mortality between screened and unscreened intakes. (Foster et al. 2013)" This is in disagreement with Table 2 of Appendix 3 (Desalination Plant Intake Review) in Foster et al. (2013); the calculated reduction in Age-1 equivalents from use of 1-mm wedgewire in southern California was 75% for northern anchovy and 40% for CIQ gobies.	Please see response to comment 9.16.
13.98	Section 13142.5(b) requires that the Ocean Plan consider all forms of marine life, regardless of size. Subsurface intakes are more protective of marine life than surface water intakes." There is no data to justify this statement. "Marine life" presumably includes organisms living on the seafloor (epibenthos), in the seafloor (benthos), and the organisms that rely on the benthic and epibenthic community. In order to make a comparative statement regarding the effects of subsurface intakes versus other types of intakes, the State Board must provide some analysis of the types of reasonably foreseeable environmental effects associated with each. In the absence of this, it cannot be concluded that "subsurface intakes are more protective of marine life than surface water intakes. "Before reaching this conclusion, the Board should consider the	Disagree. Please see section 8.3 of the Staff Report with SED. There are comparisons of the reasonably foreseeable environmental effects of the different intake types in section 12 of the Staff Report with SED. However, there are no specific comparisons provided because the Staff Report with SED is from a programmatic perspective and not a project-specific perspective. There are too many site-specific variables that go into a comparative analysis of the best available site, design, and technology feasible to provide more detail than is provided in section 12 of the Staff Report with SED. The construction-related impacts (e.g. habitat disturbance, effects to water quality such as increased turbidity and suspension of contaminants, visual impacts, and increased air emissions, etc.) and operational impacts (habitat

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	range of effects associated with subsurface intake structures, including: - Construction-related impacts, such as habitat disturbance, effects to water quality such as increased turbidity and suspension of contaminants, visual impacts, and increased air emissions, and - Operational impacts, such as habitat modifications and changes in benthic/epibenthic biological communities, and the associated larval production from those communities.	modifications and changes in benthic/epibenthic biological communities, and the associated larval production from those communities, etc.) will all be evaluated on a project-specific basis taking into considerations site-specific conditions.
13.99	Section 8.3.1.2.4 [of the Staff Report with SED] Velocity Caps The section on velocity caps summarizes some of the data available, including data from the 1950s, but omits the results of a comprehensive study of velocity cap effectiveness at Scattergood Generating Station (Los Angeles County). The study can be viewed online at: http://www.waterboards.ca.gov/losangeles/water_issues/programs/power_plants/scattergood/080128/Velocity_Cap_Report.pdf [note: link is incorrect]	Thank you for providing this information. The reference was added to the Staff Report with SED.
13.100	Section 8.3.2 [of the Staff Report with SED] Subsurface Intakes "Beach galleries specifically have design potential for large scale facilities, and have been demonstrated to be able handle large volumes of water. (Missimer et al. 2013)" What is a "large volume"? This should be explained further. This section should also discuss intake water quality as a factor in the decision process for subsurface intakes. Legacy pollutants, high oxygen demand, or naturally occurring mineral constituents could make subsurface water difficult or expensive to treat.	Missimer et al. (2013) did not elaborate on their definition of large scale. However, the Fukuoka Desalination Plant has been successfully withdrawing 103,000 m3/d (27 MGD) through an infiltration gallery for over eight years. (Shimokawa 2005; SDCWA 2009) The Camp Pendleton Seawater Desalination Project Feasibility Study considered building a facility with a production capacity 4 to 8 times larger than the Fukuoka facility. (SDCWA 2009) The Camp Pendleton Seawater Desalination Project Feasibility Study estimated an 18 to 55 acre infiltration gallery would be required to withdraw 100 to 300 MGD. The Camp Pendleton Seawater Desalination Project Feasibility Study reported that while an infiltration gallery of that size range would be feasible, the benefits of eliminating impingement and entrainment and higher source water quality would be replaced with the disruption of natural bottom sediments and benthic communities over a large area. (SDCWA 2009) Withdrawing water through subsurface intakes typically results in higher water quality because the sediment acts as a natural filter. (SDCWA

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		2009; Missimer et al. 2013) Naturally occurring minerals like iron and manganese may be present in higher concentrations in water taken through subsurface intakes relative to surface intakes. However, the challenges and cost associated with treating intake water will vary depending on the location of the facility's intake, regardless of whether the water came through a surface or subsurface intake.
13.101	Section 8.3.2.1.2 [of the Staff Report with SED] Slant Wells "Like vertical intake wells, the wellheads of slat wells are generally buried in a vault beneath the ground to maintain shoreline aesthetics." The reference to "slat" well should be "slant" well.	Thank you for this correction. The Staff Report with SED was revised accordingly.
13.102	Section 8.3.2.1.4 [of the Staff Report with SED] Infiltration Galleries The decision to utilize engineered sediments should include a discussion on possible changes to the benthic and epibenthic communities based on changes in sediment grain size as a result of the construction (and subsequent operation). Benthic community assemblages are reflective of the substrate in which they live (Johnson, 1970, Gray 1974). Usually, coarse sediments support smaller and less diverse infaunal communities than do finer sediments (Barnard 1963). Also the decision process should include an evaluation of local littoral cells and known regional sediment movement (longshore drift), including nearby dredging and beach replenishment projects. Based on these it should be possible to estimate maintenance requirements to determine the potential frequency of disturbance to the benthic and epibenthic communities.	Comment noted.
13.103	Section 8.3.4 [of the Staff Report with SED] Options The State Board is recommending Option 3, requiring subsurface intakes unless deemed infeasible. Option 3 is recommended without any analysis (general or specific) of the types of impacts associated with installation and operation of subsurface intakes. For example, a surface intake could be installed on an existing cooling water intake riser, thereby limiting any effects to seafloor habitat. However, installation of a subsurface intake could disrupt dozens (or hundreds) of acres of seafloor during construction and during maintenance.	Subsurface intakes are the preferred technology for the reasons in section 8.3 of the Staff Report with SED. Surface intakes will have continuous marine life mortality associate with the operation of the facility whereas, subsurface intakes typically have the initial construction-related mortality, but no operation mortality. The benthic community is expected to re-populate the benthos after installation of a subsurface intake. (SCWD 2009) The regional water board will consider the best available site, design, technology, and then mitigation measures feasible and then determine the combination of feasible

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		alternatives that collectively minimize intake and mortality of all forms of marine life.
13.104	While Option 3 [in the Staff Report with SED] allows surface intakes if subsurface intake is not feasible, it does not include a provision on the decision and constraints to locating land-based operations. These could be considerable and should be addressed here. Otherwise this option could result in a de-facto adoption of Option 2, requiring subsurface intake in all cases, by saying that the facility needs to be relocated to an area where subsurface intakes are feasible since they are considered here to be inherently superior (BTA). The onshore constraints for a desalination plant could be considerable, such as: - Land availability, - Zoning, - Access to nearby utilities, and - Access to water transmission lines.	Section 8.3 of the Staff Report with SED includes a discussion of whether the State Water Board should include a preferred method of seawater intake. Water Code section 13142.5(b) requires considerations of the “best available site, design, technology, and mitigation measures feasible” to minimize intake and mortality of all forms of marine life for any new or expanded seawater desalination facility. Land availability, zoning, access to nearby utilities, and access to water transmission lines, and other onshore constraints are factors that will be considered when determining what is available and feasible. However, these factors are not necessarily related to minimizing intake and mortality of all forms of marine life. Therefore, only the best available and feasible locations for a desalination facility that minimize intake and mortality of all forms of marine life will be considered in the Water Code section 13142.5(b) determination.
13.105	Based on the information presented in the SED, and on our knowledge of the marine biological resources, Option 1 is the superior option. As summarized earlier in our comments to Section 8.3.1.2.3, wedgewire screens were calculated to be considerably effective in reducing entrainment of fishes, and can be designed to eliminate impingement if they are properly maintained. Environmental impacts during installation of wedgewire screens at existing power plants would likely be much lower than those associated with the installation of subsurface intakes, and wedgewire screens would not substantially alter the seafloor.	Comment noted. The regional water board will determine the best available site, design, technology and mitigation measures feasible that in combination result in the least amount of intake and mortality of all forms of marine life.
13.106	The State Board is also recommending the requirement of a single maximum slot size. I would refer the State Board back to the section Installing Intake Screens - the effectiveness of screens depends on the size distribution of the organisms at risk of entrainment. The State could recommend 1.0-mm slot size as the maximum, but what if an entrainment study shows that 2.0-mm would reduce entrainment to some acceptable level, and reduce cost considerably?	Please see response to comment 15.4 and section 8.3.1.2.3 of the Staff Report with SED for why 1.0 mm screens are being required.
13.107	Section 8.4.1 [of the Staff Report with SED] U.S. EPA Phase I Rule	The Staff Report with SED was revised to reflect this request.

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	It should be clarified that this section refers to the "Clean Water Act §316(b)" Phase I Rule.	
13.108	Section 8.4.2 [of the Staff Report with SED] Surface and Subsurface Considerations "For example, construction may take two years, but the facility will be operational for 30 years and the marine life mortality associated with the construction of subsurface intakes will be for a short duration relative to intake-related mortality that would occur at surface intakes as long as a facility is operating." This does not consider or mention the operation and maintenance activities associated with subsurface intakes. The Fukuoka desalination facility in Japan uses a subsurface intake that has an area of 217,330 [square feet] (approximately five acres) (proposed policy p. 57). The installation of this intake may have substantially reduced or eliminated the potential for entrainment and impingement, but installation of a similar intake in southern California could permanently alter the seafloor habitat through changes in sediment particle size, which could subsequently alter the benthic and epibenthic community. This would affect production, yet this was not considered by the State Board in their proposed policy. The five-acre intake at Fukuoka can withdraw up to 13 million gallons per day (mgd). Therefore, approximately 40 acres of seafloor would be required for a comparable facility that could withdraw up to 100 mgd. For comparison, the size of the intake riser at the Huntington Beach Generating Station is 336 [square feet] (0.0077 acres).	There are currently no studies that have looked at the change in species abundance or composition after the installation of a subsurface infiltration gallery. The San Diego County Water Authority (SDCWA 2009) investigated intake options for a desalination facility at Camp Pendleton and reported a subsurface infiltration gallery between 18 and 55 acres would be needed to withdraw between 100 and 300 MGD. They also reported that the benthic community would re-colonize the sediment, but they had concerns that the sediment may not be recolonized with a similar community if the sediment characteristics are significantly changes. (SDCWA 2009) There have been reports of benthic communities recolonizing after the construction of a subsurface infiltration gallery. A recent article reported that the Fukuoka, Japan has shown no need for maintenance since it started operating over 8 years ago. The self-sustaining nature of the Fukuoka facility has been attributed to tiny worms and other organisms in the seabed that eat sediment, algae, and other material that could clog the intakes and excrete new filter material. (Weiser 2014) The regional water board will determine the best available site, design, technology and mitigation measures feasible that in combination result in the least amount of intake and mortality of all forms of marine life. This analysis will include mortality of all forms of marine life associated with a facility's intake, discharge, and construction. To clarify, there may be significant construction-related marine life mortality associated with large subsurface infiltration galleries. The construction-related impacts on marine life from other types of subsurface intakes will be minimal or non-existent.
13.109	Section 8.4.3 [of the Staff Report with SED] Siting of Discharges "Discharge at sites with high advection and ambient mixing will increase dilution, and may be more protective of the surrounding environment. Conversely, siting a brine discharge near a bathymetric depression can result in the formation of a dense anoxic layer that smothers marine life	Roberts et al. (2012) states, *"Discharge sites with high ambient mixing and advection (typical of exposed, open-ocean, collision-coastlines) are preferred, due to their greater ability to dilute and disperse the discharge. Discharge sites with bathymetric depressions (hollows) or barriers (offshore rocky outcrops) should be*

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	on the sea floor (Roberts et al. 2012)" The potential for anoxia and smothering of marine life is unlikely and overstated. Roberts et al. (2012) described the effects of the shoreline discharge of a dense, undiluted concentrate discharge within a bay on the Gulf Coast. They also stated: "Other far field bathymetric features to be avoided for the siting of a negatively buoyant brine discharge are bathymetric depressions (hollows). These are not generallv features found along the exposed open coast of California, but can be common in embayments, either from natural shoaling effects or from man-induced activities such as the dredging of navigation channels and berthing areas," and "This is unlikely to occur with a well-designed discharge however." The precautionary inclusion of this information is appropriate, including the statement: "Depending on the mixing rates with ambient waters outside of the density layer, the dissolved oxygen (DO) supply to the density layer may not meet the net oxygen demand of the benthic fauna within the layer. In this case, DO will decrease over time and, if the layer persists long enough, hypoxia or anoxia within the bottom layer can produce lethal effects in the far field well away from the discharge." However, the wording "smothers marine life on the sea floor" was not included in the original report. We recommend deleting the sentence that begins with "Conversely,"	*avoided with negatively buoyant discharges. Such sites have an increased potential for accumulation resulting in degraded water quality in the near-bottom."* Even if there are generally no bathymetric depressions or barriers found along the open coast of California, there may be opportunities to site discharges in harbors or other embayments. Consequently, it is important to consider these bathymetric conditions when siting a dense, negatively buoyant brine discharge. This is of particular concern when proposing to use an alternative brine disposal technology. Facilities that commingle with adequate amounts of wastewater and dischargers discharging through multiport diffusers may be able to discharge to areas with bathymetric depressions or barriers (offshore rocky outcrops) without resulting in hypoxic benthic conditions. However, siting of any discharge should consider the benthic topography in the area.
13.110	Sections 7.2 [of the Staff Report with SED] Marine Biodiversity and 8.4.5 Sensitive Species and Habitats Appendix C does not include any fish. Table C-3. Life History Information for Selected California Marine Fishes repeats the information presented in Table C-2. Life History Information for Selected California Marine Invertebrates. This should be corrected.	Thank you for this comment. The Table C-3 was revised.
13.111	In addition, the definition of sensitive species utilized in the SED is extremely narrow, without reference, and to the extent we can determine, incorrectly presented: Section 7.2: "Some of the species in Appendix C may be sensitive species, which are species that can only live in a narrow range of environmental conditions. The presence of sensitive species can be used	The Staff Report with SED was revised based on the information provided and to include that sensitive species include those that are particularly sensitive to anthropogenic stressors. However, the sentence, "The presence of sensitive species *can* be used as an indicator of a healthy ecosystem and the absence *may* be an indicator of environmental changes," is correct as stated.

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	as an indicator of a healthy ecosystem and the absence may be an indicator of environmental changes. The types of sensitive species will vary among biogeographic regions in California and with habitats." And later: Section 8.4.5: "Sensitive species are organisms that can only survive within a narrow range of environmental conditions. The absence of sensitive species in an area can be used an indicator of pollution or change from the 'natural' environmental conditions." It appears that this definition was incorrectly quoted from an online information source Biology Online (http://www.biology-online.org/dictionary/Sensitive_species). This quote is: "Sensitive species (Science: ecology, zoology) species that can only survive within a narrow range of environmental conditions and whose disappearance from an area is an index of pollution or other environmental change." An essential difference here is that in the case of the source quote, it is implied that the disappearance of a species previously known to occur in an area is an indicator of impairment or change, not the mere absence of any species designated as sensitive in an area. Still this definition of sensitive species is too narrow.	
13.112	The California Department of Fish and Wildlife maintains a list of "Special Animals" with the California Natural Diversity Database (CNDDB; http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/spanimals.pdf). According to the list "Special Animals" is a general term that refers to all of the taxa the CNDDB is interested in tracking, regardless of their legal or protection status. This list is also referred to as the list of "species at risk" or "special status species". The Department of Fish and Game considers the taxa on this list to be those of greatest conservation need. The species on this list generally fall into one or more of the following	The Staff Report with SED was revised based on the information provided.

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	categories: -Officially listed or proposed for listing under the State and/or Federal Endangered Species Acts. -State or Federal candidate for possible listing. -Taxa which meet the criteria for listing, even if not currently included on any list, as described in Section 15380 of the California Environmental Quality Act Guidelines. -Taxa considered by the Department to be a Species of Special Concern (SSC) - Taxa that are biologically rare, very restricted in distribution, declining throughout their range, or have critical, vulnerable stage in their life cycle that warrants monitoring. - There may be taxa that fall into this category but are not included on this list because their status has not been called to our attention. - Populations in California that may be on the periphery of a taxon's range, but are threatened with extirpation in California." Similar lists for plants are also available. This definition of "special" is essentially equivalent to the more typically used term "sensitive" as referenced in the SED. As can be seen above, inclusion on the list is considerably more comprehensive than the definition presented in the SED. Utilizing the absence of any sensitive species at a locale as an indication of impairment at that location is not appropriate.	
13.113	To address the several concerns we recommend that the paragraph above from Section 7.2 [of the Staff Report with SED] be modified to: California's diverse habitats support complex ecosystems with high species diversity. These biologically diverse species are extremely valuable from an ecosystem standpoint as well as being a key contributor to California's economy (discussed further in section 7.2.2). Life history information for selected California marine species is provided in Appendix C, which includes some sensitive species. Section 12 discusses state and federally listed threatened or endangered species that are also of interest when siting and designing a desalination facility. We also recommend that the sentences "Sensitive species are	The Staff Report with SED was revised based on the information provided.

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	organisms that can only survive within a narrow range of environmental conditions. The absence of sensitive species in an area can be used an indicator of pollution or change from the 'natural' environmental conditions" from Section 8.4.5 be deleted.	
13.114	Section 8.4.6 [of the Staff Report with SED] Co-Location "The use of the power plant's cooling water discharge does not result in incremental marine life mortality because any organism in the cooling water is presumably already dead due to the use of the water within the power plant." This is incorrect. Entrainment survival studies have demonstrated survival of ichthyoplankton, zooplankton, and phytoplankton after passage through once-through cooling water systems (see http://carlsbaddesal.com/Websites/carlsbaddesal/images/eir/Tenera.pdf). [note: incorrect link] While survival of ichthyoplankton may be low, it is probably not 0%. In the entrainment study for the Carlsbad Desalination Project, entrainment survival ranged from 0% to 9%, and averaged 2.4%. At Scattergood Generating Station, thermal/mechanical stresses due to passage through the once- through cooling water system in winter resulted in an initial survival of 91% and a latent survival of 67% for adults of the copepod Acartia spp. (IRC 1981). In summer, survival of Acartia was 95%. We recommend the following wording: "The use of the power plant's cooling water discharge would result in some incremental marine life mortality because some organisms survive transit through power plant cooling water systems. The survival rate varies by organism type and species, but ichthyoplankton survival is generally very low."	Although existing data display that a small fraction of the entrained organisms in cooling water intake systems survive; the previous determination made in the OTC Policy presumes that the impact is substantial enough to warrant mitigation efforts under the conservative assumption that 100% of the entrained organisms do not survive. (U.S. EPA 2011; Pankratz 2004) The Staff Report with SED was revised to indicate some studies show through-system survival, although survival is generally considered to be zero.
13.115	Section 8.4.8 [of the Staff Report with SED] Options Option 3: "All other things being equal, locations where subsurface intakes are feasible would be considered the best because subsurface intakes do not impinge or entrain marine life. Desalination facilities could be sited at locations where subsurface intakes are infeasible as long as the regional water board determines it is otherwise the best site and in	Co-location in the proposed Desalination Amendment and Staff Report with SED is in reference to a desalination facility co-located with a power plant. The cooling water effluent could be used for a desalination facility’s intake water as well as for brine dilutions. The Staff Report with SED discusses the potential benefits of co-locating a desalination facility with a power plant, but also recognizes that the availability of the cooling water effluent will be significantly reduced or eliminated as

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	combination with the best design, technology and mitigation measures results in the least amount of marine life intake and mortality" This makes no mention of potential effects from brine discharge. While co-location may employ a surface intake, it could also result in increased dilution with effluent streams (potentially from wastewater dischargers). The policy presumes co-location is with power plants, but it could also occur at wastewater treatment or reclamation facilities.	facilities come into compliance with the OTC Policy. The regional water board may make a Water Code section 13142.5(b) determination that will conditionally permit any desalination facility that is co-located with a power plant so that when the cooling water effluent becomes unavailable, the desalination facility will need a new determination that is based on the operating conditions without the cooling water.
13.116	Section 8.5 [of the Staff Report with SED] Should the State Water Board provide direction in the Ocean Plan on mitigating for desalination-related impacts? "Section 13142.5(b) (see section 8.1.1 of this staff report) requires an owner or operator of a new or expanded facility to mitigate for all intake and mortality of marine life, including mortality associated with facility's construction, intakes, and discharges." That is the State Board's interpretation of Section 13142.5(b), which requires using "feasible" measures to "minimize" and "mitigate". Section 13142.5(b) states: "For each new or expanded coastal powerplant or other industrial installation using seawater for cooling, heating, or industrial processing, the best available site, design, technology, and mitigation measures feasible shall be used to minimize the intake and mortality of all forms of marine life." The State Board should reference Section 13142.5(b) as it is written, not according to its interpretation.	The proposed Desalination Amendment defines mitigation as "the replacement of all forms of marine life* or habitat that is lost due to the construction and operation of a desalination facility* after minimizing intake and mortality of all forms of marine life* through best available site, design, and technology." The proposed Desalination Amendment also requires that an owner or operator fully mitigates and uses the best available mitigation measures feasible* to minimize intake and mortality of all forms of marine life. Section 8.5 was clarified based on the statutory language. The intent of the language in that paragraph is to clarify that marine life mortality associated with facility's construction, intakes, and discharges must be mitigated after the best available site, design, and technology measures feasible are used.
13.117	Section 8.5.1 [of the Staff Report with SED] Marine Life Mortality Assessment AEL and FH "AEL and FH place a higher value on larger and older fish because older	The language in the Staff Report with SED was revised to clarify that AEL and FH methods convert the losses of eggs, larvae, and juveniles into the number of equivalent adults or reproductive females based on natural mortality rates. These methods assess the losses from a population standpoint rather than assessing the "value" of the losses from an ecosystem standpoint. Since the methods do not quantify the

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	individuals have lower mortality rates than younger fish and consequently a higher probability of reaching reproductive maturity and reproducing." This is poorly worded. AEL and FH do not "place values" on fish. They convert the numbers of eggs and/or larvae into numbers of equivalent adults or reproductive females. One of the advantages of AEL and FH is putting larval loss estimates into the context of numbers of adult fish. The end product can be the number of Age-1 equivalents, in which case the entrainment of a five-year-old fish (for example only) could equal several Age-1 equivalents. In contrast, entrainment of a 4-day-old larva could be equivalent to 0.05 Age-1 equivalents. The general public could benefit from knowing if the loss of several million larvae from a single species was equal to two adult fish or 200,000 adult fish. We recommend changing the wording to: "AEL and FH are commonly used to convert the numbers of eggs and/or larvae into numbers of equivalent adults (AEL) or the number of adult females whose reproductive output was eliminated by entrainment (FH)." "AEL and FH discount the importance of the younger, smaller fish from a population standpoint and the methods do not assess the indirect impacts of the entrained organisms." See response above. We recommend deleting this sentence.	full extent of the entrainment losses, they will underestimate the amount of mitigation needed to fully mitigate for intake-related mortality.
13.118	"The loss of younger, smaller fish may seem inconsequential from a population standpoint because they have high natural mortality rates; however, AEL and FH do not quantify the loss of organisms from an ecosystem standpoint and how they" This incomplete sentence does not make sense. We recommend deleting this sentence.	The incomplete sentence was revised in the Staff Report with SED.
13.119	ETM/APF "A key assumption in the APF method is that the production forgone for a subset of species is a representative sample of all species present at that location, even those that are not directly measured."	Thank you for this minor correction. The Staff Report with SED was revised accordingly.

Please note all tables and figures referenced are present at the end of this document

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	This is not a key assumption of the APF. This is how APF has been applied at power plant and desalination siting cases in California for the past 10 years, but it is not part of the actual method. The APF used for mitigation could be the highest value instead of the average. We recommend revising this sentence to: "A key assumption in how the APF method has been applied to date in California is that the production forgone for a subset of species is a representative sample of all species present at that location, even those that are not directly measured."	
13.120	There is also no discussion regarding the type of habitat to be created. "The creation of habitat benefits all species in the food web regardless of whether or not they were assessed in the ETM/APF model." This statement uses the term "creation of habitat" instead of "restoration of habitat", and the two are not the same. This could imply the State Board will not consider the restoration of one acre to be equivalent to the creation of one acre. Restoration of habitat also needs to consider the organisms to be replaced. That is, restoration of wetlands will do little to directly replace the loss of coastal fish taxa, such as anchovies and croakers, but it will produce species such as gobies. It will also provide additional out-of-kind benefits, such as improvements to water quality, habitats for threatened and endangered species, and recreational opportunities. We recommend changing "creation of habitat" to "creation and restoration of habitat".	The proposed Desalination Amendment allows for the expansion, restoration, or creation of habitat and it is further discussed in section 8.5.2 of the Staff Report with SED. The sentence the commenter referred to was revised to include restoration.
13.121	Section 8.5.1.2 [of the Staff Report with SED] Discharge-related Mortality "To date, there is no empirical data showing the level of mortality caused by multiport diffusers. Foster et al. (2013) hypothesized that the actual level of mortality associated with multiport diffusers was very low, in part because the exposure time to organisms was very low However, until additional data is available, we assume that larvae in 23 percent of the total entrained volume of diffuser dilution water are killed by exposure to lethal turbulence. The actual percentage of killed organisms will likely change as more desalination facilities are built and more studies emerge.	Disagree. The justification is provided in section 8.5.1.2 of the Staff Report with SED. The paragraph below the excerpt from the Staff Report with SED reads, *"A potential way to address discharge-related mortality is to require mitigation for all organisms within a specific isohaline (e.g. the area that exceeds some level above natural background salinity). Organisms within a certain distance of the discharge will simultaneously be exposed to shearing stresses (when multiport diffusers are used) and toxic water conditions*

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	Future revisions or updates to the Ocean Plan may reflect additional data that becomes available." The State Board has no data on discharge-related mortality, but is assuming 23 percent mortality based on Foster et al. (2013). See Philip J. Roberts' comments on the Tenera report (in Foster et al. [2013]): - Only 23-38% of the larvae in this water would likely be affected and only for short times; - Although the exit velocity in the jets is quite high, this velocity attenuates rapidly with distance from the diffuser to near background level within a few meters. - Any larvae entrained into the jets will travel along the jet axis and eventually be expelled; at most, they will be exposed to high turbulence levels for tens of seconds. Most larvae will only be exposed to low turbulence levels. The smallest scales of this turbulence are generally smaller than the smallest organisms, suggesting little effect. - These have been extensively monitored, and show little environmental impact within a few tens of meters from the diffuser. It is not clear why Tenera did not include actual experience with brine diffusers in their report - While it is true that some damage to larvae may occur due to turbulence in the diffuser jets, it is probable that only a small fraction of those entrained will be subject to damaging levels and for durations long enough to cause significant impact In the absence of reliable estimates of potential mortality associated with diffuser discharges, the State Board should not impose their "best guess" as a regulatory requirement. If the State Board is requiring studies to determine entrainment estimates, then it should require some scientifically valid estimate of discharge-related mortality in lieu of the 2.0-ppt area/volume estimation.	*due to high salinity concentrations and/or other chemical constituents in the discharge. However, the volume of water susceptible to high shear stress should always be less than the volume of water where salinity exceeds 2.0 ppt above natural background salinity for undiluted brine discharges. Thus, shearing-related mortality would only occur within the area that exceeds 2.0 ppt above natural background salinity, and mitigating an area equivalent to the area that exceeds 2.0 ppt above natural background salinity would also compensate for shearing-related mortality."* The receiving water limitation for salinity in chapter III.L.3 was developed using the data from Roberts et al. (2012). The brine mixing zone is the area where the salinity will exceed 2.0 parts per thousand above natural background salinity, or the concentration of salinity approved as part of an alternative receiving water limitation, and the brine mixing zone must not exceed 100 meters (328 feet) laterally from the points of discharge and throughout the water column. The brine mixing zone is an allocated area where there may be toxic effects on marine life due to elevated salinity. To estimate discharge-related mortality, one could conservatively assume 100 percent mortality of organisms within the brine mixing zone. One of the reasons discharging through diffusers is the technology preferred after commingling brine with wastewater is because any shearing-related mortality is presumed to occur within the brine mixing zone, which is already an allocated area where there may be toxic effects on marine life due to elevated salinity. Any shearing-related mortality is expected to occur within an area that is already assumed to have mortality associated with elevated salinity. The Staff Report with SED was revised to include that, *"Diluted brine discharges like discharges from flow augmentation systems and commingled discharges will have to use other methods for estimating discharge-related mortality. If the brine is adequately diluted, there will be no osmotic-related mortality but there may be shearing related mortality. The shearing mortality will be related to the velocity at which the effluent is discharged. Modeling and additional studies may*

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		need to be done in order to estimate shearing related mortality from diluted brine discharge systems. In some instances, the diluted discharged may be passively discharged; however if there is any turbulent mixing, an owner or operator will need to estimate the mortality associated with brine discharge. *“For commingled discharges, there may be shearing that occurs as the result of the wastewater being discharged through diffusers. Historically, a wastewater treatment plant has not been required to mitigate for this shearing related mortality. It is not the intention of the proposed Desalination Amendment to make the wastewater treatment plants mitigate for the shearing related mortality from their existing effluent volume. However, if an owner or operator of a desalination facility plans to commingle their brine with a wastewater treatment plant, they will need to estimate the shearing mortality from the addition of the brine. For example, if a wastewater treatment plant discharged 250 MGD of treated effluent and a desalination facility is planning on adding 50 MGD to the effluent, the owner or operator of the desalination facility would be responsible for estimating and mitigating for shearing mortality from the added 50 MGD.”* The proposed Desalination Amendment requires an owner or operator to estimate marine life mortality associated with their discharge and clearly states that, *“The report shall use any acceptable approach[emphasis added] approved by the regional water board for evaluating mortality that occurs due to shearing stress resulting from the facility’s discharge, including any incremental increase in mortality resulting from a commingled discharge.”* chapter III.L.2.e.(1)(b).
13.122	"However, the volume of water susceptible to high shear stress should always be less than the volume of water where salinity exceeds 2.0 ppt above natural background salinity. Thus, shearing-related mortality would only occur within the area that exceeds 2.0 ppt above natural	Please to response to comment 13.121.

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	background salinity, and mitigating an area equivalent to the area that exceeds 2.0 ppt above natural background salinity would also compensate for shearing-related mortality" There is no reference or justification for the 2 ppt assertion. If the State Board does not have a scientific basis for this requirement, then it should be included in study requirements of the facility owner/operator.	
13.123	Section 8.5.2.2 [of the Staff Report with SED] Discharge-related Mortality See response to Section 8.5.1.2. The comparison of larval mortality potential within a diffuser plume to a mortality assessment of 100% for water used for in-plant dilution was not included in this section of the SED.	Section 8.5.2.2 does not exist in the Staff Report with SED. Diffuser-related mortality is discussed in Section 8.5.1.2 titled Diffuser-Related Mortality. In-plant dilution is a broad term that includes any type of dilution of brine that occurs at a facility or prior to brine being discharged into the ocean. Staff Report with SED distinguished flow augmentation is a form of in-plant dilution that occurs when a desalination facility withdraws additional source water for the specific purpose of diluting brine prior to discharge. Mortality associated with flow augmentation, as it is discussed in general terms in section 8.6.2.3. *"flow augmentation can successfully lower salinity of the brine prior to discharge and may be protective of organisms living at desalination outfalls. However, if the increased flows come from surface water intakes, increases in intake mortality may offset any benefit from reduced discharge mortality. Thus, any assessments of flow augmentation systems should include a whole-system estimate (intakes, water conveyance, augmented impacts, and ultimate disposal) of the intake and mortality of marine life."* As stated in sections 8.5.1.2 and 8.6.2.3 of the Staff Report with SED, there are not a lot of data that have examined mortality associated with diffusers or flow augmentation systems. A report was submitted to the State Water Board in 2013 (Wasyl and Jenkins 2013) and then revised and resubmitted as Jenkins et al. (2014) that purported to compare mortality associated with diffusers and mortality associated with flow augmentation systems using Archimedes screw pumps. The report is provided in Poseidon Water LLC's comment letter submitted to the State Water Board on August 19, 2014. Please see response to

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		comment 15.20 regarding our response to the report. Since there is a lack of data available to compare the methods, the proposed Desalination Amendment requires an owner or operator proposing to use an alternative discharge technology to conduct studies to demonstrate to the regional water board that the alternative technology provides a comparable level of protection as wastewater dilution if wastewater is available, or multiport diffusers if wastewater is unavailable.
13.124	Section 8.5.4 [of the Staff Report with SED] Adding Certainty to Mitigation Projects Care should be taken when analyzing entrainment/source water data. We recommend deleting the requirement for analysis of confidence intervals. There are several other important steps to consider before reaching this step, such as: which species to analyze, how source waters will be calculated, how larval duration will be calculated, etc. In addition, there are questions to ask when applying APF estimates to a mitigation project, including the compatibility of habitat types.	Please see response to comment 21.90 for why a 95 percent confidence level is required.
13.125	Section 8.5.6 [of the Staff Report with SED] Options "Because it does not provide a consistent statewide approach for minimizing intake and mortality of marine life, protecting water quality, and related beneficial uses of ocean waters." This sentence is incomplete.	Comment noted. The sentence was revised in the Staff Report with SED to, “Option 1 does not provide a consistent statewide approach for minimizing intake and mortality of marine life, protecting water quality, and related beneficial uses of ocean waters."
13.126	"Intake-related impacts would be assessed using an ETM/APF approach and the final APF would be calculated using a 90 percent confidence level. Although a 90th percentile confidence interval may appear to require a very high level of statistical certainty, the confidence level is less than other types of current Board requirements (e.g. Instream Flow Policy, cleanup standards). In practice, the amount of additional acreage needed for a 90th percentile confidence level is relatively low in comparison to the total size of a mitigation project."	Please see response to comment 21.90 for why a 95 percent confidence level is required.

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	In 2011, Dr. Peter Raimondi prepared a report for the CEC entitled "Variation in Entrainment Impact Estimations Based on Different Measures of Acceptable Uuncertainty", available online at: http://www.energy.ca.gov/2011publications/CEC-500-2011-020/CEC-500-2011-020.pdf. In this report, he illustrates several examples of using different confidence intervals in calculating restoration. Based on the examples provided in that report, if the 90% confidence interval was used instead of the mean (50%) confidence interval (note: these numbers are estimated because raw data were not included, only illustrations), estimated mitigation projects could potentially triple in size. While this is dependent on the use of mean density versus species-specific density, and mean larval duration versus species-specific larval duration, mitigation may not always be "relatively low". Statistical outliers (anomalous data points) can greatly affect the confidence intervals. We recommend deleting references to the 90 percent confidence interval.	
13.127	"Discharge-related impacts would be estimated by determining the area or volume in which salinity exceeds 2.0 ppt above natural background salinity (or an alternative facility-specific alternative receiving water limit)." As stated before, there is no basis for the 2.0 ppt limit.	See response to 13.121.
13.128	Section 8.6.2.2.1 [of the Staff Report with SED] Marine Life Entrainment at Multiport Diffusers "Multiport diffusers are designed to increase turbulent mixing (Roberts et al. 1997) and as a result, organisms that are entrained into the brine discharge may experience high levels of shear stress for short durations, which is thought to cause some mortality." The State Board is considering high-velocity multiport diffusers to facilitate mixing and dispersion. However, if shear stress is such an issue, why not consider low-velocity multiport diffusers that would minimize shear stress and still provide mixing? It would require more ports and a larger area, but why limit the discussion?	Low velocity multiport diffusers will not adequately mix the brine in the receiving waters (even with additional ports and a larger mixing zone) because diffusers are designed to maximize turbulent mixing to rapidly dilute the brine to prevent the formation of dense negatively-buoyant plume settling on the sea floor. If the brine is discharged through a low-velocity multiport diffuser, the slow release of a discharge will instead allow the brine to settle on the seafloor and prevent rapid dilution. *"[Regarding] "low" velocity diffusers, there does not appear to be information available for the use of low velocity diffusers for the discharge of undiluted, negatively buoyant plumes. Since diffusers are designed to be turbulent to facilitate mixing and*

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		dilution, lower velocities would presumably reduce efficiency. Lower velocity discharges are utilized to discharge brine that has been diluted prior to discharge. As indicated in the SED, discharge of undiluted brine into the ocean in the absence of turbulent mixing could result in the formation of a dense saline field near bottom and "downhill" of the discharge location." (pers comm. Davis Villas from MBC Analytical) Furthermore, the proposed Desalination Amendment provides an owner or operator with the opportunity to use an alternative discharge method they demonstrate to the regional water board that the technology provides a comparable level of protection as wastewater dilution if wastewater is available, or multiport diffusers if wastewater is unavailable. This provision allows for technological innovations in the field.
13.129	Section 8.7.1 [of the Staff Report with SED] Background: Effects of Saline Discharges on the Marine Environment. In reference to Roberts et al. (2012), the SED states "that the Panel reviewed scientific literature that addressed impacts of elevated salinity on marine organisms and found that most marine organisms started to show signs of stress when salinity was elevated by 2 to 3 ppt...". This is an overstatement of the Panel's conclusions which is worded as " ...based on existing information, a salinity increase of no more than 2 to 3 ppt in the receiving waters around the discharge appears to be protective of marine biota".	Comment noted.
13.130	8.7.2 [of the Staff Report with SED] Natural Background Salinity "Natural background salinity should be evaluated for each facility by averaging historical salinity data at the proposed facility location from at least 20 years prior. When historical data are not available, natural background salinity should be determined by measuring salinity at the depth of the proposed discharge for several years at relatively high frequency. Background salinity should be determined prior to discharging brine in order to best establish natural conditions."	Natural background salinity should be measured at the proposed discharge location and depth of the discharge prior to commencing brine discharge. The proposed desalination Amendment also requires that facilities establish a reference location with similar natural background salinity to be used for comparison in ongoing monitoring of brine discharges. As mentioned in response to comment 6.9 the definition of natural background salinity was revised so that natural background salinity will

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	If "natural background salinity" is to be measured, it should be measured at the location and depth of the proposed discharge. We would also suggest that the salinity of a reference location of similar depth and bathymetric characteristics be established outside of the area of potential influence of the discharge to determine similarity of salinity characteristics for comparison after initiation of discharge. A 20-year data set of salinity at depth at the discharge location is not practical. Instead we suggest that long-term data be acquired from the nearest location(s) where the bottom salinity data is available for the period required. The Shore Station Program (http://shorestation.ucsd.edu/) would be a suggestion for one source of data, but there are others. Intensive sampling over a relatively short period of time of at least one year is sufficient to make meaningful comparisons of local salinity characteristic to those at established monitoring stations. We recommend that the paragraph be reworded: "Natural background salinity should be evaluated for each facility by averaging historical salinity data from the nearest available source of long-term salinity data (preferably 20 years prior). High frequency salinity testing at the proposed location and depth of the discharge, and at a nearby reference site expected to be outside of the area of influence of the proposed discharge, should occur over a one-year period. Comparison of this data between sites and to the historical data source will allow for the determination of natural background salinity in the project area and establish a site for later comparison and determination of naturally occurring variability."	be based on the mean monthly natural salinity for an area at the depth of the proposed discharge. The receiving water limitation for salinity will be based on 2 ppt above the historical average (or 3-year average when historical data are unavailable) salinity for a given month. The requirements to establish natural background salinity are there to capture environmental variability. Salinity will vary monthly based on precipitation, storm water runoff, and influxes from other freshwater sources. California is also subject to long-lived changes in oceanographic conditions like El Nino, La Nina, and the Pacific Decadal Oscillation that make it sensible to collect more than one year of salinity data. We disagree that a 20 year data set is impractical based on the availability of salinity data in California's coastal waters. There are many organizations that have historical salinity data available (e.g. CalCOFI, NOAA) going back for decades and often the data are free. In the event historical data are not available for a site, three years of weekly salinity samples will capture the seasonal and inter-annual variations. Furthermore, since the receiving water limitation for salinity will be based on the mean monthly average, it is important to have a strong data set. Monthly samples for three years would mean the historical average would be based on three data points. Weekly samples will mean the monthly average will be based on at least 12 data points. Furthermore, since the definition of salinity was revised to no longer require grab samples for total dissolved solids analysis, and alternative methods for measuring salinity like an in situ electrical conductivity probe can be used, cost should not make these requirements impractical.
13.131	Section 8.7.5 [of the Staff Report with SED] Options "Using laboratory or farm raised animals increases the accuracy and reproducibility of the studies. Wild-caught species will have different levels of physical fitness, which can result in inconsistencies in the toxicity test results. If toxicity tests are run on wild species any differences detected may be a result of environmental variability and not actual differences. There is a high probability toxicity studies on wild caught species will result in inconclusive results."	Comment noted. The Staff Report with SED was revised accordingly.

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	We note that one of the species required for toxicity testing (giant kelp [M. pyrifera]) is presently not raised in a lab due to its size. Instead, giant kelp is harvested by individuals with proper permits, and sold to laboratories for testing. Our ELAP-certified laboratory runs toxicity tests on this species on a regular basis. It should be clarified that giant kelp can be "wild caught". We recommend adding the sentence: "When possible, toxicity test organisms should be laboratory- or farm-raised; however, these organisms may not always be available."	
13.132	There is an inconsistency to the approach to defining the maximum salinity limits in these options. Options 2, 3, and 4 utilize a maximum salinity limit of 2 ppt at the edge of the ZID, while Option 5 references a limit 3 ppt as being protective. Option 6 includes a reference to a range of 1.7 to 3 ppt, again stating the 3 ppt limit would be protective based on the Expert Review Panel. Since the limit of 3 ppt is justified as being protective for some of the options it is suggested that the 3 ppt limit be accepted for all options. We recommend that the limit of 3 ppt be utilized for all options.	Disagree. Please see response to comment 13.154.
13.133	Section 12.1.4 [of the Staff Report with SED] Biological Resources "Surface and Subsurface intake construction related impacts are compared in section 8.4.2 describing that although subsurface intakes could potentially have more construction related impacts, the construction period is much shorter and much less severe to the long term operation impacts caused by surface water intakes." The State Board never describes (even conceptually) the types of organisms, numbers of organisms, area or type of habitat that could be affected during construction, operation, and maintenance of a subsurface intake system.	The types of organisms, numbers of organisms, area or type of habitat that could be affected during construction, operation, and maintenance of a subsurface intake system are described in Section 7, Environment Setting and Appendix III of the Staff Report with SED. To view more detailed analysis of the type of organisms or habitats that could be affected, the CEQA documentation on site-specific desalination facilities should be viewed. Furthermore, the types of organisms, numbers of organisms, and area or type of habitat that could be affected during construction, operation, and maintenance of a subsurface intake system will be evaluated through a project's EIR and this information will also be provided to the regional water boards when making the Water Code section 13142.5(b) determination.
13.134	"Although the analysis for the four facilities described above results in few significant impacts, it is unlikely that all future facilities would result in similar impacts to biological resources for the following reasons. The	The purpose of section 12 of the Staff Report with SED was to review existing CEQA documentation for existing desalination facilities and to assess the potential construction and operational impacts that can be

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	abundance and distribution of state and federally listed marine and terrestrial threatened and endangered species vary significantly throughout the coast. Further, critical habitat designated for federally listed species and Essential Fish Habitat designated for fisheries management encompass significant portions of California's nearshore marine waters. In addition, entrainment studies conducted for the Huntington Beach and Marin facilities indicated that fish and invertebrates are entrained by surface water intakes. While these studies concluded that the observed entrainment would have a less than significant impact, it cannot be concluded that all future facilities will also result in no impact on the sustainability of local species, or the recovery and propagation of state and federally listed species. Further, the limited research conducted by the four proponents considered in this analysis did not attempt to evaluate potential impacts to the food web." The State Board should consider the results of the Cumulative Impacts Study prepared as a Conditions of Certification for the AES HBGS Retool Project (MBC and Tenera 2005). The Cumulative Impacts Study analyzed impingement and entrainment impacts from the coastal power plants in southern California. The cumulative mortality due to entrainment ranged between 0 and 2% depending on location and larval duration. It should be noted that the estimates were calculated using the maximum permitted flow volumes of 13 power plants. Due to facility retirement (Long Beach, South Bay, and San Onofre) and repowering projects (EI Segundo 1&2, Haynes 3-6), the flow volume has likely been reduced by 40%. In addition, the effects from some of the projects (San Onofre and Huntington Beach 3&4) were mitigated with agency oversight.	foreseen with future desalination facilities. Although the Cumulative Impacts Study performed by AES presents data on impingement and entrainment impacts by coastal power plant along the California coastline, the purpose of section 12 is to assess potential impacts associated with the construction and operation of a desalination facility. The Cumulative Impacts Study can be added to the administrative record if provided.
13.135	Based on the information presented by the State Board, and on our extensive studies with California's nearshore marine biological communities, surface intakes (if properly sited, constructed, and maintained) could minimize environmental impacts without large-scale, long--term impacts to biological communities associated with the seafloor and/or beaches. Without an example of what a likely or preferred subsurface intake would look like, the most likely comparison is that of the Fukuoka plant in Japan; a similar intake would alter 40 acres of seafloor to withdraw 100 mgd. The SED did not provide an estimate of the area of	The Staff Report with SED describes the construction and operational impacts of both surface and subsurface intakes in section 8.3 and 8.4.2. Surface intake construction impacts can be minimized or avoided by proper siting of the intake pipe and per the use of existing intake infrastructure. However, overall operational impacts of surface intakes are significantly higher compared to subsurface intakes. This is because the duration of construction is relatively small in relation to the life of a project. The construction may take a couple years, but the facility will be operational for 30 years. The marine life mortality

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	seafloor disturbed due to construction of wedgewire; however, we can only conclude it would be much less. For example, it was estimated that 20 wedgewire screens would be required for approximately 500 mgd of cooling water at the AES Huntington Beach Generating Station (EPRI 2008). Each screen would be supported to the cooling water pipe by a 7-foot-diameter riser. Even if there were still 20 screens for a 100-mgd desalination facility, the footprint of the risers would only be about 770 [square feet] (or about 1.8 acres). Assuming a linear reduction between intake flow and screen area, the estimated footprint would be one-fifth of that, or 0.35 acres (more than 110 times smaller than the area required for a subsurface intake).	associated with the construction of subsurface intakes will be for a short duration relative to intake-related mortality that would occur at surface intakes as long as a facility is operating.
13.136	L.2.5.b.(2). [of the proposed Desalination Amendment] " ... that avoid impacts to sensitive habitats and sensitive species." The definition of sensitive habitats includes "market squid nurseries". Market squid spawn in waters from 3 to 180 m deep, but primarily at 15m (MBC 1986). The definition of market squid nursery has been misconstrued and is incorrect (see comments above to Section 7.2.2). Squid do not necessarily return to the same areas to spawn. The way nursery is defined, any place where squid spawn could be classified as a nursery. We recommend deleting references to market squid nurseries and their designation as a special habitat.	Please see responses to comments 13.83-13.85.
13.137	L.2.d.1.(a).i [of the proposed Desalination Amendment] In the consideration of criteria for determining feasibility of subsurface intakes, we would recommend the following additions: source water quality, impacts to benthic and epibenthic communities, habitat replacement, and littoral cell characteristics.	While source water quality is a concern for an owner or operator of a desalination facility, subsurface intakes typically have better source water quality since the sediment acts as a natural barrier or filter. (Missimer et al. 2013) Some areas, particularly near freshwater sources, may have higher concentrations of iron or manganese, or other source water quality issues; however, these issues are not restricted to subsurface intakes and there are a wide variety of treatment methods available. Source water quality should not be a factor to determine whether a subsurface intake is feasible. Impacts to benthic and epibenthic communities will be taken into consideration when determining the best available site feasible, but will not necessarily be used in determining subsurface feasibility. Impacts to benthic and epibenthic communities will also be considered for surface

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		water intakes. Habitat replacement will be addressed through the best available mitigation measures feasible after the best available site, design, and technology feasible are used. Littoral cell characteristics are already addressed by other factors on the list such as geotechnical data, hydrogeology, benthic topography, oceanographic conditions, etc.
13.138	L.2.d.1.(c).ii [of the proposed Desalination Amendment] It is unclear why the State Board is picking a slot size but has not yet presented any data on effectiveness of slot sizes (which will vary by location, season, etc.). The State Board should consider the trade-offs between slot size and affected habitat. For instance, for any given intake, reducing the slot size will require an increase in the surface area to maintain a low through-screen velocity (i.e., narrower slots require more surface area to achieve the same through-screen velocity). Therefore, there would be an incremental amount of seafloor habitat affected by requiring a smaller slot compared to a larger slot. Because the flow requirements (and marine life affected) will vary from site to site, the State Board should not require any particular slot size.	Please see response to comment 15.4.
13.139	L.2.d.1.(c).iii [of the proposed Desalination Amendment] "An owner or operator may use an alternative method of preventing entrainment so long as the alternative method provides equivalent protection of eggs, larvae, and juvenile organisms as is provided by ...." This should be limited to fish, not all marine organisms. Otherwise, this would encompass all plankton. The requirement for 36 consecutive months of data is also excessive. The use of the ETM model accounts for year-to-year variability in larval densities.	Water Code section 13142.5(b) requires consideration of all forms of marine life. An owner or operator applying for an alternative receiving water limitation for salinity must demonstrate that the alternative technology provides equivalent protection as a screen with a 1.0 mm slot size or mesh size. Existing entrainment data for 1.0 mm slot size screens show that almost all organisms smaller than 1.0 mm will pass through the screen (see section 8.3.1.2.3 of the Staff Report with SED). Other studies have shown screens do not effectively exclude ichthyoplankton of some species until they are 25 mm long. (Tenera et al. 2013b) One could conservatively assume that 100 percent or eggs, larval, and juvenile organisms smaller than 25 or 30 mm are entrained and perish. An owner or operator may not have to count and compare mortality of individual microplankton if this assumption is valid. The regional water board can consider this assumption when reviewing and approving a study proposal that compares an alternative intake

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		technology to a screen with a 1.0 mm slot size or mesh size. Please see response to comment 15.5 regarding the 36 month requirement.
13.140	L.2.d.1.(d) [of the proposed Desalination Amendment] The justification for a through-screen velocity of 0.5 fps is not clear (see comments to Section 8.3).	Please see response to comment 27.2.
13.141	L.2.d.2.(b) [of the proposed Desalination Amendment] Multiport diffusers are to be engineered to "maximize dilution... and minimize marine life mortality." However, based on the information presented, the maximum dilution occurs at high jet velocity, which increases mortality.	Chapter III.L.2.d.(2) includes "*Considerations* [emphasis added] for Brine Discharge Technology," which included factors to consider when making the Water Code section 13142.5(b) determination. There are some potential mortality tradeoffs in chapter III.L.2.d.(2)(b). For example, maximizing dilution may result in an increase in shearing related mortality, but it will also minimize the area of impact due to elevated salinity. Whereas reducing diffuser velocity may reduce shearing-related mortality, it may increase the area of impact due to elevated salinity. The intent of chapter III.L.2.d.(2)(b) is to come up with the best available multiport diffuser design feasible to minimize marine life mortality.
13.142	L.2.d.2.(c) [of the proposed Desalination Amendment] The term "marine life" is used in this section, and is not defined.	The proposed Desalination Amendment language was revised to read "all forms of marine life" to be in line with the language in Water Code section 13142.5(b). A definition of "all forms of marine life" was added and is defined as including all life stages of all marine species.
13.143	L.2.d.2.(d) [of the proposed Desalination Amendment] The policy requires evaluation of "all of the individual and cumulative effects of the proposed alternative discharge method on marine life mortality, including (Where applicable); intake-related entrainment, osmotic stress, turbulence that occurs during water conveyance and mixing, and shearing stress at the point of discharge." Note that it may not be possible to parse out the contribution of different stresses to organism death. If we collected plankton in the field, how would one identify if the organism died from osmotic stress, turbulence during mixing, or shear stress? We recommend deleting the reference to individual effects.	The intent of this section is so than an owner or operator electing to apply to use an alternative brine disposal technology will measure "whole system" mortality. Systems like flow augmentation systems can be used to dilute brine, but they intake additional water to do so and there will be marine life mortality associated with the intake of that water. Chapter III.L.2.d.(2)(d) requires that the comparison of discharge technologies include mortality of organisms throughout the system including: mortality of organisms in the intake water if that water is being expressly used for dilution, mortality of organisms while being conveyed and mixed with brine (if there are live organisms in the dilution water), and mortality that occurs as the brine/ commingled effluent is discharged. If there are live organisms in the dilution water, the study

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		does not necessarily have to determine whether an organism dies from osmotic shock in the brine mixing process or from turbulence during water conveyance, but they must evaluate though-system mortality.
13.144	L.2.d.2.(e).iv [of the proposed Desalination Amendment] This process was not discussed in the Staff Report/SED. The option recommended by Staff allows for flexibility in design-based and site-specific constraints. If mitigation is based on flow augmentation, discharge impacts should be properly offset.	Chapter III. L.2.d.2.(e).iv was not discussed in the staff report because the intent of the language is clear in the proposed Desalination Amendment. If an owner or operator does not demonstrate to the satisfaction of the regional water board that an alternative brine disposal technology like flow augmentation provides equivalent protection as commingling brine or diffusers, an owner or operator must upgrade their discharge technology. As stated in chapter III.L.2.e, mitigation is considered after minimizing intake and mortality of all forms of marine life through the best available site, best available design, and best available technology measures feasible. Mitigation should not be used as a tool to compensate for inferior intake or discharge technologies when other technologies are feasible.
13.145	L.2.e.(1).a [of the proposed Desalination Amendment] Thirty-six months is excessive for an entrainment study. The use of the ETM model accounts for year-to-year variability in larval densities. A study period of 12 to 24 months would be sufficient. The use of 200-micron mesh for "a broader characterization" is also excessive and this requirement should be deleted. The State Board staff attempted to include this into the Once-through Cooling Water Policy. We also recommend deleting references to the use of the 90 percent confidence interval (CI).	Please see response to comment 15.5 regarding the study duration, response to comment 15.48 regarding the 200 micron requirement, and 21.90 regarding the use of a 95 percent confidence level.
13.146	L.2.e.(1).b [of the proposed Desalination Amendment] This section sets a salinity threshold of +2 ppt above background salinity. However, Roberts et al. (2013) recommended an increase of "no more than 2 to 3 ppt". This section requires use of "any acceptable approach for evaluating mortality that occurs due to shearing stress resulting from the facility's discharge" (?). We recommend that the limit of 3 ppt be utilized.	Please see response to comment 13.154.
13.147	L.2.e.3.b.ii [of the proposed Desalination Amendment] "The owner or operator shall do modeling to evaluate the areal extent of the mitigation project's production area* to confirm that it overlaps the facility's source	Please see response to comment 15.8 regarding mitigation and mitigation ratios and a discussion and definition of production area from a mitigation project overlapping the source water body. There are a

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	water body.* Impacts on the mitigation project due to entrainment by the facility must be offset by adding compensatory acreage to the mitigation project." This language should be deleted. Here the State Board is (1) requiring evaluation of the mitigation project's "production area", (2) requiring this area to overlap the source water body, and then (3) penalizing a facility for subsequent entrainment impacts. The alongshore length of the source water at the HBGS (for one species) extended about 85 km (53 miles). First, the term "production area" is not defined.	number of methods an owner or operator could use to determine whether the production area from a mitigation project overlaps with the source water body, and to the extent of the overlap. Since Water Code section 13142.5(b) requires mitigation measures for all forms of marine life, it includes any organisms that are entrained in the surface intake, regardless of whether they originated from the mitigation project. There is no penalty associated with this requirement, only mitigation for impacts. The goal for an owner or operator should be to attempt to locate the mitigation project so the production area overlaps with the source water body, but not so close that all of the productivity is re-entrained. Another advantage to using subsurface intakes is that the mitigation project for any mitigation required for discharge or construction-related impacts can be sited without the concern of re-entraining organisms. While it is true that ocean currents are complex, in the past 10 to 20 years there has been extensive research in the area of ocean models that can be used to accurately predict larval dispersion. One of the most commonly used models is the Regional Ocean Modeling System (ROMS), a free platform developed and maintained by researchers at Rutgers University. (Song et al. 1994) This model has been used in California with oceanographic data obtained by the California Oceanic Cooperative Fisheries Investigations (CalCOFI) to better understand the spatial and temporal dynamics of larval dispersal. (Mitarai et al. 2008) Oceanographic data has been collected throughout the California coastline for years by CalCOFI, the Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO), and other ocean observatories. Researchers at the University of California, Los Angeles have further developed of ROMS to include new features and conducted many studies specific to the coastal California current system (http://web.atmos.ucla.edu/roms/Welcome.html). These data can be used in models to evaluate larval movement in the nearshore environments. Modeling larval dispersal has been, and continues to be, an important area of research as it can be applied to studies on population ecology, predicting climate change effects, invasive species origin and

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		movement, fisheries management, and management and success evaluations of marine protected areas. (Levin 2006) A quick literature search produces thousands of peer-reviewed scientific articles with advances in this field, including a new model that predicts dispersal of clam larvae (Bidegain et al, 2013), a three-dimensional biophysical model for Southern California Bight (Simons et al. 2013), and study that incorporates habitat-specificity to evaluate larval dispersal in the Gulf of California. (Anadon et al. 2013) This literature search was by no means exhaustive, but illustrates the point that larval dispersal modeling methods have significantly improved over the last decade.
13.148	Second, if the source water overlaps with the area that larvae from the mitigation site are ultimately transported to, the owner/operator should not be penalized for potential entrainment This could be a never-ending cycle of penalization, as some percentage from each incremental offset could be entrained. It is not possible to determine where the true source of larvae are - for facilities on the open coast, the calculation of larval duration (the period of time larvae are exposed to entrainment) used in conjunction with ocean current data allow the determination of a length the larvae could have traveled. However, due to the complexity of ocean currents, the confidence in determining an actual source "point" would be low. Recently, high-frequency radar (CODAR) has been used to measure surface currents during source water studies, but we have not seen any data regarding the accuracy of this method. CODAR data may not be available for some areas of California. In addition, at HBGS a large fraction of the larvae entrained may not have originated in the nearshore waters, but instead were likely exported out of bays, estuaries, and harbors, and their point of origin could not be determined. The goal of the mitigation project should be to create habitat sufficient to offset losses due to entrainment; the discharger should not be liable for what happens to larvae produced from the mitigation site. The State Board should also allow some flexibility in determining the best methods for determination of source waters.	Please see response to comment 13.147.
13.149	"The regional boards may require additional habitat be mitigated to compensate for the annual entrainment of organisms between 200 and	Please see response to comment 15.48.

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	335 microns." This sentence should be deleted. In Section 8.5.1.1 of the Staff Report, the use of ETM/APF is required because: - It compensates for all entrained species and not just commercially valuable fish taxa, - Requires less life history data for species compared to other methods (e.g., AEL and FH), - Utilizes representative species that can be used as proxy species for rare, threatened, or endangered species, which may be challenging to acquire adequate data for, and - The creation of habitat benefits all species in the food web regardless of whether or not they were assessed in the ETM/APF model. Additional mitigation is not necessary with use of the APF. In Section L.2.e.1.a [of the proposed Desalination Amendment] it is noted that the 200-micron mesh is for a "broader characterization".	
13.150	L.2.e.3.b.iii [of the proposed Desalination Amendment] "...shall restore one acre of habitat unless the regional water board determines that a mitigation ratio greater than 1:1 is needed." There will be issues with out-of-kind mitigation. At the HBGS, which intakes and discharges from nearshore, sandy habitat, the CEC required mitigation of wetlands. There should be flexibility in determining ratios, and it should not be limited to numbers greater than one. For instance, 0.5 acres of wetlands could offset losses of 1.0 acres of nearshore, sandy habitat The same should apply to the next section regarding construction--related habitat.	Please see responses to comments 21.90, 29.6, and 15.9.
13.151	L.3.b.1 [of the proposed Desalination Amendment] It is not clear why the limit is expressed in "ppt" but measurements are required in "TDS". We can measure salinity in situ using instrumentation (moored sensors, profilers, water quality probes) in practical salinity units (psu; 1 psu ≈ 1 ppt, as stated in the SED). However, determination of TDS requires collection of grab samples, and delivery to an analytical lab. This requirement makes no sense. We recommend measurements using ppt/psu.	Please see response to comment 13.159.
13.152	L.3.c.1.a. [of the proposed Desalination Amendment] The 36-month	Please see response to comment 15.5.

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	requirement is excessive and should be deleted.	
13.153	L.3.c.1.b. [of the proposed Desalination Amendment] The policy requires toxicity testing using five species. We note that these species are not always available from suppliers and several of these may not spawn for several months during the year, including mussels, purple urchin, and red abalone. Inclusion of three invertebrate species for testing seems excessive and is not consistent with current testing requirements in the Ocean Plan. We recommend utilizing the test approach described in the Ocean Plan (Appendix III) that utilizes three species (a fish, an invertebrate and an aquatic plant, if possible) to measure compliance with the toxicity objective. In addition we recommend that WET testing allow a tiered approach to use of the species required for testing as presented in Table III-1 of the Ocean Plan (SWRCB 2012). This approach is a practical method to ensure that test organisms are available throughout the year.	The proposed Desalination Amendment language in chapter III.L.3.c.(1)(b) would only be a one-time study required of an owner or operator electing to apply for an alternative receiving water limitation for salinity. Since the study is a one-time requirement to establish an alternative receiving water limitation for salinity, the availability of test organisms throughout the year is irrelevant. All desalination facility discharges must still comply with the standard Ocean Plan toxicity monitoring requirements. The intent of the language in chapter III.L.3.c.(1)(b) is to essentially repeat the Granite Canyon study (Phillips et al. 2012) that was used to establish the 2 ppt limitation, but using effluent from the desalination facility. Based on the results from Phillips et al. (2012), using only the standard three species, a fish, an invertebrate, and an aquatic plant (algal species), could result in a receiving water limitation that is not adequately protective of marine life. *Macrocystis* (an algal species) and topsmelt (a fish) were tolerant of large salinity fluctuations. The remaining invertebrate species ranged in tolerance from changes as small as 1.6 ppt (LOEC red abalone development) to 16.2 ppt (LOEC mysid shrimp growth). An owner or operator could use the results from Phillips et al. (2012) to select a more salinity tolerant invertebrate in order to get a higher receiving water limitation. The proposed Desalination Amendment language in chapter III.L.3.c(1)(b) requires that more than one invertebrate species be used and that the more sensitive invertebrate species be used to ensure the alternative receiving water limitation for salinity is adequately protective or all forms of marine life.
13.154	L.3.c.4. [of the proposed Desalination Amendment] If a facility uses toxicity data and shows no effect, but the monitoring data or BACI study or "any other information" isn't to the Board's liking, they can "eliminate" or "revise" a facility--specific alternative receiving water limitation. This is fairly broad and open to interpretation (and potentially misuse). We recommend deleting L.3.c.4.	There is evidence that the 2 ppt above natural background salinity will be adequately protective of marine life, but some species are sensitive to changes less than 2 ppt above natural background salinity. Red abalone were sensitive to changes as low as 1.6 ppt above ambient salinity conditions. (Phillips et al. 2012) Section 8.7 of the Staff Report with SED includes sufficient evidence to support the receiving water limitation of 2 ppt above natural background salinity and includes flexibility for an owner or operator by allowing an opportunity to apply for an alternative receiving water limitation for salinity. Furthermore, Water

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		Code section 13263 allows the regional water boards to prescribe requirements as to the nature of any proposed or existing discharge taking into consideration beneficial uses. Water Code section 13263, subdivision (g) specifies that, "No discharge of waste into the waters of the state, whether or not the discharge is made pursuant to waste discharge requirements, shall create a vested right to continue the discharge. All discharges of waste into waters of the state are privileges, not rights."
13.155	Definitions [in the proposed Desalination Amendment] Eelgrass Beds: This definition is limited to Z. marina even though there are other *Zostera* species in California.	The definition of eelgrass was revised to include other species of eelgrass in California in the genus *Zostera*.
13.156	Empirical Transport Model (ETM): The ETM definition is incorrectly presented. The ETM provides an estimate of the probability of entrainment due to desalination (or power plant) intake. The source water body is not determined by the ETM, but is determined either a priori using available data, or it can be measured using current data. The ETM calculates the conditional mortality due to entrainment on an estimate of the population of organisms in the source water that are potentially subject to entrainment. See Steinbeck et al. (2007) for a more accurate definition.	The definition of Empirical Transport Model was drafted by Dr. Peter Raimondi of University of California, Santa Cruz. Dr. Raimondi is an expert on the ETM/APF model and the definition is accurate as written.
13.157	Market Squid Nurseries: This should be deleted from the policy. The last sentence in the definition has been misquoted, and is incorrect. (see Comment to Section 7.2.2 of the Staff Report).	The last sentence of the definition was deleted because the information in the sentence is provided in the Staff Report with SED. However, as stated in response to comment 13.84, spawning aggregations of market squid are predictable enough in California that fishing fleets can target spawning adults in limited geographic areas. (CDFG 2006) These geographic areas can be identified by benthic mapping and used to inform the siting of desalination intakes and discharges. The Staff Report with SED was updated to reflect that "although squids lay their eggs in the same general location, the exact area of egg deposition within the spawning grounds may change on an annual basis." (Young et al. 2011)
13.158	Natural Background Salinity: The requirement to use 20 years of background data is excessive. Weekly basis for three years is also	Please see responses to comments 15.17 and 13.130.

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	excessive.	
13.159	Salinity: The switch from ppt to TDS is strange. As described above, measurements of TDS and ppt are very different. Codify that "psu" and "ppt" can be used interchangeably for the presentation of monitoring reports.	Parts per thousand, as it pertains to salinity, is equivalent to the grams of salt per liter of water. There are a number of standard methods to measure salinity; however "parts per thousand" is not a measurement method but rather the units in which to report salinity or other analytes. The proposed Desalination Amendment included a requirement that salinity be measured using total dissolved solids method because EPA Method 160.1 is a widely used standard method (for NPDES permitting and environmental monitoring. EPA Method 160.1 requires that results are reported in mg/L or parts per million, which is why the original amendment language included 2,000 mg/l. 2,000 mg/L (ppm) is equivalent to 2.000 g/L (ppt). Since there are a number of other standard methods to measure salinity (e.g. Standard Method 2520 B, EPA Method 120.1, PSS-78), the amendment language was revised to allow an owner or operator to measure salinity using a standard method approved by the regional water board and report the data in parts per thousand. A provision was also included to allow the regional water board to accept converted salinity data at their discretion for facilities where historical salinity data was reported in units other than ppt. Practical salinity units and salinity reported in ppt are generally equivalent. But it important to consider temperature and pressure when comparing salinity data.
13.160	Sensitive Habitats: Market squid nurseries should be deleted from this section. Market squid can spawn over sandy, nearshore habitat, and not necessarily in the same location from year to year. This definition could mean large stretches of sand would be "sensitive habitats".	We disagree for the reasons stated in responses to comments 13.83-13.85.
13.161	Comments on Jenkins et al. (2013) - Recommendations for brine discharge California Biota - Data on the effects of elevated salinity and concentrate discharges on California biota are extremely limited, often not peer-reviewed, not readily available, or have flaws in the study design. Only one published study has documented impacts of a concentrate discharge on marine biota of California in the laboratory (Voutchkov	The West Basin studies were reviewed by Dr. Judith S. Weis of Rutgers University and by Dr. Daniel Schlenk of University of California, Riverside. Both reviews pointed out significant problems with West Basin's experimental design and conclusions. Consequently, the results were not discussed in the Staff Report with SED.

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	2006). Jenkins et al. (2013) notes the flaws in Voutchkov (2006), but does not mention the hyper-salinity studies that were underway (and finalized one month later) at West Basin.	
13.162	Comments on Foster et al. (2013) - Mitigation and Fees "The APF method is preferred because creation and restoration of coastal habitats compensates for all organisms impacted by entrainment, not just select groups such as fishes." This may not necessarily be true. If entrainment included larval lobster, and APF was used to calculate an area of 50 acres, the restoration of 50 acres of wetlands would do little to compensate directly for losses of larval lobster. Differences in productivity between the affected habitat and the restored/created habitat need to be taken into consideration.	The proposed Desalination Amendment requires than an owner or operator fully mitigate for intake and mortality of all forms of marine life. Chapter III.L.2.e.(3) of was revised to include provisions for in-kind and out-of kind mitigation. Please see responses to comments 15.9 and 29.6 for more about in-kind and out-of-kind mitigation and mitigation ratios.
13.163	[Comments on Foster et al. (2013)] "However, any biological impacts associated with a properly designed, constructed, and operated subsurface intake should be minimal since the withdrawal velocity through the sediment is very low....Large beach galleries or seabed filtration systems may have low IM&E impacts but large construction impacts on benthic organisms. Such construction impacts should be thoroughly evaluated for any projects proposing such intakes." This logic was not carried forward into the proposed policy.	As stated above, chapter III.L.2.e of the proposed Desalination Amendment requires than an owner or operator fully mitigate for intake and mortality of all forms of marine life, including construction-related mortality. The owner or operator of a facility is required to submit a report to the regional water board estimating the marine life mortality resulting from construction and operation of the facility.
13.164	[Comments on Foster et al. (2012)] "Other entrainment reduction technologies for surface intakes have not been evaluated in the coastal waters of California." SCE conducted field and laboratory tests of fine mesh screens and wedgewire screens at their Redondo Beach R&D lab in the 1970s (LMS 1981). Reference: Lawler, Matusky, and Skelly Engineers (LMS). 1981. Larval exclusion study. Final Report. Prepared for Southern California Edison	This statement is in Foster et al. 2012, not Foster et al. 2013. Thank you for this information. The State Water Board contracted the Expert Review Panel and the panel released a draft report, solicited input from the public, and held a public meeting on December 8-9, 2011. The Report was finalized in February 2012. We appreciate the comment, but do not intend to revise the report.

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	Company, Rosemead, CA. Research and Development Series 81-RD-30.	
13.165	[Comments on Foster et al. (2012)] Appendix 1-The appendix (Raimondi 2013) omits the project name, which is used in the text, so there is no way to verify the data.	We assume the commenter is referring to Appendix 1 of Foster et al. 2012. However, this is not a comment on an environmental issue associated with the proposed Desalination Amendment or Staff Report with SED. The State Water Board contracted the Expert Review Panel and the panel released a draft report, solicited input from the public, and held a public meeting on December 8-9, 2011. The Report was finalized in February 2012. We appreciate the comment, but do not intend to revise the report. Furthermore, comment 13.169 states that the project name is in Appendix 4 of Foster et al. 2013.
13.166	[Comments on Foster et al. (2012)] Appendix 3 -This appendix (Steinbeck 2011) highlights how effective wedgewire could be in reducing entrainment of Age-1 equivalents. While this technology may not be as effective as a subsurface intake, benthic habitat would not be affected (or much less habitat would be affected) during construction/operation. "The use of indirect or subsurface intake systems will likely be restricted to very site-specific application or low volume plants due to the high construction and maintenance costs, operational challenges, and uncertainty in using these intake designs for larger capacity desalination plants. The potential environmental effects of these intakes are largely unknown. There are likely to be impacts on later stage fish larvae for species that settle to the bottom to complete development (Jahn and Lavenberg 1986)." This logic was not carried forward into the proposed policy.	We assume the commenter is referring to Appendix 3 of Foster et al. 2012, not 2013. We disagree. The Water Code section 13142.5(b) determination will evaluate the best combination of available site, design, technology, and mitigation measures feasible to minimize intake and mortality of marine life. The proposed Desalination Amendment requires an evaluation of marine life mortality, including mortality resulting from the construction and operation of a new or expanded facility. This assessment considers what is feasible, which is defined as “capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors."
13.167	Comments on Foster et al. (2013) - Entrainment and Mitigation 1.A - "Turbulence will likely be low because only 23-38% of the entrained water is exposed to potentially damaging turbulence, and exposure to such turbulence is on the order of seconds. Literature reports of damage to larvae caused by turbulence are generally based on longer exposure times. Moreover, the need for and efficacy of diffuser designs suggested by Jenkins (2013) to reduce turbulence are questionable (review in Appendix 3)." This logic was not carried forward into the proposed policy.	Section 8.5.1.2 of the Staff Report with SED states that Foster et al. (2013) modeled shearing stress from multiport diffusers and reported that larvae in 23-38 percent of the entrained volume of dilution water may be exposed to lethal turbulence. To date, there are no empirical data showing the level of mortality caused by multiport diffusers to be expressed in the proposed Desalination Amendment. As more studies emerge, the data will be considered as part of a future amendment.

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13.168	[Comments on Foster et al. (2013)] Appendix 3 - Regarding exposure of larvae to shear stress during diffuser entrainment: "The experiments on which the criteria are based consisted of injection of juvenile freshwater fish into the zone of flow establishment close to the nozzle at the edge of the jet where shear rates are much higher. This is a quite artificial situation for actual fish behavior, which would not be expected to enter this zone. "This logic was not carried forward into the proposed policy.	As described in response 13.167, there are no empirical data showing the level of mortality caused by multiport diffusers. Section 8.6 of the Staff Report with SED discusses how brine discharges should be regulated, and notes that the owner or operator could elect to use existing data, or perform their own diffuser entrainment modeling to estimate diffuser-related mortality and mitigate for those impacts as appropriate. The comment is in response to a statement that criticizes the existing experiments conducted to investigate diffuser entrainment, which is therefore why it wasn't considered for the proposed Desalination Amendment. However, since an owner or operator must mitigate for intake and mortality of all forms of marine life to the extent feasible, an owner or operator should assess potential shearing stresses on all forms of marine life. Some organisms will be too small to swim away and alter their behavior based on the presence of the discharge.
13.169	[Comments on Foster et al. (2013)] Appendix 4 - The table (Raimondi) includes the project name that was absent above in Appendix 1 of Foster et al. (2013). Note that the HBGS mitigation is listed as 66 acres, but it was actually 66.8. The amount listed in the table ($4.927 million) is also lower than required by the CEC ($5.511million). See: http://www.energy.ca.gov/sitingcases/huntingtonbeach/compliance/2006-09-27_COMMISSION_ORDER.PDF	Thank you for this information. Please see response to comments 13.134 and 13.165 for why no revisions will be made to Appendix 4 of the Foster et al. 2012 and 2013.
13.170	[Comments on Foster et al. (2013)] Appendix 5 - Jenkins recommends measuring photosynthetically active radiation (PAR), but does not give a reason. There are multiple methods for measuring turbidity in the water column, including measurements of NTUs, light transmission, suspended solids, PAR, and colored dissolved organic materials (CDOM). While PAR may be the most appropriate, the reasoning is not spelled out.	Table 2 in the 2012 Ocean Plan includes an effluent limitation for turbidity. An owner or operator will be required to monitor for turbidity and meet the Table 2 standards since it will be included in the NPDES permit.
#14	**Maureen A. Stapleton, San Diego County Water Authority**	
14.1	In addition to the comments in this letter, the Water Authority fully supports the comment package dated August 18, 2014, submitted by Poseidon Resources, including the redlined version of the July 3rd Desalination Amendments.	Comment noted.

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14.2	Desalination is a water supply activity that should be considered independently from Once-Through-Cooling In 2010, the State Board adopted a sweeping policy to address thermal power plant cooling water withdrawals, also known as Once-Through-Cooling (OTC). OTC is regulated under the federal Clean Water Act. Unfortunately, some four years after the State Board adopted the OTC policy and effectively settled the matter, there continue to be efforts by some to equate desalination to OTC. The final SED for the OTC policy recognized that desalination and OTC were different in terms of purpose, function and regulatory standard and nothing has changed in this regard. The final OTC policy SED includes the following statement: "Desalination facilities and OTC thermal power plants are fundamentally different in their use of intake water, thus the means by which BTA would be determined is also very different. For existing OTC power plants, the most effective technology is closed-cycle wet cooling, which reuses a small volume of water several times to achieve the desired cooling effect. Desalination, on the other hand, is an extractive process for which the volume of water used cannot be limited without impairing the final production." In other words, desalination is fundamentally different from power production in that desalination must utilize ocean water in order to function whereas power production can occur using alternative cooling methods other than OTC. The regulatory standard for OTC remains the federal Clean Water Act while desalination intakes and discharges in California are regulated under State Water Code Section 13142.5(b) that requires that "...the best available site, design, technology and mitigation measures feasible shall be used to minimize the intake and mortality of all forms of marine life."	Please see response to comment 20.1
14.3	Consistent definition of "Feasible" The Water Authority fully supports the purpose of the Desalination Amendments to provide statewide guidance and consistency regarding the permitting of desalination facility intakes and discharges, consistent	Please see response to comment 6.12.

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	with Water Code Section 13142.5(b). In applying this State Water Code language to desalination facilities, the Amendment covers the siting of desalination facilities, intake and discharge technology and design as well as the calculation and implementation of mitigation measures. We appreciate that the Desalination Amendments also provide important, alternate paths to compliance, at the discretion of the Regional Water Boards. In order for these Regional Board processes to work effectively and consistently statewide, it is imperative that the Desalination Amendments provide the Regional Water Boards with direction regarding one of the more contentious aspects of the 13142.5(b) evaluation - the scope of the feasibility assessment. Since desalination projects are subject to CEQA and the Coastal Act, it follows that the Desalination Amendments should adhere to the same standard of "feasibility" used by the Coastal Commission and by lead agencies under CEQA: "Feasible" means "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors." (See, Public Resources Code, §21061 and §30108.)	
14.4	Project size determinations must balance water supply needs and appropriate siting factors For the most part, the Desalination Amendments appear to appropriately recognize that water supply requirements drive the sizing determination for a desalination project. The direction to the Regional Water Boards for conducting statutorily-mandated "evaluations of the best available site, design, technology and mitigation measures feasible to minimize the intake and mortality of all forms of marine life at new or expanded desalination facilities" recognizes that while certain technologies, such as subsurface intakes, may be preferred, the technology preference cannot dictate project size to the detriment of supply reliability. Thus, the Desalination Amendments provide the opportunity for alternate technologies as appropriate. However, the Water Authority has serious concerns with the last sentence of section 2.(b)(1) of the Desalination Amendments, which reads, "A design capacity in excess of the identified regional water need	The sentence “A design capacity in excess of the identified regional water need for desalinated* water shall not be used by itself to declare subsurface intakes as infeasible.” was moved to the technology section per comment 15.26. This is not an environmental issue but rather a policy decision. Please see responses to comments 6.3 and 18.14.

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	for desalinated* water shall not be used by itself to declare subsurface intakes as infeasible." This sentence creates unnecessary confusion and should be deleted.	
14.5	Subsurface Intake "Requirement" The Water Authority recognizes the site-specific potential for subsurface intakes for new projects and in fact, recently completed detailed, site-specific ocean, marine and subsurface surveys and technical studies of the viability of both open ocean and subsurface intakes for our proposed Camp Pendleton Desalination Project (See Attachment 2). However, while these subsurface surveys and investigations provided valuable site-specific data, there remains much uncertainty regarding the viability of a subsurface intake for any desalination project proposed in California, much less the proposed Camp Pendleton project. Currently, the Desalination Amendments compel the Regional Water Boards to "require" subsurface intakes, while allowing an alternative path to compliance if subsurface intakes are determined to be infeasible. We are concerned that use of the word "requirement" does not recognize the comparatively limited application of subsurface intakes for desalination facilities worldwide and the unproven and uncertain nature of those intakes, as discussed above. We acknowledge the "preference" for subsurface intakes, based solely on intake mortality, but a "requirement" in the Desalination Amendments reaches beyond what has been proven at this point in time. If a preference must be identified, then we request that the Desalination Amendments be revised to identify a preference, not a requirement.	Please see response to comment 15.32.
14.6	Practicality of Intake Screen Slot Size The Water Authority is relying on the Carlsbad facility to operate as a highly reliable source of water for our region. As such, the Water Authority is making a significant investment in the Carlsbad facilities to ensure that the plant can operate at full capacity during adverse conditions, such as a severe "red tide" event. We are concerned that there is insufficient operating data from current desalination installations to determine if the	The willingness of the Water Authority and Poseidon's to continue research on efficacy of fine mesh and wedgewire screens at seawater intakes is appreciated and we look forward to receiving the report. However, based on the results from Tenera (2013) and other data described in section 8.3.1.2.3 of the Staff Report with SED, screens with openings 2.0 mm or larger do not reduce entrainment by any appreciable amount. A study that examined the efficacy of a 5 mm at reducing entrainment would not be of interest because entrainment of

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	screen sizes proposed in the Desalination Amendments will impact the reliability of the Carlsbad plant. The use of unproven screen technology could inhibit the flow of water and increase the maintenance requirements of the desalination facility, thereby compromising the reliability and efficiency of the plant. Further consideration should be given to the screen size recommendation to ensure the suitability of this technology for the intended use. The Water Authority supports Poseidon's proposal to utilize the Carlsbad facility to advance screen technology science without putting the facility's reliability at risk. Upon transition to stand-alone operations, following retirement of the Encina Power Station, Poseidon would install a 1.0 mm screen at the plant for side-by-side comparison to a more standard 5 mm screen. During the following three years, Poseidon would collect operational data related to flow, fouling, and marine life mortality, and submit annual reports to the State Water Board.	fish smaller than 50 mm long would be close to 100 percent. A more useful study would be to compare either a 0.75 mm or 0.5 mm screen opening in comparison to a 1.0mm screen. The tables in the Tenera report (2013) help visualize the efficacy of 0.75, 1.0, 2.0, 3.0, 4.0, and 6.0 mm slot size screens at reducing entrainment for a number of common California marine species. Table B9 of Tenera (2013) reported 100 percent of anchovies 1 to 25 mm long would be entrained through a 3 mm or larger screen and 2.0 mm screens only reduced entrainment of 25 mm long fish by 40 percent. Entrainment data were similar for kelpfish and silversides because they have similar body types to anchovies. Entrainment depends largely on species because morphometrics matter and also the size of the organism. The screens were more effective at excluding fish like sculpins, seabass, and clingfish because these fish have larger head capsules that prevent them from passing through the screens. However, it is important to use the screen with smallest opening to ensure the surface intake is as protective as possible for all species of marine life. Based on the information provided in section 8.3.1.2.3 of the Staff Report with SED, available data do not support that 1) there is insufficient data to determine the efficacy of a 1.0 mm screen or 2) that 1.0 mm screens are “unproven technology.” A screen with a 1.0 mm slot size is feasible for all new or expanded desalination facilities in California.
14.7	Entrainment Study Duration The Desalination Amendments also require project owners and operators that wish to operate surface intakes conduct an entrainment study of at least 36 consecutive months. A 36 month entrainment study would be excessive and would result in the idling of the Carlsbad project for at least two and a half years. The Desalination Amendments should require 12 months of entrainment data which conforms to the guidelines for entrainment impact assessment included in Appendix E of the Staff Report. These guidelines, written by members of the State Water Board's "Expert Review Panel on Intake Impacts and Mitigation", state that entrainment sampling done for 12 months is a reasonable period of	Please see response to comment 15.5

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	sampling because the entrainment estimated by the ETM method is "much less subject to inter-annual variation. Therefore, a 12 month study should be adequate to account for variation in oceanographic conditions and larval abundance and diversity such that the abundance estimates are reasonably accurate.	
14.8	Preservation of Existing Carlsbad Desalination Project Mitigation Plan The wetlands project for the Carlsbad project has been under development for seven years and is in the final stages of approval. Construction of the mitigation project is expected to begin late next year. A requirement to locate the mitigation within the "source water body" would adversely affect the Carlsbad project to the extreme detriment of Poseidon and the Water Authority. The current mitigation project would have to be abandoned and new mitigation started, even though it has already been determined that there are no suitable mitigation sites within the source water body. Additionally, the Desalination Amendments would require a 250 percent increase in the size of the wetlands restoration project for the Carlsbad project even though it has already been determined that the project is fully mitigated. The Water Authority requests that the mitigation requirements included in the Desalination Amendments align with the mitigation efforts already under way on the Carlsbad project.	Please see responses to comments 15.8 and 15.9.
14.9	Performance Standard for Diffuser Technology The Desalination Amendments require that proponents of alternative discharge technologies provide a comparison of the marine life impacts of the proposed technology to that of the "preferred technology" identified by staff in order to demonstrate a comparable level of environmental protection. But the Desalination Amendments fail to provide a performance standard against which other discharge technologies can be compared. If the State Board decides to identify a "preferred technology" for brine discharge, it is imperative that the Desalination Amendments also set forth an objective standard against which other non-preferred technologies can be compared.	Please see responses to comments 15.7 and 15.42.

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14.10	Brine Mixing Zone Determination The definition for "Brine Mixing Zone" provides that the Desalination Amendments include a mechanism for establishing a larger mixing zone other than the default 100 meter recommendation that appears to be associated with multi-port diffusers. Correspondingly, the Desalination Amendments need to include a process for establishing a larger mixing zone that recognizes the option to utilize alternative brine disposal technologies such as flow augmentation (in the case of the Carlsbad project), or other technologies not yet developed.	Please see responses to comments 15.76, 15.58, and 15.61.
14.11	Application of Salinity Standard For the Carlsbad project, the historical salinity data has been measured using electrical conductivity, but the Desalination Amendments impose a salinity standard based on Total Dissolved Solids. In order to reconcile this problem, we think the measurement of salinity needs to reflect the same method as that of the historical data base.	Please see responses to comments 15.15.
14.12	Receiving Water Limit for Salinity The Desalination Amendments provide that brine discharges from desalination facilities shall not exceed 2.0 parts per thousand above the natural background salinity. Natural background salinity is defined as the 20-year average salinity at the project location. The database that makes up the natural background salinity for the Carlsbad Project shows a mean salinity of 33.5 ppt, a minimum salinity of 27.4 ppt, and a maximum salinity of 34.2 ppt over the last 20 years. Sixty-four percent of daily salinity measurements over the last 20 years are above the 33.5 ppt average. This means that the Carlsbad facility would have to operate at less than a 2 ppt increase over the ambient salinity 64 percent of the time. This operating requirement would severely impact plant reliability. To address this problem, Desalination Amendments should be revised such that the natural background salinity shall be determined by averaging 20 years of historical salinity* data at a location unless the actual salinity measured at the facility intake is greater than the 20 year average salinity, in which case, the natural background salinity shall be the lower of: (1) the	Please see responses to comments 15.57 and 15.65.

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	actual salinity measured at the intake; or (2) the maximum salinity level measured in the 20 years of historical salinity data (i.e., 33.5 to 34.2 ppt in Carlsbad).	
14.13	For a programmatic document, the SED makes definitive conclusions regarding the significance of impacts and need for mitigation. This is inappropriate for this programmatic level of analysis. The report needs to remain programmatic; both in its general assessment of impacts and in its conclusions. The impacts of specific desalination proposals will be examined in project-specific environmental documentation.	The impacts of individual desalination proposals need to be examined in project-specific environmental documents. However, a programmatic document allows an agency to consider broad policy alternatives and program-wide mitigation measures at an earlier time (CEQA Guidelines § 15168(b)(4)). A programmatic document will be most helpful in dealing with subsequent activities if it deals with the effects of the program as specifically and comprehensively as possible (CEQA Guidelines§ 15168(c)(5)). Conclusions regarding the significance of impacts and the need for mitigation are appropriate in a programmatic document. In addition, the project in question involves crafting a statewide analytical framework for applying Water Code section 13142.5(b), which requires use of “best available site, design, technology, and mitigation measures feasible . . . to minimize the intake and mortality of all forms of marine life.” Thus, conclusions about the level of mitigation required for desalination facilities generally reflect not only the requirements of CEQA but also the statute that the State Water Board is interpreting.
14.14	Page 117, Section 12.1 [of the Staff Report with SED]: States that "City of Oceanside Camp Pendleton Seawater Desalination Project Feasibility Study Report Executive Summary prepared by RBF Consulting, December 2009". This is the exact same reference cited two bullets down for the San Diego County Water Authority. The San Diego County Water Authority reference is correct. Please check the report citations.	Thank you for this correction. Section 12.1 of the Staff Report with SED was revised accordingly.
14.15	Page 144, Section 12.2.4 [of the Staff Report with SED] States that "...it is likely that significant impacts to biological resources may occur with implementation of a particular desalination facility...". This broad conclusion is unsubstantiated. The significance, or not, of any specific desalination proposal on biological resources will be determined by site specific studies. Please delete such conclusory statements from the impact analysis sections throughout the document.	The commenter references section, 12.2.4, which does not exist in the draft Staff Report with SED. From the context, it appears that the commenter intended to reference 12.1.4. Importantly, Section 12.1 “identifies the potential impacts that might generally occur from construction and operation of a coastal desalination facility, without regard to the requirements set forth in the State Water Board’s proposed Desalination Amendment.” This portion of the analysis is based upon review of environmental documentation prepared for

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		planned desalination facilities. Thus, the statements contained that section are not intended to reflect conclusions about the significance of impacts resulting from any specific desalination facility. Regardless, the intake of seawater and discharge of brine waste, and the associated impingement, entrainment and other impacts will have a negative effect on biological resources. Whether those impacts are significant will depend on site specific and facility specific factors such as facility location, method of diversion, method of discharge, and the local assemblage of flora and fauna. It is reasonable to assume that there could be significant adverse impacts related to specific facilities, based on the above criteria, without specifically identifying what those impacts may be. It is also appropriate to identify those potentially significant adverse impacts at the programmatic level of review. No change to the document is warranted.
14.16	Page 153, Section 12.1.7 [of the Staff Report with SED]: States that "...it is important to consider where the offset will be occurring." This is incorrect. GHG's are a global issue. The state law regulating GHG emission (AB32) setting statewide GHG reduction goals does not have a requirement that mitigation be local. Further, recent agreements executed by Governor Brown with Canada and Mexico to coordinate GHG cap and trade efforts support the fact that GHG emissions in one area can be offset in another. GHG offsets, regardless of location, reduce total GHG emissions and their effect on global climate change. Please delete the following sentences: "However, it is important to consider where the offset will be occurring. If the offsets are associated with a renewable energy or forest project in the Midwest, these offsets would have limited impact on local GHG emissions. Only those offsets that occur in the service area of the facility would be effective at reducing local GHG emissions."	Agree. The identified sentences have been deleted in section 12.1.7 Greenhouse Gases of the Staff Report with SED.
14.17	Page 161, Section 12.1.9 [of the Staff Report with SED]: States that "... impingement and entrainment also represent a potential threat to water quality and beneficial uses...". Impingement and entrainment effects are limited to biological resources and do not affect water quality. Please revise the sentence to read: "...also represent a potential threat to --water quality-- beneficial uses...".	Agree. Text has been amended in section 12.1.9 Hydrology and Water Quality of the Staff Report with SED.

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14.18	Page 168, Section 12.1.13 [of the Staff Report with SED]: States that "however; the existence of a reliable water supply could induce more people to reside in the area where a reliable water supply is available." There is no documentation or other evidence to support this speculative statement. Water from a desalination facility that replaces an existing source of supply does not increase water availability in a region. The same amount of water is available, just the source changes. In addition, the evaluation of whether replacement of a less reliable supply with a more reliable supply is likely to induce growth or merely avoid other impacts associated with rationing during shortage periods is an issue that should be addressed, as appropriate, in the project-specific EIR. Please delete the statement.	The establishment of a new source of water can reasonably be expected to have growth inducing impacts either directly or indirectly. Water is a limiting resource for new development in California. There is no evidence that existing sources of water will be abandoned when desalination facilities come on line and the conclusion must be made that there could be significant growth inducing impacts. The State Water Board cannot compel a water right holder to reduce water diversions as a result of the production of desalinated seawater. Provided that a water right holder properly reports his or her cessation of, or reduction in, the use of water under existing rights as the result of desalinated water, that water right holder is protected from forfeiture of his or her water rights. The State Water Board is prohibited from reducing the amount of fresh water authorized for appropriation by the water right holder's water right permit or from reducing the permitted amount that would otherwise be licensed as a result of desalinated water. Furthermore, the water right holder may sell, lease, exchange, or otherwise transfer any water or water right that has ceased being used or has been reduced as the result of the use of desalinated water (Wat. Code, § 1010). When project-specific environmental reviews are conducted in the future, they will need to address these issues in greater detail and may find that there is no impact. The State Water Board cannot make a finding of no impact at this level of review. No change to the document is warranted.
14.19	Page 172, Section 12.1.18 [of the Staff Report with SED]: States that "However, these offsets may not reduce local GHG emissions....cumulative impacts on a regional scale would be significant and unavoidable." This statement is incorrect and misleading. As noted above, the state of California, via AB32, has set statewide targets for GHG reductions. There are no local targets and GHG offsets can be acquired from out of state or out of the country per the recent cap and trade agreements executed by Governor Brown. These agreements recognize the global nature of GHG emissions. Please delete the following sentences: "However, these offsets may not reduce local GHG emissions. If several facilities are built in California and even a small proportion of offsets are purchased from other regions of the country, the cumulative impacts on a regional scale would be significant and unavoidable."	Agree. The identified sentences have been deleted in section 12.1.18 Cumulative Impacts of the Staff Report with SED.

Please note all tables and figures referenced are present at the end of this document

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14.20	Page 172, Section 12.1.18 [of the Staff Report with SED]: States that "the increased availability of water could result in increased growth... even if the desalination facility was intended to replace and existing source...". There is no documentation or other evidence to support this speculative statement. Water from a desalination facility that replaces an existing source of supply does not increase water availability in a region. The same amount of water is available, just the source changes. The evaluation of whether replacement of a less reliable supply with a more reliable supply is likely to induce growth or merely avoid other impacts associated with rationing during shortage periods is an issue that should be addressed, as appropriate in a project specific EIR. Growth inducement was addressed in the project-specific EIR for the Carlsbad project as a new supply source. Please revise the sentence to read: "As described in Section 12.1.13, the increased availability of water could result in increased growth within the facility service area --even if the desalination facility was intended to replace an existing source or sources--."	Agree. The identified statement has been removed from the Staff Report with SED.
14.21	Page 180, Section 12.4.1 [of the Staff Report with SED]: Multiple alternatives state that "Therefore, these impacts are considered significant and unavoidable." Absent a specific project, it is not possible at a programmatic level to make such a definitive conclusion. The significance of each proposed project will depend on the particular circumstances of the project, which will be analyzed in a project specific environmental document. Please revise the sentence to read: "Therefore, these impacts --are considered-- may be significant and unavoidable." This conclusory sentence appears in numerous areas of the staff report (e.g., 12.4.2, 12.4.3, and 12.4.4.) All instances should be changed as described above.	Agree. Absent a specific project, it is not possible to make definitive conclusions about the significance of any specific project. For this reason, the Staff Report with SED was revised as recommended by the commenter. However, given 1) the broad applicability of the proposed Desalination Amendment to existing, proposed, and future projects, and 2) that many of the mitigation measures are outside the authority of the Water Boards, it is reasonably foreseeable that at least one of the projects will be found to have significant and unavoidable impacts of the type discussed in the Staff Report with SED. Therefore, it is reasonable to develop statements of overriding consideration for these potential impacts.
15	**Peter MacLaggan, Poseidon Water, LLC**	
15.1	Even though the Carlsbad Desalination Project intake and discharge has been fully permitted through the San Diego Regional Water Quality Control Board ("Regional Water Board"), the Desalination Amendments and its requirements will apply to the Carlsbad Desalination Project as a result of recent notification that the Encina Power Station will cease	Please see comment 6.12.

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	operations as early as June 1, 2017. Because the permit issued by the Regional Water Board for the Carlsbad project is predicated on operation of the power station and associated cooling water flows, the transition to stand-alone operation of the desalination plant will require planned upgrades to the intake system that will be regulated by the Desalination Amendments. If the draft Desalination Amendment is adopted, Poseidon intends to take the following steps to bring the Carlsbad project into compliance with the Desalination Amendments: - Revise the Flow, Entrainment and Impingement Minimization Plan approved by the Regional Board in 2009, to describe new technology measures that will be incorporated to comply with the Desalination Amendments and address the 2017 planned closure of the Encina Power Station. - Relocate the intake providing seawater to the desalination facility from the Encina Power Station discharge to the intake and install new protective fish screen. - Construct a new 200 MGD low-impact pump station to serve as the source of initial dilution water for the brine discharge and install new fish screens. - Seek approval for a facility and site-specific brine mixing zone. - Seek approval of a facility and site-specific salinity standard. ... Water Code 13142.5(b) Determination: One of the primary purposes of the Desalination Amendments is to provide implementation procedures to the Regional Water Boards for conducting statutorily-mandated "evaluations of the best available site, design, technology and mitigation measures feasible to minimize the intake and mortality of all forms of marine life at new or expanded desalination facilities." (Water Code § 13142.5(b). Emphasis added). Yet the draft Desalination Amendments fail to provide the Regional Water Boards with direction regarding one of	

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	the more contentious aspects of the 13142.5(b) evaluation - the scope of the feasibility assessment. California's Fourth District Court of Appeal effectively resolved this debate in 2012 when it assessed whether the San Diego Regional Water Board complied with Water Code section 13142.5(b) in issuing Order R9-2009-0038 for the Carlsbad Desalination Project. (Surtider Foundation vs. California Regional Water Quality Control Board (2012) 211 Cal. App. 4th 557, 581). The court determined that the Regional Board fully complied with section 13142.5(b) in relying on the definition of "feasible" under CEQA. (Id. at pp. 582-583). Under CEQA, "feasible" means "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors." (Pub. Res. Code, § 21061). The California Coastal Act relies on the same definition. (Pub. Res. Code, § 30108 (Coastal Act)). Poseidon believes it is vital for the Regional Water Boards to have clear direction on the scope of the feasibility assessment and respectfully requests the final version of the Desalination Amendments include the definition of feasible that was relied upon by CEQA lead agencies, the San Diego Regional Water Board, and the California Coastal Commission (the "Coastal Commission"), and which was ultimately upheld by the Fourth District Court of Appeal.	
15.2	Seawater Intakes: Naturally, desalination plants must have seawater to desalinate and create potable water supplies. Water Code Section 13142.5(b) recognizes this by establishing general guidelines that govern (not prohibit) how desalination plants are to minimize intake and species mortality. It is critical to understand that the imposition of infeasible seawater intake conditions will significantly impede (or even prohibit) the development of desalination facilities permitted under the Water Code. The following three examples highlight the need for the State Water Board to ensure that the Desalination Amendments not only comply with Water Code Section 13142.5(b), but do not unreasonably impede the development of desalination projects that provide reasonable water quality and ocean species protection. Intake Technology Requirements. The Staff Report supporting the	Language was added to section 8.3.4 off the Staff Report with SED to clarify that the proposed Desalination Amendment does not take a technology neutral approach, but states that subsurface intakes are the environmentally preferred technology because they do not impinge or entrain marine life. Construction of subsurface wells will have minimal to no impact on marine organisms depending on where they are sited and when the construction occurs. Even though marine life mortality may occur as the result of the construction and operation of subsurface infiltration galleries, the mortality will still be less than the operational mortality that would occur at a screened surface intake. Therefore subsurface intakes are the most protective intake technology for all forms of marine life. For this reason, the proposed Desalination Amendment does favor subsurface intakes and the regional water board shall require subsurface intakes unless they determine that

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	Desalination Amendments carefully - and appropriately - embraces the notion that the Desalination Amendments should be "technology-neutral"; that is to say, not specifically establishing or favoring a specific type of technology as the "default" means of complying with impingement or entrainment standards. Poseidon agrees with this approach for several reasons. First, it complies with the statutory requirements of Water Code Section 13142.5(b) requiring an analysis of the "best available...technology ...feasible" to minimize intake and mortality. Second, as State Water Board staff has routinely acknowledged (and the Staff Report/SED specifically states), not all intake technologies are going to be feasible and appropriate at all desalination project sites. Imposing a "default" intake technology in the Desalination Amendments would contradict this known reality. Third, imposing a "default" intake technology in the Desalination Amendments would stifle and inhibit technological advancements that private companies might develop for desalination projects several years down the road. The current draft of the Desalination Amendments provide that Regional Water Boards "shall require subsurface intakes" unless the Regional Water Boards make an affirmative finding of infeasibility under Section L.2.a.(2). On its face, this language conflicts with the State Water Board staff recommendation contained on page 58 of the Staff Report. The language in the draft Desalination Amendments needs to be revised accordingly.	subsurface intakes are infeasible. One of the project goals is to support the use of ocean water as a reliable supplement to traditional water supplies while protecting beneficial uses. For this reason the proposed Desalination Amendment allows the use of screened surface intakes, which are significantly less protective of marine life, because in some circumstances, subsurface intakes may be infeasible. The current approach in the proposed Desalination Amendment does not stifle or inhibit technological advances but includes provisions for future technological innovations in desalination intakes by allowing an owner or operator to use an alternative intake technology as long as it is as protective of all forms of marine life as using a 1.0 mm screened surface intake. The current hierarchical approach for intake technologies will ensure that the most protective intake method (subsurface intakes) must be considered first and used when feasible before screened surface intakes or alternative screening technologies are considered.
15.3	In a separate section, the Desalination Amendments provide that a Regional Water Board "may find that a combination of subsurface and surface intakes is the best feasible alternative to minimize intake and mortality of marine life." (L.2.d.(l)(a)ii) Yet, it is fundamentally not practical to expect a desalination facility operator to be able to effectively and feasibly manage the differing water quality and unique operational conditions associated with two completely different water intakes feeding a single desalination facility. This section should be omitted.	The amendment language in chapter III.L.2.d.(1)(a)ii supports the concept that the best available technology feasible shall be used to minimize intake and mortality of all forms of marine life. There are a number of circumstances where using a combination of subsurface and surface intakes would be found to constitute the best available technology feasible. For example, there may be an existing facility that is operating a surface water intake, but wants to expand their intake volume and the additional intake can be withdrawn through a subsurface intake. Another situation could be if a new facility needs 100 MGD of source water but can only get 90 MGD of that through subsurface intakes. In this instance, the regional water board could allow them to withdraw the additional 10 MGD from a screened surface

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		intake rather than taking the full 100 MGD, which would substantially reduce intake and mortality of marine life. This option would ensure that an owner or operator uses the best available intake technology feasible to minimize intake and mortality of all forms of marine life. Even though there might be differences in intake water quality from surface and subsurface intakes, most desalination treatment processes are modular and the modules could be designed to accommodate the different source waters. This would be particularly true for an expansion where one assumes that additional pre-treatment and RO systems would need to be installed to accommodate for the additional source water volume. However, a simpler solution would be to blend the water before treatment to prevent the need to manage differing source water quality. The operational differences of concern were not stated in the comment and we do not agree that the operational differences would be unmanageable. Additionally, the feasibility of using a combination of surface and subsurface intakes would still be considered using the CEQA definition that defines feasible as “capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors.” (Public Resources Code § 21061.1; § 30108). If an owner or operator could demonstrate the combination of using subsurface and surface intakes is not feasible, then another alternative could be considered.
15.4	Screen Slot Size Poseidon supports inclusion of feasible measures in the Desalination Amendments to reduce entrainment. However, we are concerned that there currently is insufficient operating data to determine the operating efficacy of the proposed screen sizes. The Carlsbad Desalination Project is an important water supply facility to the entire San Diego region. As such, Poseidon and the San Diego County Water Authority are making a significant investment in the design and construction of the facility to ensure the plant can operate at full capacity during adverse conditions, such as a severe algal bloom. The use of unproven screen technology could inhibit the flow of water and increase the maintenance	Smaller screen slot sizes and mesh sizes are better from an environmental protection standpoint. Screens with slot sizes 1.0 mm and smaller reduce entrainment of eggs, larvae, and juvenile organisms (see section 8.2.1.2.3 of the staff report). While there is not an abundance of data where small mesh size and slot size screens have been used in full-scale operating conditions in California, there have been a number of pilot-scale studies on wedgewire screens in California (e.g. Marin Municipal Water District, Santa Cruz and Soquel Creek, West Basin Municipal Water District). Section 8.2.1.2.3 of the Staff Report with SED goes into great detail on the use of wedgewire and fine mesh screens at pilot facilities and permanently operating full-scale

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	requirements of the desalination facility, thereby compromising the reliability and efficiency of the plant. We respectfully urge the State Water Board Members to give further, careful consideration to the screen size recommendation to ensure the suitability of this technology for the intended use.	facilities. Additionally, comment 9.16 provides additional information on studies that have been done on wedgewire screens. Most of the data in the Staff Report with SED focuses on the screen opening size from an entrainment reduction standpoint because the goal is to use the screens to reduce intake and mortality of all forms of marine life. However, studies have been done on powerplants to examine the technical feasibility of using a fine mesh screen without jeopardizing plant reliability. Below is an addition to section 8.3.1.2.3 of the Staff Report with SED that was added at the request of another response to a comment. *"Other studies have investigated the efficacy and use of fine-mesh traveling screens to reduce entrainment in conjunction with the functionality of the screens in terms of plant reliability. (Thompson 2000; Hogarth and Nichols 1981) The US EPA required that the Brunswick Steam Electric Plant in North Carolina install and use 1.0 mm mesh size with a fish return system on two of the four traveling screens in addition to implementing flow-minimization requirements and a 9.5 mm mesh size fish diversion device at the facility. There was an 82 percent decrease in the average density of entrained fish after the requirements were implemented. Hogarth and Nichols (1981) investigated the reliability of fine mesh intakes and reported that the fine mesh traveling screens significantly reduced entrainment without jeopardizing the plant reliability. After the flow minimization requirements were implemented, the intake volumes dropped from 1105 -1205 cfs (714-778 MGD) intake volume varies seasonally at the plant) to 605 to 915 cfs (390-591 MGD). (Hogarth and Nichols 1981) It is important to note that even after the flow minimization requirements and the use of 1.0 mm mesh size intake screens were implemented, the OTC intakes were able to withdraw between 390 and 591 MGD, volumes which exceed the intake volume for even the largest proposed desalination facility in California."*

Please note all tables and figures referenced are present at the end of this document

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		The U.S. EPA and other NPDES permitting agencies have required power plants to implement 0.5 mm and 1.0 mm fine mesh screens on a portion of a facility's intakes. For example, US EPA Region IV and the Florida Department of Environmental Regulation required that the Tampa Bay Electric Company's newly constructed once-through cooling system Big Bend Unit 4 utilize traveling screens with a 0.5 mm mesh size, in addition to Unit 3. Each unit had an intake capacity of 540 cubic feet per second (cfs; 349 MGD) once the screens were installed. In some cases, the traveling screens were able to reduce entrainment by more than 80 percent. (Brueggemeyer et al. 1987). In other instances, the small screen sizes were only required seasonally when larval abundances are high. In California, many species spawn and reproduce throughout the year making a seasonal screen requirement illogical. These screening requirements from the U.S. EPA and other NPDES permitting agencies in other areas in the United States demonstrate that small mesh sizes are feasible on large surface water intakes. Even though the requirements have been restricted to some, but not all of the intakes at the power plants, the individual intakes (e.g. Unit 4) are still capable of withdrawing large volumes of water using the 0.5 mm and 1.0 mm mesh size screens without compromising the reliability or efficiency of the plant. (Hogarth and Nichols 1981) Many of the studies on small mesh and slot sizes have been done on facilities using fresh or brackish source water. Although, it is noted that seawater may pose additional operational challenges. Furthermore, there will be more challenges when operating a 0.5 mm screen compared to a 1.0 mm screen, which is why the 1.0 mm mesh size or slot size is recommended in the final Desalination Amendment. In response to the small screen slot sizes decreasing reliability during algal blooms, most marine algae that are responsible for algal blooms (e.g. dinoflagellates) are small and will pass through a 0.5 mm screen even if in high abundance. These small microorganisms may result in organic buildup on the pretreatment filters and on the RO membranes, which would increase the need for membrane treatment chemicals. But the concern here is not screen clogging it is a human health concern

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		that the algal toxins will end up in the drinking water supply. However, whether the screens size is 0.5 mm, 1.0 mm, or 9.5 mm, the screen would not prevent the passing of the small microorganisms. The small screens slot sizes (0.5 - 1.0 mm) can be beneficial from an operational standpoint because they prevent macroalgae entrainment. Marine macroalgae will present a problem for the facility regardless of screen size because it will either get trapped on the intake screen or entrained in the system. Either way, it will have to be removed before processing. Larger screen slot and mesh sizes will allow the macroalgae, other macro organisms, and macro-debris to enter the system and can clog filters and damage pumps. Smaller screens can prevent macro algae from being entrained protecting filters and pumps but the clogging of screens may reduce the intake flow at passive intake screens. Screen clogging is an operational challenge for facilities with screened surface intakes, but there are mitigative measures that can be taken to reduce and prevent clogging. Active screens have brush systems to sweep away fouling organisms and marine macro algae to prevent clogging or fouling. Air burst systems can also dislodge debris and algae. Divers can also be sent to clean screens during periods of high debris loads. These mitigative measures have been used in the past on even larger screen slot sizes (9.5 mm) that face similar clogging issues. In some instances the facilities will need to be temporarily shut down, but that would be the case with macro algal blooms, sea jelly swarms, or heavy marine debris or trash regardless of screen size. On a side note, one of the benefits of subsurface intakes is that they will not be impacted by algal blooms and can continue to operate at full capacity regardless of the ambient conditions.
15.5	Entrainment study duration: The draft Desalination Amendments also require project owners and operators who wish to operate surface intakes to conduct an entrainment study of at least 36 consecutive months. A 36 month entrainment study would be excessive and would result in the idling of the Carlsbad project for at least 30 months. The Desalination Amendments should follow the recommendation of the Expert Review	There are currently three studies with a 36-month-long study duration requirement in the proposed Desalination Amendment. Two of the studies are optional for an owner or operator seeking to use either an alternative intake screening technology or to obtain an alternative facility-specific receiving water limitation for salinity. The third study is the mitigation assessment study using the ETM/APF method that would

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	Panel convened by the State Board and require 12 months of entrainment data which conforms to the guidelines for entrainment impact assessment included in Appendix E of the Staff Report. These guidelines, written by members of the State Water Board's "Expert Review Panel on Intake Impacts and Mitigation," state that entrainment sampling performed for 12 months is a reasonable period of sampling because the entrainment estimated by the ETM method is "much less subject to inter-annual variation. Therefore, a 12 month study should be adequate to account for variation in oceanographic conditions and larval abundance and diversity such that the abundance estimates are reasonably accurate.	be required for any new or expanded desalination facility. Staff received considerable feedback from the regulated community that 36 months was too long and in the case of the Carlsbad Desalination Project, it would significantly delay the project's start date. Staff proposed the 36-month-long time period because it was consistent with the requirements in the Once-through Cooling Policy. Additionally, the scientific community commonly uses a 36-month long study duration for environmental studies because it helps detect differences between an actual change (e.g. in species composition) and natural environmental variability. One of the peer reviewers went as far as to recommend a study with a duration spanning 3 years before and 3 years after the brine discharge commences to ensure that the environmental variability was adequately characterized. However, after further consideration of the issue, staff concurs with stakeholders that the study duration is not necessarily the critical factor in producing the amount of data the regional water board will need. The most critical factor in each of these studies is the experimental design. For the first optional study for an alternative screening technology, the experiment should be designed to ensure there are enough organisms in the water to be able to detect the differences between a screen with a [0.5, 0.75, 1.0 mm] slot size and the alternative screening technology. Replication of the tests is also critical to ensure the numbers are reproducible and consistent among the tests and can reduce the variability enabling the detection of statistical differences. In the case of the alternative screening technology, the study duration could be 12 months long as long as the experiment is well designed and generates enough data to compare the screens to the alternative screening technology. For the second optional study, for those owners or operators seeking an alternative receiving water limitation for salinity, the study would be required to characterize baseline conditions of ecologic composition of habitat and marine life prior to commencing the brine discharge. The current language would allow the use of existing data at the discretion of the regional water board. For this study, more data would be better in order to capture long-term variation (e.g. over a few seasons) but it is

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		recognized the 36-month-long study duration would be more costly and potentially cause project delays in Poseidon's Carlsbad Desalination Project. A well-designed 12-month-long study would capture seasonal variation and should be adequate for characterizing ecologic composition of habitat and marine life prior to commencing the brine discharge. The third study would be a mitigation assessment study using ETM/APF and would be required of any new or expanded desalination facility with a screened surface intake (or potentially an intake approved alternative screening technology). Again, more data would be better in order to capture long-term variation (e.g. over a few seasons); but, the more critical issue is that the study is properly designed. A poor sampling design and sampling error can result in uncertainty associated with the ETM. Appendix E reviews critical factors to consider when designing a study to collect data for an ETM/APF analysis. For example, the frequency of sampling should account for species with short spawning periods or a short larval duration. However, a one year sampling period is reasonable if entrainment sampling is done concurrently with source water sampling. (Steinbeck et al. 2007, Appendix E) Another benefit to using the ETM/APF model over other demographic models such as AEL and FH is that the estimates of the relative effects of entrainment should be less subject to interannual variations. (Steinbeck et al. 2007, Appendix E) The 36-month-long studies mentioned above were revised to 12 months. Chapter III.L.2.a.(1) already includes a provision that the studies and models are subject to the approval of the regional water board in consultation with State Water Board staff. But chapter III.L.2.a.(1) applies only to new or expanded desalination facilities. Chapter III.L.3.f was added to include the same provision, but will apply to discharge-related studies for all desalination facilities. The intent of this language is to prevent important decisions from being made based on inadequate or inaccurate study designs. It is recommended that an owner or operator seek approval of the proposed study design or models from the regional water board prior to commencing the studies. This will prevent an owner or operator from having to re-do or revise a

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		study after it has been completed.
15.6	Technology-neutral brine disposal determination: The staff recommendation with respect to brine discharge technology is to establish state wide requirements for use of the "most protective brine discharge method after a facility specific evaluation" (Section 8.6.5 Staff Recommendation, page 93). Poseidon agrees with this technology-neutral recommendation, and notes that it is specifically mandated under Water Code Section 13142.5(b). However, the draft Desalination Amendments does not carry through with this recommendation. Instead, the draft Desalination Amendments declare that commingling brine with wastewater and multiport diffusers are the "preferred technology" for brine discharge. The Draft Desalination Amendments further provide a streamlined process for owners and operators proposing such technologies. Poseidon has included several comments on the draft Desalination Amendments directed at conforming the draft Desalination Amendments to the staff recommendation. Fundamentally, however, Poseidon believes that the current draft of the Desalination Amendments should neither establish a "default" preferred technology for brine discharge, nor impose uneven requirements for assessing which discharge technologies are "best available" for a given site and related environmental conditions. To this point, if the Desalination Amendments are going to include a requirement that proponents of "flow augmentation" (or in-plant dilution) must demonstrate that the technology provides a comparable level of protection to that of a multi-port diffuser, then the Desalination Amendments must also provide a standard against which flow augmentation proponents can compare their technology and demonstrate equal or better species protection.	Language was added to section 8.6.5 of the staff report to clarify that the proposed Desalination Amendment does not take a technology neutral approach, but states that commingling brine with wastewater is the first environmentally preferred method of brine disposal followed by discharging undiluted brine through multiport diffusers. The proposed Desalination Amendment takes a hierarchical stance on brine discharge methods while allowing flexibility for technological innovations and site-specific factors. For example, wastewater from a WWTP facility may be unavailable for brine dilution because it is being used for water recycling efforts. In this case, multiport diffusers would be the next best method for discharging brine because they can rapidly dilute and disperse brine within a small area and result in minimal marine life mortality. Multiport diffusers are commonly used at ocean outfalls and can be installed at almost any location. The proposed Desalination Amendment requires that they be sited and designed to minimize the impacts to marine life. For example, the regional water board would not permit multiport diffusers to be sited next to a highly productive kelp bed if the diffuser array could be sited in a less productive area. In addition to the abovementioned environmentally preferred options, the proposed Desalination Amendment accommodates future technological innovations in the field of brine disposal by allowing an owner or operator to use an alternative brine disposal technology. This option is contingent on the fact they can effectively demonstrate to the satisfaction of the regional water board in consultation with the State Water Board that their method is at least as protective as discharging through multiport diffusers. While there may be some marine life mortality from the shearing effect associated with multiport diffusers, these effects will likely be minimal from properly sited multiport diffusers. (Foster et al. 2013; Bothwell comment letter 2014) An owner or operator proposing to use an alternative brine disposal method must demonstrate to the regional water board in consultation with the State Water Board that their proposed method is at least as protective as

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		discharging through multiport diffusers. Water Code section 1314.25(b) and the proposed Desalination Amendment require mitigation measures to compensate for residual mortality that occurs after the best available site, design, and technology feasible are implemented. Historically, mitigation has not been required for shearing-related mortality that occurs when discharging through multiport diffusers. WWTPs and other ocean dischargers may use multiport diffusers on ocean outfalls but are regulated under National Pollutant Discharge Elimination System permits pursuant to Clean Water Act section 402, which also serve as Waste Discharge Requirements under Porter-Cologne chapter 4, Article 4 (§§ 13260 et. seq.) and chapter 5.5 (§§ 13370 et. seq.), which do not require mitigation for these types of impacts. New and expanded desalination facilities will be regulated under Water Code section 13142.5(b), which requires mortality of all forms of marine life be minimized and mitigated for. This includes mortality that results from desalination facility discharges. Foster et al. (2013) and Jenkins and Wasyl (2013) were some of the first to examine the marine life mortality associated with multiport diffusers. While both studies help elucidate potential mortality associated with shearing stress and the data from the studies are valuable, neither study was extensive. Staff has no other data estimating shearing-related mortality from multiport diffusers and suggests that more studies be done before setting a performance standard. Until more peer-reviewed studies emerge and data are compiled and approaching consistent, it is inappropriate to set a performance standard for multiport diffusers based on the available data.
15.7	Discharge technology compliance standard: In order to demonstrate a comparable level of environmental protection, the draft Desalination Amendments require that proponents of the alternative discharge technology provide a comparison of the marine life impacts of the proposed technology to that of the "preferred technology" identified by staff. The current draft Desalination Amendments lack guidance on the discharge technology compliance standard to be met under the Desalination Amendments, but there is substantial evidence in the Staff	Please see response to comment 15.6. There is not “substantial evidence” to set a performance standard for multiport diffusers. Staff did not include the Foster et al. (2013) estimate (23 to 38 percent of the total entrained volume of dilution water may be exposed to lethal turbulence) of shearing mortality in the proposed Desalination Amendment because they did not deem it appropriate to set a performance standard based on one study. Foster et al. (2013) can be used as a reference, but additional studies are needed to better quantify shearing mortality

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	Report to support such an evaluation. Poseidon recommends that the guidance found on page 73 of the Staff Report be incorporated in the Desalination Amendments, "until additional data is available, we assume that larvae in 23 percent of the total entrained volume of diffuser dilution water are killed by exposure to lethal turbulence." This assumption is based on a finding in the State Water Board "Expert Panel Report" (Foster et al 2013) that modeled shearing stress form multiport diffusers and reported that larvae in 23 to 38 percent of the total entrained volume of dilution water may be exposed to lethal turbulence. (Staff Report at 73-74).	before an appropriate performance standard can be set. When sufficient data become available, the State Water Board may amend the Ocean Plan to include a performance standard for multiport diffusers.
15.8	Siting of Mitigation Projects: The draft Desalination Amendments requires a project proponent to locate mitigation within the "source water body" of the feedwater of a desalination facility. This would result in Poseidon having to abandon its current mitigation project and start over, even though it has already been determined that there are no suitable mitigation sites within the source water body. We hope this is an oversight and will be addressed in the final Desalination Amendments.	Language was added to chapter III.L.2.e.(2) of the proposed Desalination Amendment that says, “The regional water boards may consider existing mitigation projects for regional water boards associated with a conditionally permitted desalination facility when making a new Water Code section 13142.5(b) determination.” Requiring an owner or operator to establish a new mitigation project within the facility’s source water body when they already have an established mitigation project would result in unreasonable costs and resource expenditures for owners and operators of conditionally permitted facilities. However, the regional water boards retain the right to require additional mitigation for any additional impacts that occur when transitioning to the long-term-stand-alone facility. The additional mitigation would only be for additional construction impacts or an increase in intake and mortality of marine life once the long-term-stand-alone facility is operating under the new conditions. Also, the proposed Desalination Amendment does not require that the mitigation project be located within the source water body. Chapter III.L.2.e.(3)(b)ii states that, “The owner or operator shall do modeling to evaluate the areal extent of the mitigation project’s production area* to confirm that it overlaps the facility’s source water body when feasible.” The production area from a mitigation project is the area where organisms originating at the mitigation site are dispersed to (see section 8.5.2 of the Staff Report with SED). The mitigation project should provide a source of organisms to replace those that were lost at a desalination facility. The best available mitigation measures feasible will

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		be required to minimize intake and mortality of all forms of marine life. The goal of a mitigation project should be to compensate for losses of all forms of marine life and to ensure there is an increase in the populations of the lost species within the ecosystem. The provision requiring the overlap of the mitigation project's production area with the source water body is to ensure the production replaces what was lost. Since Water Code section 13142.5(b) includes the term feasible, the proposed Desalination Amendment was revised to include "when feasible" after this requirement. If it is not feasible to locate the mitigation project so that the production area overlaps the source water body, then the mitigation project can be located elsewhere. However, if the mitigation project's production area does not overlap the source water body, the regional water board should carefully evaluate the mitigation project to ensure that it is still fully mitigating for losses. Additionally, the language in chapter III.L.2.e.(3)(b)ii only applies to facilities using surface intakes. Facilities using subsurface intakes will not have source water bodies from which species will be entrained, and consequently will not be required to perform modeling studies for dispersal. Facilities using subsurface intakes that require mitigation for construction or mitigation impacts should provide proposed mitigation locations to the regional water board for approval. The proposed mitigation locations should be located to the extent feasible in a habitat close enough to the facility to fully mitigate for the losses.
15.9	Calculation of mitigation acreage: Even though planned improvements to the Carlsbad project will reduce entrainment mortality, the methodology for calculating mitigation acreage requirements for the Carlsbad project under the draft Desalination Amendments would increase the mitigation requirements established by the Coastal Commission from 55 acres to approximately 130 acres. This is due to three provisions in the draft Desalination Amendments that differ from the Commission methodology for establishing mitigation for the entrainment impacts associated with the Carlsbad project: Mitigation ratio: The draft Desalination Amendments require 1:1	Per comment 15.8, the following language was added to chapter III.L.2.e.(7) of the proposed Desalination Amendment: *"For conditionally permitted facilities or expanded facilities, the regional water boards may:* *(a) Consider existing mitigation projects for regional water boards associated with a facility when making a new Water Code section 13142.5(b) determination.* *(b) Require additional mitigation when making a new Water Code section 13142.5(b) determination for any additional*

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	mitigation of all impacts - regardless of the relative productivity of the habitat impacted - to that of the mitigation habitat provided. Consistent with past APF siting and sizing determinations, the Desalination Amendments should provide the Regional Water Boards sufficient flexibility to adjust the mitigation acreage as needed based on the expected productivity of the type of mitigation to be provided compared to the actual productivity within the facility's source water body. For example, the Coastal Commission determined that 49 acres were needed to mitigate for estuarine species and 64 acres were needed to mitigate for the open ocean species entrained by the Carlsbad project for a total of 130 acres. However, in recognition of the impracticality of creating 64 acres of offshore open water habitat, and recognizing the relatively greater productivity rates per acre of estuarine wetlands habitats, the Coastal Commission allowed the offshore impacts to be "converted" to estuarine mitigation areas. Based on a recommendation from a member of the Coastal Commission's Science Advisory Panel, Dr. Peter Raimondi, the Coastal Commission determined that successfully restored wetland habitat would be ten times more productive than a similar area of nearshore ocean waters. Based on this determination, for every ten acres of nearshore impacted by the project, Poseidon was allowed to mitigate by creating or restoring one acre of estuarine habitat. As a result, 49 acres of estuarine wetlands habitat ("EWH") were required to mitigate for estuarine species, and 64 acres of EWH to mitigate for ocean species, for a total of 55.4 acres. Although this approach would result in "out of kind" mitigation, the Coastal Commission found it would produce overall better mitigation because: (1) it is not practical to create near-shore open water habitat; and (2) that habitat type is already well-represented along the shoreline. The Coastal Commission found that the Carlsbad Mitigation Plan would support a long-recognized need to increase the amount of coastal estuarine habitat in Southern California.	*impacts that occur when transitioning to a long-term-stand-alone facility or expanding a facility. The additional mitigation must be for additional construction impacts or an increase in intake and mortality of marine life once the long-term-stand-alone facility is operating under the new conditions."* This provision would allow the regional water board's previous determination of the 64 acre mitigation project as being in compliance with the mitigation requirements in the proposed Desalination Amendment unless there were additional impacts from the construction or operation of the long-term-stand-alone facility. We do not intend to require projects that have already met their mitigation requirements to perform additional mitigation for previously mitigated impacts. However, the regional water boards retain the right to require additional mitigation for additional impacts when making a new Water Code section 13142.5(b) determination. Section 8.5.4 of the Staff Report with SED discusses adding certainty to mitigation projects and goes into detail about why it is appropriate and important to use either a mitigation ratio or confidence interval to ensure all impacts are fully mitigated. This issue is ultimately a policy decision that will be made by the State Water Board; however, additional information is provided to help inform the decision. Out-of-Kind Mitigation for Open Water and Soft-Bottom Habitats Section 8.5.2 of the Staff Report with SED describes the appropriate types of projects for mitigating impacts from a desalination facility. Out-of-kind mitigation is when the habitat or species lost is different than what is replaced through mitigation and it does not result in whole ecosystem benefits that occur with in-kind mitigation. In-kind mitigation is when the habitat or species lost is the same as what is replaced through mitigation. Out-of-kind mitigation is inappropriate for habitat types such as estuaries, wetlands, kelp beds, rocky reefs, or seagrass beds because there are practical mitigation methods that have been successful for these habitat types. However, after considering public comments, it may be necessary to allow out-of-kind mitigation for impacts to open water and soft-bottom habitats because these habitats

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		are impractical to restore or create. Past projects (e.g. Huntington Beach and Morro Bay power plants) have dealt with the impracticality of mitigating open water and soft-bottom habitats by mitigating "more productive" habitats like wetlands or estuaries. (CCC 2008) Certain populations of entrained species may benefit from out-of-kind mitigation because some species may use the alternative mitigated habitat at some point in their life cycle. For example, adult California Halibut are found in deeper soft-bottom habitat but move into shallow soft-bottom habitat to spawn. The larval and post-larval halibut live in open water before settling to the nearshore soft-bottom environment. Larger larvae and juveniles then move into coastal estuaries and embayments and would benefit from an estuarine mitigation project (Kucas and Hassler 1986; Fodrie and Mendoza 2006). Other species lost to entrainment may not be replaced by the mitigation project because they do not utilize the alternative habitat at any point in their life cycle. However, the proposed Desalination Amendment was revised to allow the regional water boards to permit mitigation of a more productive habitat in lieu of mitigating open water and soft-bottom habitats. This is currently the best mitigation alternative available for these habitats when mitigation of the alternative habitat results in a better overall mitigation project. <u>Mitigation Ratios Scenario 1: Impacts to Highly Productive Habitats</u> The concept of applying a mitigation ratio stems from wetlands mitigation, where the restored, created, or enhanced habitat does not always provide "full, immediate, and riskless replacement of all services provided by each acre of impacted wetland." (King and Price 2004) Often with wetlands mitigation projects, the restored or created habitat provides different habitat functions and services than the lost natural habitat. This could be from differences between the locations of the mitigation site and the natural habitat or because newly mitigated habitat takes time to develop ecosystem functions and services that occur in older, more established habitats (e.g. note the ecosystem differences between a newly planted redwood forest and a hundred year old redwood forest). A mitigation ratio can be applied to compensate for the differences between the impacted habitat and the

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		habitat that will be restored, created, or enhanced. A mitigation ratio is calculated as the number of acres of mitigated habitat (created, restored, or enhanced) to each acre of natural habitat being impacted. When there is a risk the mitigated habitat will not provide "full, immediate, and riskless replacement of all services provided by each acre of impacted wetland [or other habitat]," a higher mitigation ratio can be applied. For example, a mitigation ratio of 4:1 would mean that four acres of habitat would be mitigated for every acre of impacted natural habitat. Mitigation projects for impacts to highly productive marine habitats like wetlands, estuaries, kelp beds, surfgrass beds, eelgrass beds, and rocky reefs may require higher mitigation ratios because the impacts may be permanent. A higher mitigation ratio will help to ensure the project fully mitigates for all impacts. Confidence levels are another means of adding certainty that a project will fully mitigate impacts. Response to comment 21.90 describes the use of a 95 percent confidence level in the proposed Desalination Amendment. Confidence levels and mitigation ratios can be used in combination. For example, some mitigation projects have used a 50 percent confidence interval to characterize the expected impact, and then applied a mitigation ratio of 2:1 or 3:1 to compensate for the lower confidence level and provide additional habitat in case the project is far from the affected area or if the project is unsuccessful. (CCC 2008) The proposed Desalination Amendment requires that the impacts from screened surface intakes are evaluated using an ETM/APF analysis with a 95 percent confidence level. Since a 95 percent confidence level is required, a lower mitigation ratio (1:1 or 2:1) would be appropriate for wetland, estuarine, kelp bed, surfgrass, eelgrass, and rocky reef mitigation. When determining a mitigation ratio for wetlands mitigation, King and Price (2004) stated, *"To account for differences in the ecosystem services provided per acre by impacted and replacement wetlands, a mitigation ratio should take into account the following five factors:*

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		1. *The existing level of wetland function at the site prior to the mitigation;* 2. *The resulting level of wetland function expected at the mitigation site after the project is fully successful;* 3. *The length of time before the mitigation is expected to be fully successful;* 4. *The risk that the mitigation project may not succeed; and* 5. *Differences in the location of the lost wetland and the mitigation wetland that affect the services and values they have the capacity and opportunity to generate."* These five factors could also be considered when determining an appropriate mitigation ratio for other productive habitat types such as rocky reefs, kelp beds, eelgrass beds, and surfgrass beds. Since there are a number of factors to consider when determining a mitigation ratio, the regional water boards will need to evaluate the Marine Life Mortality Reports and Mitigation Plans on a project-specific basis to establish an appropriate mitigation ratio to ensure the impacts from desalination facilities are fully mitigated. <u>Mitigation Ratios Scenario 2: Impacts to Open Water and Soft-Bottom Habitats</u> A mitigation ratio can be also applied to out-of-kind mitigation for open water and soft-bottom habitats. Normally when out-of-kind mitigation is performed, a higher mitigation ratio compensates for the fact that the mitigation will not provide a direct or complete replacement of the losses. However, for impacts to open water and soft-bottom habitats, a lower mitigation ratio may be appropriate for out-of-kind mitigation when the alternative habitat is more productive than the open water and soft-bottom habitats. As mentioned above, when a desalination facility entrains open water or soft-bottom species, creating, restoring, or enhancing a more productive habitat such as coastal estuarine habitat may result in a better overall mitigation project. Some of the project proponents commented that in this case, the mitigation ratio should account for the differences in productivity between the habitats and the regional water

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		boards should only require a 1:10 mitigation ratio (ten acres of the impacted area would be mitigated by restoring, creating, or enhancing one acre of more productive habitat). Even though the organisms replaced would not necessarily be the same species as the organisms that were entrained, this approach would result in no net loss of biological productivity if the mitigation project is successful. Figure 15.9-1 below illustrates how biological productivity can vary between two habitats. In this example, there is four times as much biomass, or biological productivity, in the estuarine habitat than in the open coastal or soft-bottom habitats. If an owner or operator was allowed out-of-kind mitigation, but required to use a 1:1 mitigation ratio, the mitigated habitat may produce up to four times as much biomass as the amount of biomass that was lost. A mitigation ratio could be applied to compensate for the differences in biological productivities between the mitigated and impacted habitats, which would result in equivalent amounts of biomass lost and produced. In the example provided in Figure 15.9.1, one acre of estuarine habitat has the equivalent biomass as four acres of open coastal or soft-bottom habitat. Applying a mitigation ratio of 1:4, or one acre of estuarine habitat restored for every four acres of open water or soft-bottom habitat, would result in a balance of biological productivity lost and produced. Since the type of alternative habitat selected for mitigation and the productivity of that habitat will vary, the regional water boards will need to evaluate the relative productivity of the impacted natural habitat to the estimated productivity of the replacement habitat on a case-by case basis to establish an appropriate mitigation ratio. The proposed Desalination Amendment was revised to allow the regional water boards to apply a mitigation ratio for open water or soft-bottom habitats based on an evaluation of the relative productivity of the habitats. The regional water board may determine that a mitigation ratio less than 1:10 (e.g. 1:5, 2:1) is appropriate, but the regional water board may not use a mitigation ratio exceeding 1:10 (e.g. 1:20). As mentioned in Mitigation Ratios Scenario 1: Impacts to Highly Productive Habitats, a mitigation ratio of at least 1:1 (e.g. 2:1, 3:2) should be used for all other habitat types (estuarine, wetland, kelp, surfgrass, and rocky reef

Please note all tables and figures referenced are present at the end of this document

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		habitats). <u>Example of Applying Mitigation Ratios</u> As described above, mitigation ratios are complicated and will vary on a project-by-project basis. Table 15.9-1 below includes an example of how mitigation ratios can be applied for the different impacts (intake, construction, and discharge) and habitat types. The example incorporates the APF from Data Set 2 in response to comment 21.90 as well as including example acres of disturbed area for construction and discharges. In the table below, Column A includes the mitigation assessment method that will be used to determine the number of acres to mitigate. Column B is the number of acres initially calculated for mitigation using the assessment method in Column A. For intake-impacts, the number of acres to mitigate (as determined by APF) will be broken down based on the habitat the impacted species utilize and is listed in Column C. In this example, 10 percent of the entrained species inhabited rocky reefs, 5 percent surfgrass beds, 15 percent inhabited estuarine habitat, and 70 percent live in open coastal nearshore waters. Column D breaks down the numbers of acres to be mitigated per habitat type before consideration of a mitigation ratio. Column E includes an example mitigation ratio based on habitat type. Please note that these mitigation ratios are for example purposes only. The actual mitigation ratios per chapter III.L.2.e.(3)(b). Column F includes the number of acres to mitigate after applying the mitigation ratio. Column G includes whether the mitigation acres in Column F will be in-kind or out-of-kind.
15.10	Mitigation confidence interval: The Desalination Amendments require that the mitigation acreage calculation be based on a 90 percent confidence level. This proposal has not been reviewed by the ERP. The Coastal Commission found that an 80 percent confidence interval would be acceptable under the site-specific conditions in Carlsbad. The uniform application of a 90 percent confidence interval does not take into consideration the varying levels of uncertainty associated with ETM/APF estimates, and therefore is overly conservative as applied to Carlsbad. Staff's proposal for a 90 percent confidence interval should be submitted to the State Water Board's "Expert Review Panel on Intake Impacts and	Please see response to comment 21.90.

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	Mitigation" ("ERP") for peer review.	
15.11	Requirement of mitigation of area inside the brine mixing zone: The Desalination Amendments require 1:1 mitigation for the area within the brine mixing zone exceeding 2 ppt. Standard practice under the Ocean Plan is that dischargers do not mitigate for impacts within the zone of initial dilution ("ZID"). The NPDES permit for the Carlsbad project does not require mitigation inside the ZID. It is not clear why staff is recommending desalination facilities mitigate for impacts within the prescribed brine mixing zone, or even how such mitigation could be accomplished. In the case of the Carlsbad Desalination Project, the proposed ZID will be approximately 1000 feet.	WWTPs do not currently have to mitigate for shearing related mortality, and the concept is somewhat new in the regulated community. Historically, mitigation has not been required for impacts within the zone of initial dilution, including shearing-related mortality that occurs when discharging through multiport diffusers. WWTPs and other ocean dischargers may use multiport diffusers on ocean outfalls but are regulated under National Pollutant Discharge Elimination System permits pursuant to Clean Water Act section 402, which also serve as Waste Discharge Requirements under Porter-Cologne chapter 4, Article 4 (§§ 13260 et. seq.) and chapter 5.5 (§§ 13370 et. seq.), which do not require mitigation for these types of impacts. However, Water Code section 13142.5(b) requires that an owner or operator of a new or expanded desalination facility mitigate for all mortality of all forms of marine life; including that which occurs as a result of the construction and operation of the facility. This further includes any shearing related mortality that occurs as a result of the addition of the brine waste stream to the effluent for commingled discharges or any other mortality that occurs in the zone of initial dilution (ZID) or brine mixing zone (BMZ). In some cases, the regional water board may determine that the shearing related mortality from the addition of the brine waste stream is not significantly higher than the shearing mortality that occurs at a WWTP in the absence of the brine stream. In this case, the regional water board may not require mitigation for shearing mortality, but they still may determine there is mortality associated with brine toxicity within the ZID or BMZ that requires mitigation.
15.12	Facility-specific receiving water limit: Based upon the proposed language in the draft Desalination Amendments, it does not appear possible for an operator to successfully develop a facility-specific receiving water limit: LOEL vs. NOEL: The procedure set forth in the Desalination Amendments for establishing facility-specific receiving water limits uses a completely different, and more restrictive, standard of salinity than the standard that is used as a guideline throughout the entire draft Desalination Amendments. Throughout the draft Desalination	No observable effect level (NOEL) was used to ensure the standard would be adequately protective of marine life. However, the language has been changed to lowest observable effect level to provide a standard that is consistent with the approach from Roberts et al. 2012.

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	Amendments, and indeed, throughout Roberts et al. 2012 (upon which much of the draft Desalination Amendments are based), it is stated that red abalone are the most sensitive species tested, with a LOEL (Lowest Observable Effect Level) of 35.6 ppt - or approximately 2.1 ppt above ambient salinity levels (in southern California waters). Thus, it is argued, a maximum regulatory salinity increase of 2 ppt is reasonable because it protects the most sensitive species. However, the language in the draft Desalination Amendments uses a completely different standard, which is NOEL (No Observable Effect Level). The NOEL value, according to Philips et al. (2012) is 34.9 ppt, or approximately only 1.4 ppt above ambient salinity levels (in southern California waters). Consequently, an operator that wishes to establish a site-specific receiving water limit under the draft Desalination Amendments is held to a more restrictive salinity standard. Poseidon requests that the Desalination Amendments provide the facility-specific alternative receiving water standard is based on the same standard that will be used to establish the statewide receiving water limit of 2 ppt - the lowest observed effect level (LOEL).	
15.13	Benthic monitoring study: The Desalination Amendments require that an owner or operator conduct a 36-month baseline biological conditions survey at the discharge location and at reference locations prior to commencing brine discharge. The discharge from the Carlsbad project will start in the 2nd quarter of 2015, so this option is currently not available to the Carlsbad project. In addition, the justification for a 36-month survey period prior to discharge is not clear. Comprehensive testing over a shorter period supported by existing biological data from nearby similar habitat should be sufficient for determining the biological characteristics of the site.	Please see response to comment 15.5.
15.14	Brine Mixing Zone: The draft Desalination Amendments propose to limit the salinity increase to a maximum of 2 ppt over natural ocean salinity background, at a fixed distance of 100 meters from the point of discharge. The distance of 100 meters appears to have been selected based on the multiport diffuser. (Staff Report at 98.) The Staff Report states - without a stated basis - that facilities using flow augmentation should also be able to meet 2 ppt above ambient with 100 meters. (Staff Report at 99.) However, this is not correct. Depending on ambient mixing conditions	The proposed Desalination Amendment provides flexibility for new and innovative brine disposal methods that are equally protective as multiport diffusers. Multiport diffusers are the second best preferred technology (second to commingling brine with an adequate volume of wastewater) because they rapidly disperse brine in the receiving waters within a relatively small area. Facilities commingling brine with an adequate volume of wastewater are expected to have positively buoyant plumes and will easily be able to meet the receiving water

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	(tides, wind, waves, current, temperature) in the receiving water, the Carlsbad project requires anywhere from 200 meters under good mixing conditions to 500 meters under poor mixing conditions to ensure strict compliance with the proposed 2 ppt standard. The draft Desalination Amendments' definition of "brine mixing zone" alludes to a mechanism for establishing a larger brine mixing zone: "the brine mixing zone shall not exceed 100 meters...unless otherwise authorized in accordance with this plan." However, the draft Desalination Amendments does not include a process for establishing a larger brine mixing zone. Failure to include a process for establishing a larger brine mixing zone in the Desalination Amendments would limit the brine discharge options available to the Carlsbad project to the environmentally inferior multiport diffuser. This appears to be an oversight, and we respectfully request that it will be addressed by staff in follow-up revisions.	limitation for salinity within 100 meters of the outfall. Roberts et al. (2013) reviewed studies on discharges through multiport diffusers and performed modeling of multiport diffusers and conservatively found that discharges through multiport diffusers should also easily be able to meet a receiving water limitation for salinity of 5 percent (~2 ppt or 2 PSU) above natural background salinity within 100 meters from the discharge. This requirement is consistent with the project goal to provide a consistent statewide approach for protecting water quality and related beneficial uses of ocean waters and controlling adverse effects of desalination discharges by minimizing the area of impact. Commingling brine with wastewater and discharging brine through multiport diffusers are both technologies that can reduce or eliminate toxic effects of salinity within a relatively small area (100 m). Alternative discharge technologies that are equally protective as commingling with wastewater of discharging through diffusers should also be designed to minimize the area where salinity exceeds 2 ppt above natural background salinity or the alternative receiving after limitation (other than 2 ppt). If a flow augmentation system requires between 200 and 500 meters in order to meet the 2 ppt standard, then it is not as protective as discharging through multiport diffusers because the area of impact is much larger than 100 meters. Please see response to comment 15.58. We have removed "…unless otherwise authorized in accordance with this plan" from the definition of brine mixing zone to clarify that the brine mixing zone shall extend no more than 100 m laterally from the points of discharge and throughout the water column. Please also see response to comment 6.11. Regarding the statement that, "Failure to include a process for establishing a larger brine mixing zone in the Desalination Amendments would limit the brine discharge options available to the Carlsbad project to the environmentally inferior multiport diffuser," please see response to comment 15.20.

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15.15	Definition of salinity: The definition of salinity in the draft Desalination Amendments is as follows: SALINITY is a measure of the dissolved salts in a volume of water. For the purposes of this Plan, salinity shall be measured as total dissolved solids in mg/l. Whereas the definition of natural background salinity in the draft Desalination Amendments is as follows: NATURAL BACKGROUND SALINITY is the salinity* at a location that results from naturally occurring processes and is without apparent human influence. Natural background salinity shall be determined by averaging 20 years of historical salinity* data at a location. When historical data are not available, natural background salinity shall be determined by measuring salinity* at depth of proposed discharge for three years, on a weekly basis prior to a desalination facility* discharging brine,* and the average salinity* shall be used to determine natural background salinity. Facilities shall establish a reference location with similar natural background salinity to be used for comparison in ongoing monitoring of brine* discharges. These two definitions are potentially at odds with each other depending on the analytical method used to establish the historical salinity data for a particular desalination facility. This is because the definition for Natural Background Salinity seeks to establish a long-term background value, and most of the data collected in the past that would be useful for these purpose measures total dissolved salts, not total dissolved solids ("TDS"). The definition of Salinity in the draft Desalination Amendments, on the other hand, provides that for purposes of determining compliance with the maximum 2 ppt increase over the natural background salinity at the edge of the brine mixing zone (or facility-specific receiving water limit), "salinity shall be measured as total dissolved solids." As noted in Attachment 6, the Scripps Institution of Oceanography ("SIO") maintains a 30 year historical database of Pacific Ocean salinity that serves as the baseline background salinity for the Carlsbad project.	The proposed Desalination Amendment included a requirement that salinity be measured using total dissolved solids method because EPA Method 160.1 is a widely used standard method (for NPDES permitting and environmental monitoring. EPA Method 160.1 requires that results are reported in mg/L or parts per million, which is why the original amendment language included 2,000 mg/l. 2,000 mg/L (ppm) is equivalent to 2.000 g/L (ppt). The results from Phillips et al. (2012) and conclusions from Roberts et al. (2013) were reported in ppt and ppt units are also commonly used in the Ocean Plan and NPDES permits. However, we recognize that the definition of salinity and natural background salinity may present an issue for some facilities if the historical salinity data were not measured using total dissolved solids. To reconcile this issue, the amendment language was revised to allow an owner or operator to measure salinity using a standard method (e.g. Standard Method 2520 B, EPA Method 120.1, EPA Method 160.1) that is approved by the regional water board, but the data must be reported in parts per thousand. A provision was also included to allow the regional water board to accept converted salinity data at their discretion. This may require an owner or operator to provide additional information (e.g. correlative data) to demonstrate how the data were converted.

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	SIO's salinity data base, and most other salinity data bases, measure salinity as total dissolved salts not TDS. This is accomplished using electrical conductivity and reported as the Practical Salinity per PSS-78. This approach is viewed as the most accurate measure of Pacific Ocean salinity because it eliminates the uncharged (neutral) dissolved solids (such as dissolved organic matter) in seawater that are not related to the salinity. The San Diego Regional Water Quality Control Board adopted a similar approach in the order issued for the Carlsbad project. (See Table 5 on page E-8 of Order R9-2006-0065).	
15.16	For the Carlsbad project, the long-term average Natural Background Salinity, as defined in the draft Desalination Amendments, is 33.5 ppt. The problem with using TDS in the definition of Salinity in the draft Desalination Amendments is that, relative to the historic SIO database measured using electrical conductivity and reported as the Practical Salinity per PSS-78, the TDS measurement is expected to yield a higher reading due to the presence of uncharged (neutral) dissolved solids (such as dissolved organic matter) in seawater that are included in the TDS measurement, but not related to the salinity. To the extent that the TDS measurement is greater than the PSS-78 salinity measurement, and this figure is used to confirm compliance with the 2 ppt increase (or site-specific receiving water limit) over the a historical average of 33.5 measured by the PSS-78 method, then Poseidon is not receiving the full benefit of the 2 ppt increase (or site-specific receiving water limit) by the amount of the difference between the TDS and PSS-78 measurements. In order to reconcile this problem, we think the measurement of salinity needs to reflect the same method as that of the historical data base. The following definition would correct this problem: SALINITY is a measure of the dissolved salts in a volume of water. For the purposes of this Plan, salinity shall be measured using electrical conductivity and reported as the Practical Salinity per PSS-78. Other measures of salinity, including absolute salinity as defined per TEOS-10 (in g/kg), salinity as reflected in total dissolved solids measurements (in mg/L), or the sum of the major anions and cations (chloride, sulfate, bicarbonate, bromide, sodium, magnesium, calcium, and potassium, in mg/L) may also be collected and reported to determine proper	Please see response to comment 15.15 and note that the definition of salinity was revised to resolve this issue.

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	correlations with PSS-78 salinity measurements.	
15.17	Receiving Water Limit for Salinity: The Desalination Amendments provide that brine discharges from desalination facilities shall not exceed 2.0 parts per thousand above the natural background salinity. Natural background salinity is defined as the 20-year average salinity at the project location. The database that makes up the natural background salinity for the Carlsbad Project shows a mean salinity of 33.5 ppt, a minimum salinity of 27.4 ppt, and a maximum salinity of 34.2 ppt over the last 20 years. Sixty-four percent of daily salinity measurements over the last 20 years are above the 33.5 ppt average. This means that the Carlsbad facility would have to operate at less than a 2 ppt increase over the ambient salinity 64 percent of the time. This operating requirement would severely impact plant reliability. To address this problem, Desalination Amendments should be revised such that the natural background salinity shall be determined by averaging 20 years of historical salinity* data at a location unless the actual salinity measured at the facility intake is greater than the 20 year average salinity, in which case, the natural background salinity shall be the lower of: (1) the actual salinity measured at the intake, or (2) the maximum salinity level measured in the 20 years of historical salinity data (i.e., 33.5 to 34.2 ppt in Carlsbad).	Per comment 6.9 the definition of natural background salinity was updated so that the natural background salinity used in determining compliance with the receiving water limitation for salinity will be based on the historical average for the month. The alternative approach to natural background salinity proposed by the commenter would not be adequately protective of water quality or other related beneficial uses of ocean waters. Using the actual salinity measured at an intake as the natural background salinity does not work for facilities with the intakes located nearby the discharges. In this scenario, the brine discharge could make the intake water saltier and saltier over time but the facility would not be in violation of the receiving water limitation for salinity, even though natural background salinity is increasing over time. The second option of using the maximum salinity measured in the 20 years of historical salinity data would also not be adequately protective of water quality or other related beneficial uses of ocean waters. One of the Desalination Amendment Peer Reviewers, Dr. Lisa A. Levin a Distinguished Professor from the Scripps Institution of Oceanography, UC San Diego, California discusses the issue of determining natural background salinity in her review. Dr. Levin states that in stable environments where natural background salinity does not vary significantly; a standard of 2 ppt above natural background salinity may have sub-lethal effects even though lethal effects may not be detected. Using the maximum salinity measured in the 20 years of historical salinity data in stable oceanic environments could result in sub-lethal salinity effects. Furthermore, Dr. Levin goes on to say the following regarding variability: *"The nature of variability is just as important in establishing receiving water limits as the amount of variation, as indicated by this plot of salinity variation at the outfall off Huntington Beach [See Figure 5-2 in Roberts et al. 2013]. Natural variability involves significant episodic drops in salinity by 2 ppt, but never a rise of this magnitude. Representing variability as 9.7% in this case does not tell a realistic story, since natural*

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		exposures rarely rise above 34. Another measure of variability should be considered since the disturbance at hand involves elevated salinity – perhaps by calculation of variance above the mode or mean. Certainly 37 for a numeric limit seems unrealistic for California waters (except perhaps in our inverse, hypersaline estuaries." The current definition of natural background salinity takes into account seasonal variability where there may be natural seasonal drops that are typically correlated with precipitation in winter months or increased solar radiation in summer months. The current approach will meet the project goal of providing a consistent statewide approach for protecting water quality, and related beneficial uses of ocean waters while being flexible enough to compensate for site-specific salinity differences. Please also see response to comment 13.130.
15.18	Definition of Brine Mixing Zone: Project operators would not be able to comply with the proposed prohibition of acutely toxic conditions in the brine mixing zone. The definition of brine mixing zone should include an allowance for acute toxicity consistent with the definition of Acute Toxicity in the Ocean Plan - "The mixing zone for the acute* toxicity* objective shall be ten percent (10%) of the distance from the edge of the outfall structure to the edge of the (brine mixing zone*)." This appears to be an oversight, and we respectfully request that it will be addressed by staff in follow-up revisions.	Please see response to comment 6.11.
15.19	Additional information Poseidon requests the State Water Board to consider prior to finalizing the Desalination Amendments: During the administrative process leading up to the release of the draft Desalination Amendments, Poseidon submitted a number of technical studies and reports to staff for consideration in evaluating the use of low-impact pumps for flow augmentation as a method for brine disposal technology. Included below are a summary of the studies and reports provided and the applicability of that information to the draft Desalination Amendments. Copies of these studies and reports are included as attachments hereto. U.S. Bureau of Reclamation research on low-impact pumps for transfer of	Thank you for providing these additional studies. We reviewed Attachments 8 (Borthwick et al. 1999) and 9 (Borthwick and Corwin 2001) that provided information on Archimedes lifts and internal helical pumps, but did not include the results in the Staff Report with SED because the studies do not provide information about the survival of fish and eggs in the size classes that would be entrained through a surface intake with a 1.0 mm slot size or smaller screened intake. The proposed Desalination Amendment requires that surface intakes be equipped with screens with openings no larger than 1.0 mm. Generally, the length of organisms that will be protected is equivalent to 10 percent of the screen slot size, which means fish smaller than 10 mm in length will be

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	juvenile pumps: In February 2014, Poseidon provided to State Water Board staff copies of U.S. Bureau of Reclamation's ("USBR") studies analyzing the low-impact pump technology at the Red Bluff Research Pumping Plant Program (the "RPP") on the Sacramento River. The full-scale pumping plant was constructed to test new fish-protection technology, including Archimedes lifts and internal helical pumps. The research program assessed seasonal patterns of fish entrainment from the Sacramento River, and mortality, injury, and stress of hatchery-reared juvenile Chinook salmon passed through the pumps. The RPP has produced a wealth of studies and peer-reviewed reports on various aspects of the Archimedes Lifts and impacts on juvenile and larval salmonids, all of which are currently available on the USBR website. Of particular interest and value with respect to the State Water Board's evaluation of flow augmentation as a brine disposal technology are the following reports: Investigations of Fish Entrainment By Archimedes and Internal Helical Pumps at the Red Bluff Research Pumping Plant, Sacramento River, California: February 1997 - June 1998, October 1999. Wild Fish Entrainment by Archimedes Lifts and an Internal Helical Pump at the Red Bluff Research Pumping Plant, Upper Sacramento River, California: February 1997 - May 2000, December 2001.	entrained through screens with 1.0 mm slot size. (Weisberg 1987) Entrainment is largely related to the species and organism size. Studies have estimated that certain species of fish 20 to 25 mm in length can be entrained through a 1.0 mm slot size screen. (Tenera et al. 2013a) The majority of mortality data presented in Borthwick et al. (1999) and Borthwick and Corwin (2001) are for fish 30 to 100 mm in length, but include data for fish up to 300 mm in length (1.2 to 3.9 inches, up to 11.8 inches). Borthwick et al. (1999) and Borthwick and Corwin (2001) state that data on fish <30 mm were not reported because the small fish were not efficiently retained in their study systems. (Borthwick et al. 1999) There are no empirical studies that estimate damage to or mortality of eggs, larvae, and small (i.e.< 30mm) juvenile organisms that pass through Archimedes lifts and internal helical pumps. The Borthwick et al. 1999 and Borthwick and Corwin 2001 studies are valuable from the standpoint that the Archimedes lift systems can be used to safely transport larger juvenile and adult fish, but more studies are needed to evaluate the damage to and mortality of organisms in the size class of interest as they move through the Archimedes lift systems. The size class of interest in the case of the proposed Desalination Amendment is any organism that is small enough to pass through a screen with a 1.0 mm opening, or approximately smaller than 25 mm. Furthermore, the intake system is only one part of the flow augmentation process. Other steps in the process (e.g. water conveyance and mixing with brine) will need to be evaluated before comparisons can be made between flow augmentation as a proposed alternative technology and multiport diffusers.
15.20	Hydrodynamic Impacts on Marine Life Due to Brine Dilution Strategies for Seawater Desalination Plants: In 2013, Poseidon provided to State Water Board staff copies of a report by Jenkins and Wasyl. This report provided a comparison of the expected entrainment mortality in the dilution water used for flow augmentation and multiport diffusers. Subsequently, Dr. Jenkins revised the report in response to comments received from staff, and submitted it to the Journal of Environmental Science and Technology for consideration for publication.	The revised report, included as Attachment 10 to the Poseidon Resources comment letter was reviewed and is an improvement over the Jenkins and Wasyl draft submitted in 2013. However, the conclusions in Jenkins et al. 2014 are not adequately supported by the information presented in the report or by any other literature. The report is biased and does not fairly or holistically compare the two discharge methods. The analysis compares impacts for diffusers that have been sited next to a highly productive kelp bed rather than at a

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		nearby-location without a kelp bed (see their Figure 4 vs. staff's Figure 15.20-1 below). There are numerous other options for siting the diffuser array and the report inappropriately compared diffusers sited next to a kelp bed where marine life mortality would be higher than diffusers sited in the area slightly offshore or to the north. Poseidon did not provide adequate justification for why they sited the diffuser array directly next to the kelp bed rather than an area further away from the kelp beds. This is an issue that has been mentioned to Poseidon during numerous stakeholder meetings and it was assumed that this would be addressed in subsequent report drafts. However, the report persists to portray a biased and incomplete analysis of the discharge options. Second, Jenkins et al. (2014) focuses on hydrodynamic impacts to marine life at the point of discharge, but neglects to consider the hydrodynamic mortality that would occur during water conveyance and mixing with brine for flow augmentation systems. The analysis should compare all discharge-related mortality including the intake of water for brine dilution, water conveyance and mixing, and shearing mortality. Diffuser systems do not require the additional intake of seawater and consequently have no mortality associated with the intake of water for brine dilution. The only marine life mortality associated with diffusers is associated with elevated salinity and shearing. Flow augmentation systems will have mortality associated with the additional seawater intake and water conveyance, and possibly shearing, depending on how the effluent is discharged. In the case of the Carlsbad Desalination Project, the facility is designed to intake an additional 200 MGD solely for brine dilution. This volume of water would need to be increased to provide adequate dilution to meet the receiving water limitation for salinity in the proposed Desalination Amendment. This additional volume would not only be subjected to potential mortality at the intake, but assuming organisms survive the intake process, they would be subjected to stress, potentially lethal shearing mortality, or mortality at a number of places in the water conveyance and brine dilution. This fact was not made clear and the report failed to estimate mortality associated with each step in the flow augmentation system. Table 1 in Jenkins et al. 2014 attempts to portray the mortality

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		associated with each step, but it contains inaccurate, unsupported, and skewed information rather than a fair and accurate comparison of the two technologies. Numerous times throughout the report, the authors make assumptions that are not supported by past or current data, then extrapolate the data, drawing conclusions from the unfounded assumptions (e.g. integrated injury factor, # of organisms injured per day, “co-lateral [sic] environmental damage,” and “co-lateral [sic] damage”). Additionally, the authors include equations but fail to clearly or adequately tie them in to the analysis and support their reported numbers (e.g. integrated injury factor and # of organisms injured per day). This results in the authors reporting numbers and presenting them as facts without supporting them by reference, with data, or in the text. The “Co-lateral [sic] Environmental Damage” and “Co-lateral [sic] Damage” lists turbidity increases from diffuser turbulence and reduction in PAR. Both of these have been rejected by Foster et al. (2013) as significant impacts. Turbidity impacts are directly related to the volume of discharge and the diffuser design. Poseidon’s proposed diffuser design would increase turbidity, but the regional water board will require that the diffuser be designed to minimize the suspension of benthic sediments (chapter III.L.2.e.(2)(b)). Furthermore, existing provisions in the Ocean Plan include effluent limitations for turbidity. The “Co-lateral [sic] Impact Zone” again mentions there would be impacts to the kelp beds, but these would not occur if the diffusers were not sited near a highly productive environment. For these reasons, the report is insufficient to support the conclusion that, "Marine life impact numbers were found to be 7 to 9.5 times greater using high velocity diffusers to affect brine dilution with jet discharge velocities ranging from 3 m/s to 5 m/s." Figure 15.20-1 below was generated with the kelp beds highlighted in red juxtaposed to Poseidon Carlsbad’s proposed siting of the diffuser outfall pipe (black) that was used in Jenkins et al. (2014) comparative analysis. An area highlighted in green was included to show an environmentally superior location for the diffuser array based on the location of the kelp beds alone. The siting of the diffuser should be in the best possible location to minimize intake and mortality of marine life,

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		and Figure 15.20-1 demonstrates the point that the proposed diffuser design is not sited in the best available location feasible to protect the kelp bed resources.
15.21	Revise [the proposed Desalination Amendment] as follows: "The regional water board shall analyze, review and approve the owner or operator's Water Code section 13142.5(b) analysis of all new and expanded desalination facilities.* A Water Code section 13142.5(b) analysis may include future expansions at the facility. The regional water board shall first analyze separately as independent considerations a range of feasible*"	Please see response to comment 6.2.
15.22	Amendment Section L.2.a.(2): The stated purpose of the Desalination Amendments are to provide implementation procedures for conducting Water Code section 13142.5(b) "evaluations of the best available site, design, technology and mitigation measures feasible to minimize the intake and mortality of all forms of marine life at new or expanded desalination facilities." Yet the draft Desalination Amendments fail to provide the regional water boards with direction regarding one of the more contentious aspects of the 13142.5(b) evaluation - the scope of the feasibility assessment. The Court of Appeal effectively resolved this debate in 2012 when it assessed whether the San Diego Regional Water Board complied with Water Code section 13142.5(b) in issuing Order R9-2009-0038 for the Carlsbad Desalination Project. (Surfrider Found. V. Cal. Reg'l Water Quality Control Bd. (2012) 211 Cal. App. 4th 557, 581). The court determined that the Regional Board fully complied with section 13142.5(b) in relying on the definition of "feasible" under CEQA. (Id. at pp. 582-583). Under CEQA, "feasible" means "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors." (Pub. Res. Code, §§ 21061). The Coastal Act relies on the same definition. (Pub. Res. Code, § 30108 (Coastal Act)). This definition of Feasibility has been included in Poseidon's suggested revisions to the Definition of Terms section of the Ocean Plan.	Please see response to comment 6.12.
15.23	Amendment Section L.2.a.(2): It is important that the language here accurately tracks WC section 13142.5(b).	The proposed Desalination Amendment and the Staff Report with SED were revised to include references to "available" and "feasible" for the

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	[Revise as follows: "The regional water board shall analyze, review and approve --conduct a-- the owner or operator's Water Code section 13142.5(b) analysis of all new and expanded desalination facilities.* A Water Code section 13142.5(b) analysis may include future expansions at the facility. The regional water board shall first analyze separately as independent considerations a range of feasible* alternatives for the best available site, the best design, the best technology, and the best available mitigation measures to minimize intake and mortality of marine life. Then, the regional water board shall consider all four factors collectively, and include the best combination of alternatives feasible* that in combination minimize intake and mortality of marine life. The best combination of alternatives feasible* may not always include the best alternative under each individual factor because some alternatives may be mutually exclusive, redundant, or infeasible in combination."]	statutory factors, in order to make the intent clear.
15.24	Amendment Section L.2.a.(3): This provision discourages marginal increases in productive capacity of the plant and associated efficiency gains by putting the entire facility at risk of having to come into compliance with technology improvements. As a matter of public policy, the state should encourage the optimal utilization of existing infrastructure. [Revise as follows: "The regional water board's 13142.5(b) analysis for expanded facilities shall --may-- be limited to those expansions or other changes that result in the increased intake or mortality of marine life.--unless the regional water board determines that additional measures that minimize intake and mortality of marine life are feasible for the existing portions of the facility.--"]	Disagree with the suggested language change. Expanded facilities will have additional environmental impacts that result from an increased intake flow and brine discharge. Water Code section 13142.5(b) requires that expanded facilities use the best available site, design, technology, and mitigation measures feasible to minimize intake and mortality of all forms of marine life and this is consistent with the proposed regulatory language. In some cases, desalination facilities were built more than 20 years ago and an expansion of a facility is one of the few opportunities for the regional water boards to require upgrades for intake technology for previously-approved desalination facilities with appropriate statutory determinations because of the limiting scope of Water Code section 13142.5(b). The State Water Board encourages the use of existing infrastructure. In some instances, an "additional measure" may be replacing an old intake screen with a 1.0 mm or smaller slot size or mesh size screen while still utilizing existing infrastructure.
15.25	Amendment Section L.2.a.(5)(b): Water agencies are investing in desalination facilities to diversify their water supply portfolio to achieve specific goals with respect to water supply quantity, quality and reliability. Therefore the length of deferral of Section 13142.5(b) modifications should be linked to the ability of the water agency served by the	The changes proposed in the comment would allow an owner or operator to potentially indefinitely delay upgrading to the new Water Code section 13142.5(b) determination requirements, which could pose a significant threat to aquatic life beneficial uses. Adding the language "of comparable quantity, quality, and reliability" would restrict when the

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	desalination facility to obtain a temporary replacement supply of water with a comparable quantity, quality, and reliability. Similarly, the owner of the facility may have financing that requires the facility continue operating while modifications are implemented (as is the case with the Carlsbad project). The deferral should be available to an owner that needs to continue operations to receive payments to pay any project specific related financing while modifications are being implemented. [Revise as follows: "The regional water board may allow up to five years from the date of the event for the owner or operator to make modifications to the facility required by a new Water Code 13142.5(b) determination, provided that the regional water board finds that any water supply interruption resulting from the facility modifications requires additional time for water users to (1) obtain a temporary replacement supply of comparable quantity, quality, and reliability; or (2) the owner of the facility needs to continue operations to receive payments to pay any project specific related financing while modifications are being implemented."]	regional water board could extend the compliance timeline and could potentially limit alternative water supply options. The second proposed language addition, "or (2) the owner of the facility needs to continue operations to receive payments to pay any project specific related financing while modifications are being implemented" does not necessarily protect the public interest, but rather a pecuniary interest. Furthermore, there is nothing in the existing language that would prevent the regional water board from considering the need to continue operations while modifications are being implemented. However, the proposed Amendment language was revised to provide additional flexibility to the regional water boards when considering the need for up to five years to make modifications to the facility. The following underlined language was added to chapter III.L.2.a.(5)(b): *"The regional water board may allow up to five years from the date of the event for the owner or operator to make modifications to the facility required by a new Water Code <u>section</u> 13142.5(b) determination, provided that the regional water board finds that <u>1)</u> any water supply interruption resulting from the facility modifications requires additional time for water users to obtain a temporary replacement supply <u>or 2) such a compliance period is otherwise in the public interest and reasonably required for modification of the facility to comply with the determination.</u>"*
15.26	Amendment Section L.2.b.(2) [second sentence]: This sentence should be moved to the technology section. [Revise as follows: "Consider whether the identified regional need for desalinated* water identified is consistent with any applicable general or coordinated plan for the development, such as a county general plan, or utilization or conservation of the water resources of the state, such as --a county general plan-- an integrated regional water management plan or an urban water management plan as well as available current and projected water supplies. --A design capacity in excess of the identified regional water need for desalinated* water shall not be used by itself to declare subsurface intakes as infeasible.--]	The sentence was moved to the chapter III.L.2.d.(1)(a) and revised to, "A design capacity in excess of the regional water need for desalinated* water as identified in chapter III.L.2.b.(2) shall not be used by itself to declare subsurface intakes* as not feasible.*"
15.27	Amendment Section L.2.b.(3) [Delete "geographic scope" portion]: Not	"From the geographic scope of" was removed from chapter III.L.2.b.(3)

Please note all tables and figures referenced are present at the end of this document

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	clear what this means.	of the proposed Desalination Amendment.
15.28	Amendment Section L.2.b.(4) : Clarify scope of analysis. [Revise as follows: "Analyze oceanographic, bathymetric, geologic, hydrogeologic, and seafloor topographic conditions within the area affected by the project, so the siting of a facility, including the intakes and discharges, minimize the intake and mortality of marine life."]	The phrase "at the site" was added instead of "within the area affected by the project" to address this comment.
15.29	Amendment Section L.2.b.(6): It is impossible to demonstrate "no impacts," which potentially exposes the projects to litigation. [Revise as follows: "Ensure that the intake and discharge structures are not located within a MPA or SWQPA.* Discharges shall be sited at a sufficient distance from a MPA or SWQPA* so that there are no measurable impacts from the discharge on a MPA or SWQPA* and so that the salinity* within the boundaries of a MPA or SWQPA* does not exceed natural background salinity.* --To the extent feasible, intakes shall be sited so as to maximize the distance from a MPA or SWQPA.*--]	Please see response to comment 6.4.
15.30	Amendment Section L.2.b.(6): The first two sentences adequately address the need to protect MPAs and SWQPAs. Last sentence of this section should be deleted because it is redundant and open to subjective interpretation. [Delete: "To the extent feasible, intakes shall be sited so as to maximize the distance from a MPA or SWQPA.*]	Removing the language as proposed by the commenter would result in language that is not adequately protective of MPAs or SWQPAs. The first sentence in chapter III.L.2.b.(7) formerly (6) states that intakes and discharges shall not be sited within a MPA or SWQPA with the exception of intake structures without associated construction-related marine life mortality (e.g. slant wells). The second sentence adds additional provisions for siting discharges and the third sentence adds additional provisions for siting intakes. The first sentence in chapter III.L.2.b.(7) does not adequately address intakes because intakes sited near MPAs or SWQPAs can have negative effects on MPAs or SWQPAs. Clarifying language was added so that the third sentence applies only to surface intakes because a surface intake near a MPA or SWQPA has the potential to entrain organisms utilizing the protected areas, whereas subsurface intakes will not. The third sentence is additionally needed to ensure that we continue to establish special protections for California's invaluable MPAs and SWQPAs. Also, please see response to comment 6.4.

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15.31	Amendment Section L.2.c.(4): Clarify intent. [Revise as follows: "Design the outfall so that discharges do not result in dense, negatively-buoyant plumes that result in adverse effects due to elevated salinity* above 2 ppt or above the facility-specific salinity standard (if applicable) or anoxic conditions occurring outside the brine mixing zone.* An owner or operator must demonstrate that the outfall meets this requirement through plume modeling and/or field studies. Modeling and field studies shall be approved by the regional water board in consultation with State Water Board staff."	The “above 2 ppt or above the facility-specific salinity standard (if applicable)” language is intended to clarify “elevated salinity.” In this case, the concern is that salinity will be elevated above a threshold of concern. The “threshold of concern” would be any water that is 2 ppt or the facility-specific salinity standard above natural background salinity.
15.32	Amendment Section L.2.d.(1)(a): The staff recommendation with respect to subsurface intakes presented on page 58 of the Staff Report is: "Option 3: Establish subsurface intakes as the preferred technology for seawater intakes." This change accurately reflects the staff recommendation: [Revise as follows: "Subject to Section L.2.a.(2), the preferred technology for minimizing mortality of marine life resulting from the intake of seawater is --regional water board shall require-- subsurface* intakes unless the regional water board determines that subsurface* intakes are infeasible based upon an analysis of the criteria listed below, in consultation with State Water Board staff."]	Disagree. The proposed Desalination Amendment does not take a technology-neutral approach; it identifies subsurface intakes as the preferred intake technology and only allows the use of screened surface intakes or an alternative intake technology if subsurface intakes are infeasible. Please see response to comment 15.2.
15.33	Amendment Section L.2.d.(1)(a)i.: This additional text is needed to complete 13142.5(b) feasibility criteria set established in Surfrider Found. v. Cal. Reg’l Water Quality Control Bd. (2012) 211 Cal. App. 4th 552-553: [Revise as follows: "The regional water board shall consider the following criteria in determining feasibility of subsurface* intakes: geotechnical data, hydrogeology, benthic topography, oceanographic conditions, presence of sensitive habitats,* presence of sensitive species, energy use; construction impacts, impact on recreational resources, freshwater aquifers, local water supply, and existing water users; desalinated* water conveyance, existing infrastructure, co-location with sources of dilution water, design constraints (engineering, constructability, environmental),	Construction impacts will be considered by the regional water board when determining the best available technology feasible. The phrase “impacts on recreational resources” was not added because this is not an environmental issue and it is not an appropriate factor to consider in the context of minimizing intake and mortality of all forms of marine life. A definition of feasible was added to the proposed Desalination Amendment that includes "the ability of being accomplished in a successful manner within a reasonable period of time." Please see response to comment 6.12.

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	the ability of being accomplished in a successful manner within a reasonable period of time, and project life cycle cost. Project life cycle cost shall be determined by evaluating the total cost of planning, design, land acquisition, construction, operations, maintenance, mitigation, equipment replacement and disposal over the lifetime of the facility, in addition to the cost of decommissioning the facility. In addition, the regional water board may evaluate other site- and facility-specific factors."]	
15.34	Amendment Section L.2.d.(1)(a)ii.: [Delete] It is not practical to expect the operator would be able to effectively manage the differing water quality and operational conditions associated with two fundamentally different intakes feeding one treatment facility.	Disagree. Please see response to comment 15.3.
15.35	Amendment Section L.2.d.(1)(c)ii.: Poseidon supports inclusion of feasible measures in the Desalination Amendments to reduce entrainment. However, we are concerned that there currently is insufficient operating data to determine the efficacy of the proposed screen sizes. The Carlsbad Desalination Project is an important water supply facility. As such, Poseidon and the Water Authority are making a significant investment in the design and construction of the facility to ensure the plant can operate at full capacity during adverse conditions, such as a severe red tide event. The use of unproven screen technology could inhibit the flow of water and increase the maintenance requirements of the desalination facility, thereby compromising the reliability and efficiency of the plant. Further consideration should be given to the screen size recommendation to ensure the suitability of this technology for the intended use.	We appreciate the support of the inclusion of feasible measures to reduce entrainment in the proposed Desalination Amendment. We disagree that 1) there is insufficient data to determine the efficacy of a 1.0 mm screen and 2) that 1.0 mm screens are “unproven technology.” A screen with a 1.0 mm slot size is feasible for all new or expanded desalination facilities in California. Please see response to comment 15.3 and section 8.3.1.2.3 of the Staff Report with SED for more information.
15.36	Amendment Section L.2.d.(1)(c)iii.: Entrainment sampling needs to be in the source water body of the intake. Whereas, the pilot study would need to be conducted in a laboratory setting to obtain adequate quantities of fish eggs and larval fish to evaluate the low-impact entrainment mortality. Poseidon is working with Hubbs SeaWorld Research Institute to evaluate larval fish and fish egg survival associated with the low-impact pump operation. The research facility is well equipped to provide sufficient quantities of larval fish and fish eggs, holding tanks and supervision of	The purpose of section III.L.2.d.(1)(c)iii is to describe the requirements for comparing the proposed alternative intake technology to intake screens with 1.0 mm openings. Ideally an owner or operator would construct an intake with a 1.0 mm screen opening and another intake with the alternative intake technology at a pilot facility and conduct the entrainment measurements side-by-side. However, there may be instances where the intake technologies can be effectively compared in a laboratory setting. The language, “at the pilot study location” was

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	appropriately trained marine scientists to oversee the pilot study. [Revise as follows: "The owner or operator must conduct a pilot study to demonstrate the effectiveness of the alternative method, and use an Empirical Transport Model* (ETM)/ Area of Production Forgone* (APF) approach* to estimate entrainment within the source water body*.-- at the pilot study location--"]	deleted to permit studies done in a laboratory setting. It is important that whether the study is done at a pilot location or in a laboratory setting, that it provides a reasonable approximation of how the alterative intake technology would perform in the environment where it will be used. There are environmental factors such as corrosion that may not be detected in a laboratory setting that can influence the ability of an alternative intake technology to prevent entrainment. Furthermore, it is important that the study is well designed and generates enough data to compare the screens to the alternative screening technology, particularly because the study duration was shortened to at least 12 months (See Appendix E of the Staff Report with SED). There needs to be a high enough abundance of organisms in the water to detect differences between the 1.0 mm screen and the alternative technology. The experiment should also look at a size range from 25 or 30 mm and smaller as well as a diverse range of species since the probability of entrainment is directly related to size and species. Replication of the tests is also critical to ensure the numbers are reproducible and consistent among the tests and can reduce the variability enabling the detection of statistical differences. Additionally, standard quality assurance and quality control protocols should be followed (e.g. controls, replicates). If there are not enough data to compare the intake technologies, the regional water boards may require an owner or operator to extend the study past 12 months. In order to ensure a study is well designed, an owner or operator must submit the proposed study design to the regional water board in consultation with the State Water Board prior to the study commencing. The Water Boards may require an owner or operator to hire a third party contractor to review and approve the study. The oversight of the study design and resulting data will prevent important decisions from being made based on inadequate or inaccurate study designs and the resulting data.
15.37	Amendment Section L.2.d.(1)(c)iii.: The Desalination Amendments should permit the use of 12 months of entrainment data which conforms to the guidelines for entrainment impact assessment included in Appendix E of the Staff Report. (Guidance Documents for Assessing Entrainment Including Additional Information on the Following Loss Rate	Please see response to comment 15.5.

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	Models: Fecundity Hindcasting (FH), Adult Equivalent Loss (AEL) and Area of Production Forgone using an Empirical Transport Model (ETM/APF)). These guidelines, written by members of the SWRCB's Expert Review Panel on Intake Impacts and Mitigation, state that entrainment sampling that is done for 12 months is a reasonable period of sampling because the entrainment estimated by the ETM method is "much less subject to inter-annual variation." (Id. at 97.) Therefore, a 12 month study would be adequate to account for variation in oceanography conditions and larval abundance and diversity such that the abundance estimates are reasonably accurate. All of the intake assessments in California, except one, have been conducted for a period of one year. A 36 month study would be excessive and would result in the idling of the Carlsbad project for two to three years. [Revise as follows: "The entrainment study period shall be at least 12 --36-- consecutive months and sampling shall be designed to account for variation in oceanographic conditions and larval abundance and diversity such that abundance estimates are reasonably accurate."]	
15.38	Amendment Section L.2.d.(2)(a): [Delete] The staff recommendation with respect to brine discharge technology is to amend the Ocean Plan to establish state wide requirements for use of the most protective brine discharge method after a facility specific evaluation. (See Section 8.6.5 Staff Recommendation, page 93). Given the technology neutral approach recommended by staff, it is inappropriate to declare commingling brine with wastewater as the "preferred technology" in the Desalination Amendments.	Please see response to comment 15.6. The proposed Desalination Amendment is not technology-neutral. Commingling brine with wastewater is the preferred method of brine discharge when available and feasible.
15.39	Amendment Section L.2.d.(2)(b):[Delete] See previous comment. Additionally, the staff report acknowledges that multiport diffusers "may not be the most environmentally protective technology." (See Option 4, page 91 of Staff Report). Given the technology neutral approach recommended by staff, it is inappropriate to declare multiport diffusers as "the next best method for disposing brine" in the Desalination Amendments.	Please see response to comment 15.6. The proposed Desalination Amendment is not recommending a technology-neutral approach. Where commingling brine with wastewater is not an available or feasible option, multiport diffusers are the next best method of discharging brine. The commenter has taken the language: "multiport diffusers 'may not be the most environmentally protective technology.'" out of context. The original sentence read "However, Option 3 may not be the most environmentally protective in all cases and should not be the only brine disposal method available." In section 8.6.4 of the Staff

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		Report with SED, Option 3 was to amend the Ocean Plan to establish statewide requirements for use of multiport diffusers as the only brine discharge method. Option 3 was rejected because while multiport diffusers may be the environmentally preferred option that is available and feasible in many cases, is will not be the environmentally preferred option in all cases. Commingling brine with wastewater is the environmentally preferred method of brine discharge and Option 3 would prevent an owner or operator from using this discharge method. Option 3 was also rejected because it would prohibit the use of new brine discharge technologies that have been demonstrated to be equally protective as discharging through multiport diffusers. To add further clarity, the following sentence was changed to read "However, Option 3 may not be the most environmentally protective [cut: in all cases} [add]: if wastewater is available for commingling and should not be the only brine disposal method available."
15.40	Amendment Section L.2.d.(2)(c):This paragraph accurately reflects the recommendation in the Staff Report. (See Option 5, page 91-92 and Section 8.6.5 Staff Recommendation, page 93 of the Staff Report).	Chapter III.L.2.d.(2)(c) of the proposed Desalination Amendment released for public comment was deleted. Since commingling is the preferred discharge technology, and discharging through multiport diffusers is the next best method, the factors in chapter III.L.2.d.(2)(c) only need to be evaluated for alternative brine discharge technologies. Please see responses to comments 15.6, 15.7, and 15.39.
15.41	Amendment Section L.2.d.(2)(d): Under the technology neutral approach recommended by staff, wastewater dilution and multiport diffusers should not be excused from having to demonstrate that it is the technology that best reduces the effects of the discharge of brine on marine life. [Revise as follows: "Brine* disposal technologies --other than-- such as wastewater dilution and multiport diffusers,* and flow augmentation,*..."]	Disagree. As mentioned in response to comments 15.6, 15.7, 15.39, and Section 8.6 of the Staff Report with SED, commingling brine with wastewater is the best method for minimizing intake and mortality of marine life followed by discharging brine through multiport diffusers.
15.42	Amendment Section L.2.d.(2)(d): In order to demonstrate a comparable level of environmental protection, the draft Desalination Amendments require that proponents of the alternative discharge technology provide a comparison of the marine life impacts of the proposed technology to that	Disagree. As stated in response to comment 15.6, there are only two reports estimating shearing-related mortality from multiport diffusers and one of the reports is unreliable for the reasons stated in response to comment 15.20. More studies should be done before the State Water

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	of the "preferred technology" identified by staff. The current draft Desalination Amendments lack guidance on the discharge technology compliance standard to be met under the Desalination Amendments, but there is substantial evidence in the Staff Report to support such an evaluation. Poseidon recommends that the guidance found on page 73 of the Staff Report be incorporated in the Desalination Amendments: "Until additional data is available, we assume that larvae in 23 percent of the total entrained volume of diffuser dilution water are killed by exposure to lethal turbulence." This assumption is based on a finding in the State Board Expert Panel Report (Foster et al 2013) that modeled shearing stress form multiport diffusers and reported that larvae in 23 to 38 percent of the total entrained volume of dilution water may be exposed to lethal turbulence. [Revise as follows: "…may be used if an owner or operator can demonstrate to the regional water board that the technology provides a comparable level of protection. For comparison purposes, the regional water board shall assume that larvae in 23 percent of the total entrained volume of diffuser dilution water are killed by exposure to lethal turbulence until and unless additional data is available. The owner or operator must evaluate all of the individual and cumulative effects of the proposed alternative discharge method on marine life mortality, including (where applicable); intake-related entrainment, osmotic stress, turbulence that occurs during water conveyance and mixing, and shearing stress at the point of discharge. When determining the level of protection provided by a brine* disposal technology or combination of technologies, for purposes of the comparison."]	Board sets a numeric performance standard for multiport diffusers. Also, please see response to comment 13.121.
15.43	Amendment Section L.2.d.(2)(d)ii.: Clarify intent and make consistent with iii below. [Revise as follows: "Estimate --degradation of-- marine life mortality from elevated salinity within the brine mixing zone,* including osmotic stresses, the size of impacted area, and the duration that marine life are exposed to the toxic conditions. Consideration--s-- shall be given to the most sensitive species located in the brine mixing zone,* and community structure and function."]	Disagree. The proposed change would not be adequately protective of marine life. Mortality is an important endpoint to measure, but it is also important to identify preliminary signs of a reduction in fitness that is the result of exposure to elevated salinity before mortality occurs.

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15.44	Amendment Section L.2.d.(2)(e): The purpose of this deletion is to conform to the technology neutral staff recommendation. Some of the requirements below are, as noted, applicable only to flow augmentation, others should be applied equally to all brine discharge technologies; otherwise, the Desalination Amendments are not technology neutral. [Revise as follows: "An owner or operator proposing --to use flow augmentation* as an alternative-- brine* discharge technology must: i. For facilities proposing to use flow augmentation, --U-- use low turbulence intakes (e.g., screw centrifugal pumps or axial flow pumps) and conveyance pipes."]	The proposed Desalination Amendment does not take a technology neutral approach. Please see response to comments 15.6, 15.7, and 15.39. Chapter III.L.2.d(2)(e) specifically applies to desalination facilities proposing to use flow augmentation systems and not any other alternative brine disposal technologies. At this time, flow augmentation is the only alternative brine disposal option being proposed. It is the only alternative brine disposal technology with any information regarding the mechanics of how the systems are proposed to work. The purpose of chapter III.L.2.d(2)(e) is to ensure that flow augmentation systems are best designed to minimize intake and mortality of all forms of marine life and only applies to facilities proposing to use flow augmentation because the provisions in the chapter may not be appropriate or applicable to other discharge technologies. As technological innovations occur in this field and new disposal technologies emerge, the Ocean Plan may be amended to include additional protective provisions for the alternative brine disposal technologies.
15.45	Amendment Section L.2.d.(2)(e)iii.: Changes are to conform to technology neutral staff recommendation and clarify the type of empirical study the operator is to prepare and submit to demonstrate the marine life mortality of the brine disposal technology. [Revise as follows: "Within three years of beginning operation, submit to the regional water board an empirical study that evaluates intake and mortality of marine life associated with --flow augmentation-- the brine discharge technology. The study must evaluate impacts caused by augmented intake volume, intake and pump technology, water conveyance, waste brine* mixing, and effluent discharge. The study shall use any acceptable approach for evaluating mortality that occurs due to shearing stress resulting from the facility's discharge, including any incremental increase in mortality resulting from a commingled discharge. Unless demonstrated otherwise, organisms entrained by --flow augmentation*-- brine discharge technology are assumed to have a mortality rate of 100 percent."]	The proposed Desalination Amendment does not take a technology neutral approach. Please see responses to comments 15.6, 15.7, and 15.39.
15.46	Amendment Section L.2.d.(2)(e)v.: Question for staff - this is the section	The intent of chapter III.L.2.d.(2)(d)(formerly III.L.2.d.(2)(e)) is to

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	regarding consideration of intake technology, which is applicable to all facilities. Why is this needed here?	reiterate that all intakes for desalination facilities, whether they are for the desalination processing water or brine dilution, must follow the intake provisions in the proposed Desalination Amendment. This means subsurface intakes for brine dilution water must be considered and used if feasible before a screened surface intake can be used. Proponents of flow augmentation systems have stated that most or all of the organisms being withdrawn into the facility will survive the system and make it out alive after the effluent is discharged into the ocean. However, Water Code section 13142.5(b) requires that intake and mortality of all forms of marine life be minimized, which means it is necessary to install a screen to reduce the intake and mortality of organisms. Fish trapped in the conveyance water of the flow augmentation systems will experience stress during water conveyance and osmotic shock or death when the dilution water is mixed with brine and so it is important to minimize or eliminate these impacts by implementing subsurface intakes when feasible or screened surface intakes.
15.47	Amendment Section L.2.e.(1)(a): The draft Desalination Amendments require that project owners and operators that wish to operate surface intakes conduct an entrainment study of at least 36 consecutive months. A 36 month entrainment study would be excessive and would result in the idling of the Carlsbad project for 30 months. The Desalination Amendments should permit the use of 12 months of entrainment data which conforms to the guidelines for entrainment impact assessment included in Appendix E of the staff report. (Guidance Documents for Assessing Entrainment Including Additional Information on the Following Loss Rate Models: Fecundity Hindcasting (FH), Adult Equivalent Loss (AEL) and Area of Production Forgone using an Empirical Transport Model (ETM/APF)). These guidelines, written by members of the SWRCB's Expert Review Panel, state that entrainment sampling that is done for 12 months is a reasonable period of sampling because the entrainment estimated by the ETM method is "much less subject to inter-annual variation." (Id. at 97.) Therefore, a 12 month study would be adequate to account for variation in oceanography conditions and larval abundance and diversity such that the abundance estimates are reasonably accurate.	Please see response to comment 15.5.

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15.48	Amendment Section L.2.e.(1)(a): As noted on page 70 of the Staff Report, the Expert Review Panel III recommended the ETM/APF method that relies on the 335 micron mesh net to calculate mitigation levels because: - This method has historically been used in California to determine mitigation for entrainment at power plants and is widely accepted in the scientific community, - Compensates for all entrained species and not just commercially valuable fish taxa, and; - Utilizes representative species (e.g. fish larvae sampled using a 335 micron mesh net) that can be used as proxy species for rare, threatened, or endangered species, which may be challenging to acquire adequate data for. The creation of habitat benefits all species in the food web regardless of whether or not they were assessed in the ETM/APF model. [Revise as follows: "Samples must be collected using a mesh size no larger than 335 microns and individuals collected shall be identified to the lowest taxonomical level practicable. The ETM/APF analysis* shall be representative of the entrained species collected using the 335 micron net.--Additional samples shall also be collected using a 200 micron mesh to provide a broader characterization of other entrained organisms.--"]	Agree. The proposed language requiring assessment of and mitigation for organisms as small as 200 microns was removed from the proposed Desalination Amendment. As noted in section 8.5.1.1 of the Staff Report with SED, Foster et al. (2013) recommended the ETM/APF method to calculate desalination facilities' mitigation levels because ETM/APF: • This method has historically been used in California to determine mitigation for entrainment at power plants and is widely accepted in the scientific community; • Compensates for all entrained species and not just commercially valuable fish taxa; • Utilizes representative species (e.g. fish larvae sampled using a 335 micron mesh net) that can be used as proxy species for rare, threatened, or endangered species, which may be challenging to acquire adequate data for. The creation or restoration of habitat benefits all species in the food web regardless of whether or not they were assessed in the ETM/APF model Sampling for ETM/APF studies is typically done using a 335 micron mesh screen because it is challenging to identify most marine eggs and larvae down to genus and species when they are smaller than approximately 300 microns. The requirement to requiring assess and mitigate for organisms as small as 200 microns was removed from the proposed Desalination Amendment because the estimates from the ETM/APF model are based on a limited number of target species and then used as the best estimate for all entrainable species. The assumption that the target species are reasonable representatives of the un-sampled non-target species, including species smaller than 335 microns.
15.49	Amendment Section L.2.e.(1)(a): The Desalination Amendments require that the mitigation acreage calculation be based on a 90 percent confidence level. This proposal has not been reviewed by the ERP. The CCC found that an 80 percent confidence interval would be acceptable	The proposed deletion of the 90 percent confidence level will not be accepted for reasons stated in response to comment 21.90. Section 8.5.4 of the Staff Report with SED provides additional information regarding adding certainty to mitigation projects. This section includes

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	under the site-specific conditions in Carlsbad. The uniform application of a 90 percent confidence interval does not take into consideration the varying levels of uncertainty associated with ETM/APF estimates, and therefore is overly conservative as applied to Carlsbad. Staff's proposal for a 90 percent confidence interval should be submitted to the ERP for peer review. [Revise as follows: "The APF* shall be calculated using a --90 percent-- confidence level [consistent with the procedures established by the Intake Expert Review Panel"].	details about why it is appropriate and important to use either a mitigation ratio or confidence interval to ensure all impacts are fully mitigated.
15.50	Amendment Section L.2.e.(1)(a): Consistent with Section L2d(1)(c)iii, the Desalination Amendments should allow the use of existing data that meets the guidelines in Appendix E. [Add: "The regional water boards shall permit the use of existing entrainment data from studies conducted in conformance with the Guidelines for Entrainment Impact Assessment (Appendix E) to meet this requirement."]	Chapter III.L.2.e.(1)(a) includes language that allows the regional water boards to accept existing data at their discretion. The language "The regional water boards shall permit the use of existing entrainment data from studies conducted in conformance with the Guidelines for Entrainment Impact Assessment (Appendix E) to meet this requirement" proposed by Poseidon is not necessary because the language already says, "At their discretion, the regional water boards may permit the use of existing entrainment data from the facility to meet this requirement." The regional water board will retain the right to accept or reject the data as they see fit because there may be instances where the data are outdated or there are data gaps that need to be filled.
15.51	Amendment Section L.2.e.(1)(b): [Delete] Standard practice under the Ocean Plan is that dischargers do not mitigate for impacts within the ZID. Why is staff recommending desalination facilities mitigate for impacts within the prescribed brine mixing zone?	Please see response to comment 15.11. New or expanded desalination facilities will be regulated under Water Code section 13142.5(b) which requires mitigation for intake and mortality of all forms of marine life. There will be discharge-related marine life mortality and this section of the water code requires mitigation for those impacts.
15.52	Amendment Section L.2.e.(3)(b)ii.: The Desalination Amendments require 1:1 mitigation of all impacts, regardless of the relative productivity of the habitat impacted to that of the mitigation habitat provided. Consistent with past APF siting and sizing determinations, the Desalination Amendments should provide the regional water board sufficient flexibility to adjust the mitigation acreage as needed based on the expected productivity of the type of mitigation to be provided compared to the actual productivity within the facility's source water body.	Please see responses to comments 15.9 and 15.10.

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	For example, the CCC determined that 64 acres were needed to mitigate for the open ocean species entrained by the Carlsbad project. However, in recognition of the impracticality of creating 64 acres of offshore open water habitat, and recognizing the relatively greater productivity rates per acre of estuarine wetlands habitats, the CCC allowed the offshore impacts to be "converted" to estuarine mitigation areas. Based on a recommendation from a member of the State Water Board's Expert Review Panel on Intake Impacts and Mitigation ("ERP"), Dr. Peter Raimondi, the CCC determined that successfully restored wetland habitat would be ten times more productive than a similar area of nearshore ocean waters. Based on this determination, for every ten acres of nearshore impacted by the project, Poseidon was allowed to mitigate by creating or restoring one acre of estuarine habitat. Although this approach would result in "out of kind" mitigation, the CCC found it would produce overall better mitigation because (1) it is not practical to create nearshore open water habitat; and (2) that habitat type is already well-represented along the shoreline. The CCC found that in this instance, creating or restoring coastal estuarine habitat types would support a long-recognized need to increase the amount of those habitat types in Southern California. [Revise as follows: "The owner or operator shall demonstrate that the project fully mitigates for intake-related marine life mortality by including acreage that is at least equivalent in size to the APF* calculated in the Marine Life Mortality Report above, unless the regional water board determines that the habitat is of higher productivity than the facility's source water body* (e.g., open ocean vs. estuarine mitigation habitat) in which case, the regional water board shall adjust the quantity of the mitigation acreage such that the productivity of the mitigation habitat provided matches that of the APF times the productivity of the source water body.*;" and Amendment Section L.2.e.(3)(b)iii. to: "The owner or operator shall demonstrate that the project also fully mitigates for the discharge-related marine life mortality projected in the Marine Life Mortality Report above. If the regional water board determines that the mitigation habitat is of higher productivity than the facility's source water body (e.g., open ocean vs. estuarine mitigation habitat), the regional water board shall adjust the quantity of mitigation acreage required such	

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	that the productivity of the mitigation habitat provided fully mitigates for the discharge-related marine life mortality projected in the marine life mortality report. For each acre of discharge-related disturbance as determined in the Marine Life Mortality Report, an owner or operator shall restore one acre of habitat unless the regional water board determines that a mitigation ratio less--greater-- than 1:1 is warranted due to the higher productivity of the mitigation site compared to that of the disturbed area--needed.--"]	
15.53	Amendment Section L.2.e.(3)(b)ii.: The wetlands project for the Carlsbad project has been under development for seven years and is in the final stages of approval (EIS and CDP scheduled for approval late this year). Construction of the mitigation project is expected to begin late next year. The Desalination Amendments requirement to locate the mitigation within the "source water body" would result in Poseidon and the Water Authority having to abandon their current mitigation project and start over, even though it has already been determined that there are no suitable mitigation sites within the source water body. [Revise as follows: "The owner or operator shall attempt to locate the mitigation project within the facility's source water body,* and shall do modeling to evaluate the areal extent to which --of-- the mitigation project's production area* --to confirm that it-- overlaps the facility's source water body.*"]	Please see responses to comments 15.8, 15.9, and 15.10.
15.54	Amendment Section L.2.e.(3)(b)ii.: See comment [15.47]. See also Expert Review Panel Report on Intake Impacts and Mitigation. Specifically page 1 of Appendix 1 which states in part: "The key assumption of APF that makes it useful...it should reflect the impacts to measured and unmeasured resources (e.g., to invertebrate larvae). This is because its calculation assumes that those species assessed (those species captured on the 335 micron mesh) are representative of those not assessed (those species smaller than 335 micron). Practically, this means that should the amount of habitat calculated using APF be created or substantially restored, the habitat will support species that were assessed as well as those that were not assessed in the ETM. Importantly, that amount of habitat will also compensate for impacts to	The proposed Desalination Amendment language was revised to reflect these changes.

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	species only indirectly affected. This means that should the mitigation take place according to APF estimates there will be no net impact." [Revise as follows: "Impacts on the mitigation project due to entrainment by the facility must be offset by adding compensatory acreage to the mitigation project. --The regional water boards may require additional habitat be mitigated to compensate for the annual entrainment of organisms between 200 and 335 microns.--"]	
15.55	Amendment Section L.2.e.(3)(b)iv.: Changes are intended to conform with Desalination Amendments section 2.e.(1).(c) which states the regional water board may determine that the construction-related disturbance does not require mitigation because the disturbance is temporary and the habitat is naturally restored. [Revise as follows: "The owner or operator shall demonstrate that the project also fully mitigates for any permanent --the-- construction-related marine life mortality identified in the Marine Life Mortality Report above. For each acre of construction-related disturbance, an owner or operator shall restore one acre of habitat unless the regional water board determines that a mitigation ratio less --greater-- than 1:1 is warranted due to the higher productivity of the mitigation site compared to that of the disturbed area --is needed--. The regional water board may determine that the construction related disturbance does not require mitigation because the disturbance is temporary and the habitat is naturally restored."]	Disagree. The proposed additional language is already stated in the Marine Life Mortality Report requirements (chapter III.L.2.e.(1)(c)) and is consequently unnecessary.
15.56	Amendment Section L.2.e.(4)(c): This is an additional reason the Desalination Amendments should not limit mitigation sites to only those sites that overlap with the source water body.	Please see response to comment 15.8.
15.57	Amendment Section L.3.b.(1): The Scripps Institution of Oceanography ("SIO") maintains a 98 year historical database of Pacific Ocean salinity that serves as the baseline background salinity for the Carlsbad project. SIO's salinity data base, and most other salinity data bases, measure salinity as total dissolved salts, not dissolved solids ("TDS"). This is accomplished using electrical conductivity and reported as the Practical	Please see response 15.15, 15.17, and 13.130.

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	Salinity per PSS-78. This approach is viewed as the most accurate measure of Pacific Ocean salinity because it eliminates the uncharged (neutral) dissolved solids (such as dissolved organic matter) in seawater that are not related to the salinity. See definition of salinity for more additional discussion on this point. [Revise as follows: "Discharges shall not exceed a daily maximum of 2.0 parts per thousand above natural background salinity* to be measured as using electrical conductivity and reported as the Practical Salinity per PSS-78 --total dissolved solids-- (mg/L)..."]	
15.58	Amendment Section L.3.b.(1): The draft Desalination Amendments propose to limit the salinity increase to a maximum of 2 ppt over natural background, at a fixed distance of 100 meters from the point of discharge. The distance of 100 meters appears to be based on the multiport diffuser. (Staff Report at 98). The Staff Report states that facilities using flow augmentation should also be able to meet 2 ppt above ambient with 100 meters. (Staff Report at 99). However, this is not correct. Depending on ambient mixing conditions (tides, wind, waves, current, temperature) in the receiving water, the Carlsbad project requires anywhere from 200 meters under good mixing conditions to 500 meters under poor mixing conditions to ensure strict compliance with the proposed 2 ppt standard. The definition for Brine Mixing Zone states that the Desalination Amendments include a mechanism for establishing a larger brine mixing zone: "the brine mixing zone shall not exceed 100 meters...unless otherwise authorized in accordance with this plan." However, the Desalination Amendments currently do not include a process for establishing a larger brine mixing zone. This appears to be an oversight. Failure to include a process for establishing a larger brine mixing zone in the Desalination Amendments would limit the brine discharge options available to the Carlsbad project to the environmentally inferior multiport diffuser. [Revise as follows: "...measured no further than 100 meters (328 ft) horizontally from the discharge or the facility specific brine mixing zone authorized in accordance with this plan. There is no vertical limit to this zone.;" and change Amendment Section L.3.b.(2) to:	Please see responses to comments 15.14 and 6.11 regarding the 100 meter requirement for the brine mixing zone. This requirement is consistent with the project goal to provide a consistent statewide approach for protecting water quality and related beneficial uses of ocean waters and controlling adverse effects of desalination discharges by minimizing the area of impact. The 100 meter requirement is a technology-driven standard. Commingling brine with wastewater and discharging brine through multiport diffusers are both technologies that can reduce or eliminate toxic effects of salinity within a relatively small area (100 m). Alternative discharge technologies that are equally protective as commingling with wastewater of discharging through diffusers should also be designed to minimize the area where salinity exceeds 2 ppt above natural background salinity or the alternative receiving after limitation (other than 2 ppt) within 100 meters from the outfall. The alternative receiving water limitation may exceed 2 ppt above natural salinity if an owner or operator can demonstrate that their brine effluent does not need to be diluted as much to be adequately protective of beneficial uses. Chapter III.L.3.c. was revised to clarify that the alternative receiving water limitation for salinity must be met no further than 100 meters from the discharge: *"An owner or operator may submit a proposal to the regional water board for approval of an alternative (other than 2 ppt) salinity* receiving water limitation to be met no further than 100 meters horizontally from the discharge. There is no vertical*

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	(a) The fixed distance referenced in the initial dilution* definition shall be no more than 100 meters, or the facility-specific brine mixing authorized in accordance with this plan (328 feet). (b) In addition, the owner or operator shall develop a dilution factor (Dm) based on the distance of 100 meters, or the facility-specific brine mixing authorized in accordance with this plan (328 feet) or initial*dilution, whichever is smaller."]	*limit to this zone."*
15.59	Amendment Section L.3.c.(1)(a): The Desalination Amendments require that an owner or operator shall conduct a 36-month baseline biological conditions survey at the discharge location and at reference locations prior to commencing brine discharge. The discharge from the Carlsbad project will start in the 2nd quarter of 2015. This means that the facility-specific alternative receiving water limitation is currently not available to the Carlsbad project. In addition, the justification for a 36-month survey period prior to discharge is not clear. Comprehensive testing over a shorter period supported by existing biological data from nearby similar habitat should be sufficient for determining the biological characteristics of the site. [Revise as follows: "Establish baseline biological conditions at the discharge location and at reference locations --over a 36-month period-- prior to commencing brine* discharge. The biologic surveys must characterize the ecologic composition of habitat and marine life using measures established by the regional water board. At their discretion, the regional water boards may permit the use of existing data from the facility to meet this requirement."]	Please see response to comment 15.5.
15.60	Amendment Section L.3.c.(3): The procedure set forth in the Desalination Amendments for establishing facility-specific receiving water limits uses a completely different, and more restrictive, standard of salinity than the standard that is used as a guideline throughout the entire draft Desalination Amendments. Throughout the draft Desalination Amendments, and indeed, throughout Roberts et al. 2012 (upon which much of the draft Desalination Amendments is based), it is stated that red	Please see response to comment 15.12.

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	abalone are the most sensitive species tested, with a LOEL (Lowest Observable Effect Level) of 35.6 ppt - or approximately 2.1 ppt above ambient (in southern California waters). Thus, it is argued, a maximum regulatory salinity increase of 2 ppt is reasonable because it protects the most sensitive species. However, the language in the draft Desalination Amendments uses a completely different standard, which is NOEL (No Observable Effect Level). The NOEL value, according to Philips et al. (2012) is 34.9 ppt, or approximately only 1.4 ppt above ambient (in southern California waters). Consequently, an operator that wishes to establish a site-specific receiving water limit under the Desalination Amendments is being held to a more restrictive salinity standard. Poseidon requests that the Desalination Amendments be amended such that the facility-specific alternative receiving water standard be based on the same standard that will be used to establish the statewide receiving water limit of 2 ppt - the lowest observed effect level (LOEL). [Revise as follows: "The facility-specific alternative receiving water limitation shall be based on the lowest --no-- observed effect level (--N--LOEL) for the most sensitive species and toxicity endpoint as determined in the chronic toxicity* studies. The regional water board in consultation with State Water Board staff has discretion to approve the proposed facility-specific alternative receiving water limitation for salinity.*"]	
15.61	Appendix I [of the proposed Desalination Amendment]; "Brine Mixing Zone" definition: The draft Desalination Amendments propose to limit the salinity increase to a maximum of 2 ppt over natural background, at a fixed distance of 100 meters from the point of discharge. The distance of 100 meters appears to be based on the multiport diffuser. (Staff Report at 98). The Staff Report incorrectly states that facilities using flow augmentation should also be able to meet 2 ppt above ambient with 100 meters. (Staff Report at 99). Depending on ambient mixing conditions (tides, wind, waves, current, temperature) in the receiving water, the Carlsbad project require greater than 100 meters to ensure strict compliance with the proposed 2 ppt standard. The definition for Brine Mixing Zone alludes to a mechanism for establishing a larger brine mixing zone: "the brine mixing zone shall not exceed 100 meters...unless	Please see responses to comments 15.14, 15.58, and 6.11.

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	otherwise authorized in accordance with this plan." However, the Desalination Amendments currently do not include a process for establishing a larger brine mixing zone. This appears to be an oversight. Failure to include a process for establishing a larger brine mixing zone in the Desalination Amendments would limit the brine discharge options available to the Carlsbad project to the environmentally inferior multiport diffuser.	
15.62	Appendix I [of the proposed Desalination Amendment]; "Brine Mixing Zone" definition: Project operators would not be able to comply with the acute toxicity requirement as drafted. The proposed language tracks the acute toxicity allowance in the Ocean Plan. [Revise as follows: "BRINE MIXING ZONE is the area where the salinity* exceeds 2.0 parts per thousand above natural background salinity.* The brine mixing zone shall not exceed 100 meters (328 feet) laterally from the points of discharge and throughout the water column unless otherwise authorized by the regional water board in accordance with this plan. The brine mixing zone is an allocated impact zone where water quality criteria can be exceeded as long as the mixing zone for the acute toxicity objective shall be ten percent (10%) of the distance from the edge of the discharge structure to the outer edge of the brine mixing zone. There is no vertical limit on this zone --acutely toxic conditions are prevented and the designated use of the water is not impaired as a result of the brine mixing zone.-- The brine mixing zone is determined through a mixing zone study and the use of applicable water quality models that have been approved by the regional water boards in consultation with State Water Board staff."]	Please see responses to comments 15.14, 15.58, and 6.11.
15.63	Appendix I [of the proposed Desalination Amendment]; "Brine Mixing Zone" definition: One of the primary purposes of the Desalination Amendments is to provide implementation procedures for conducting Water Code section 13142.5(b) "evaluations of the best available site, design, technology and mitigation measures feasible to minimize the intake and mortality of all forms of marine life at new or expanded desalination facilities." Yet the draft Desalination Amendments fails to provide the regional water boards with direction regarding one of the	Please see response to comment 6.12.

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	more contentious aspects of the 13142.5(b) evaluation - the scope of the feasibility assessment. The 4th District Court of Appeal effectively resolved this debate in 2012 when it assessed whether the San Diego Regional Water Board complied with Water Code section 13142.5(b) in issuing Order R9-2009-0038 for the Carlsbad Desalination Project. (Surfrider Found. V. Cal. Reg'l Water Quality Control Bd. (2012) 211 Cal. App. 4th 557, 581). The court determined that the Regional Board fully complied with section 13142.5(b) in relying on the definition of "feasible" under CEQA. (Id. at pp. 582-583). Under CEQA, "feasible" means "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors." (Pub. Res. Code, § 21061). The Coastal Act relies on the same definition. (Pub. Res. Code, § 30108 (Coastal Act)). It is critical that the regional water boards have clear direction on the scope of the feasibility assessment. The final version of the Desalination Amendments include the definition of feasible relied upon by CEQA lead agencies, the California Coastal Commission (the "CCC") and the Court of Appeal. [Add: "FEASIBLE shall mean capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, technological factors."]	
15.64	Appendix I [of the proposed Desalination Amendment]: Receiving Water Limit for Salinity. The Desalination Amendments provide that brine discharges from desalination facilities shall not exceed 2.0 parts per thousand above the natural background salinity. Natural background salinity is defined as the 20-year average salinity at the project location. The database that makes up the natural background salinity for the Carlsbad Project shows a mean salinity of of 33.5 ppt, a minimum salinity of 27.4 ppt, and a maximum salinity of 34.2 ppt over the last 20 years. Sixty-four percent of daily salinity measurements over the last 20 years are above the 33.5 ppt average. This means that the Carlsbad facility would have to operate at less than a 2 ppt increase over the ambient salinity 64 percent of the time. This operating requirement would severely impact plant reliability. To address this problem, Desalination Amendments should be revised such that the natural background salinity	Please see responses to comments 15.17 and 13.130.

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	shall be determined by averaging 20 years of historical salinity* data at a location unless the actual salinity measured at the facility intake is greater than the 20 year average salinity, in which case, the natural background salinity shall be the lower of: (1) the actual salinity measured at the intake, or (2) the maximum salinity level measured in the 20 years of historical salinity data (i.e., 33.5 to 34.2 ppt in Carlsbad). [Revise as follows: NATURAL BACKGROUND SALINITY is the salinity* at a location that results from naturally occurring processes and is without apparent human influence. Natural background salinity shall be determined by averaging 20 years of historical salinity* data at a location unless the actual salinity measured at the facility intake is greater than the 20 year average salinity, in which case, the natural background salinity shall be the lower of: (1) the actual salinity measured at the intake, or (2) the maximum salinity level measured in the 20 years of historical salinity data. When historical data are not available, natural background salinity shall be determined by measuring salinity* at depth of proposed discharge for three years, on a weekly basis prior to a desalination facility* discharging brine,* and the average salinity* shall be used to determine natural background salinity unless the actual salinity measured at the facility intake is greater than the average salinity, in which case, the natural background salinity shall be the lower of: (1) the actual salinity measured at the intake, or (2) the maximum salinity level measured in the salinity data. Facilities shall establish a reference location with similar natural background salinity to be used for comparison in ongoing monitoring of brine* discharges."]	
15.65	Appendix I [of the proposed Desalination Amendment], "Salinity" definition: Depending on the analytical method used to establish the historical salinity data for a particular desalination facility, the definition of Salinity is potentially at odds with the definition of Natural Background Salinity. This is because the definition for Natural Background Salinity seeks to establish a long-term background value, and most of the data collected in the past that was collected using electrical conductivity and reported as the Practical Salinity per PSS-78. The definition of Salinity, on the other hand, provides that for purposes of determining compliance with the maximum 2 ppt increase over the natural background salinity at	Please see response to comment 15.15

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	the edge of the brine mixing zone (or facility-specific receiving water limit), "salinity shall be measured as total dissolved solids." As noted in Attachment 6, the Scripps Institution of Oceanography ("SIO") maintains a 98 year historical database of Pacific Ocean salinity that serves as the baseline background salinity for the Carlsbad project. SIO's salinity data base, and most other salinity data bases, measure salinity as total dissolved salts, not dissolved solids ("TDS"). This is accomplished using electrical conductivity and reported as the Practical Salinity per PSS-78. This approach is viewed as the most accurate measure of Pacific Ocean salinity because it eliminates the uncharged (neutral) dissolved solids (such as dissolved organic matter) in seawater that are not related to the salinity. The San Diego Regional Board adopted a similar approach in the order issued for the Carlsbad project. (See Table 5 on page E-8 of Order R9-2006-0065). For the Carlsbad project, the long-term average Natural Background Salinity is 33.5 ppt. The problem with the use of of TDS in the definition of Salinity, is that relative to the historic SIO database measured using electrical conductivity and reported as the Practical Salinity per PSS-78, the TDS measurement is expected to yield a higher reading due to the presence of uncharged (neutral) dissolved solids in seawater that are included in the TDS measurement, but not related to the salinity. To the extent that the TDS measurement is greater than the PSS-78 salinity measurement, and this figure is used to confirm compliance with the 2 ppt increase (or site-specific receiving water limit) over the a historical average of 33.5 measured by the PSS-78 method, then the owner or operator is not receiving the full benefit of the 2ppt increase (or site-specific receiving water limit) by the amount of the difference between the TDS and PSS-78 measurements. In order to reconcile this problem, the measurement of salinity should reflect the same method as that of the historical data base (e.g., PSS-78). [Revise as follows: "SALINITY is a measure of the dissolved salts in a volume of water. For the purposes of this Plan, salinity shall be measured --as total dissolved solids in mg/l-- using electrical conductivity and reported as the Practical Salinity per PSS-78. Other measures of salinity, including absolute salinity as defined per TEOS-10 (in g/kg), salinity as	

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	reflected in total dissolved solids measurements (in mg/L), or the sum of the major anions and cations (chloride, sulfate, bicarbonate, bromide, sodium, magnesium, calcium, and potassium, in mg/L) may also be collected and reported to determine proper correlations with PSS-78 salinity measurements."]	
15.66	Draft Staff Report Pg 45, Section 8.3.1: Subsurface Intakes: The last sentence of the first paragraph of Section 8.3.1 states that subsurface intakes eliminate the need for pretreatment requirements. This is an over generalization. It would be more accurate to say that depending on the location and design of the subsurface intake, pretreatment requirements may be reduced or eliminated. In other locations (e.g., Carlsbad), the quality of the subsurface water may be difficult to treat. See the administrative record that was before the State Board in the Board's consideration of the administrative appeal in Surfrider Foundation v. Cal. Reg 'l Water Quality Control Ed., 211 Cal. App. 4th 557 (2012).	Language has been added to the section 8.3.1 of the Staff Report with SED to clarify that in some cases, pretreatment will be required for water from subsurface intakes.
15.67	Draft Staff Report Pg 45, Section 8.3.1: Subsurface Intakes. The first sentence of the second paragraph of Section 8.3.1 states that surface intakes result in higher operation costs compared to subsurface intakes. This too is an over generalization. It would be more accurate to say that depending on the location and design of the subsurface intake, the operation costs may be reduced or eliminated. In other locations (e.g., Carlsbad), the quality of the subsurface water may be difficult to treat which would increase the operational cost. See the administrative record that was before the State Board in the Board's consideration of the administrative appeal in Surfrider Foundation v. Cal. Reg 'l Water Quality Control Ed., 211 Cal. App. 4th 557 (2012).	Comment noted. This is not a comment on an environmental issue.
15.68	Draft Staff Report Pg 49, Section 8.3.1.2: Intake Screen Mesh Size. Several examples are presented in support of the recommended screen size of 0.5 mm to 1.0 mm. The literature referenced by staff for this purpose is poorly cited, resulting in inaccurate representations in the Staff Report as to screen mesh sizes being used, and misleading facts as to when and how the screens are being used. For example, with respect to the three case studies cited that are operating in the marine environment:	Disagree. Specific operational details of the facility were not left out with the intent to mislead the reader, but merely because it is impractical to include all details from all of the studies. The Staff Report with SED cites all literature references for interested parties to seek out the specific methodologies and details of each study. The first study was included in the "Importance of Screen Slot Size" part of section 8.3.1.2.3 of the Staff Report with SED to illustrate the point that 0.5 mm slot size and fine mesh screens have been used to prevent entrainment. The Tampa Bay

Please note all tables and figures referenced are present at the end of this document

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	1. The first reference is the Big Bend Power Plant in Tampa Bay, FL. The Staff Report states that the power plant intake pipe is equipped with 0.5 mm fine mesh screens. The 0.5 mm screens are only used seasonally between March 15 and October 15 and only in the intake for Units 3 and 4. The intake for Units 1 and 2 is equipped with 9.5 mm screens.	desalination plant receives its source water (50 MGD) from the Big Bend Power Plant heated effluent. (Alden Labs Comment 9.21) The Big Bend cooling water intake system is capable of withdrawing 1.4 billion gallons of water per day through four main intake units, which is where the screens are used. (Alden Labs Comment 9.21) Language was added to section 8.3.1.2.3 of the Staff Report with SED to clarify that the screens are on two of the four intake units and that they are used seasonally in conjunction with a fish return system. (Alden Labs Comment 9.21) Even though the screens are used seasonally during periods of peak larval abundance and only used on two of four units, each unit is capable of withdrawing approximately 350 MGD. The initial purpose of including the information was to provide entrainment reduction data for 0.5 mm screens, but this information also illustrates the point that a small mesh size screen is used regularly at a 350 MGD intake.
15.69	Draft Staff Report Pg 49, Section 8.3.1.2: Intake Screen Mesh Size. 2. The second reference is the Barney Davis Seawater Cooling Station in Corpus Christi, TX. The Staff Report states that 0.5 mm mesh screens successfully reduced impingement mortality at this location. Poseidon contacted a representative from this power plant who stated the power plant installed 0.7 mm screens, however, those screens were replaced with 1.0 x 1.2 mm screens due to the inability to consistently get enough flow through the 0.7 mm screens.	The second reference was also in the “Importance of Screen Slot Size” part of section 8.3.1.2.3 to illustrate the point that 0.5mm slot size and fine mesh screens have been used to prevent entrainment. The information came from the Tetra Tech Inc. 2002 report. The intent of this section of the Staff Report with SED was not to highlight the operational feasibility of screens, but to compare entrainment reduction for screen slot sizes. We added the updated information to the Importance of Screen Slot Size section even though it is unrelated to entrainment reduction.
15.70	Draft Staff Report Pg 49, Section 8.3.1.2: Intake Screen Mesh Size. 3. The third seawater screen reference is for the Brunswick seawater cooling plant in North Carolina. The staff report states that 0.5 mm fine mesh screens at this facility showed entrainment losses of 84 percent. The actual screen sizes were 1.0 mm on three of the four traveling screens installed at this facility and 9.t mm on the fourth screen. Additionally, the design of the intake is fairly unique and likely confers a substantial benefit in terms of managing debris.	Please see response to comment 9.24. Attachment 2B of the Poseidon Resources comment letter is the same letter Alden Labs submitted to the State Water Board Clerk. Responses to all comments submitted by Alden Labs can be found in Comment Letter # 9 of this document.
15.71	Draft Staff Report Pg 54, Section 8.3.2: Subsurface Intakes. Paragraph	Language was added to the third paragraph of 8.3.2 to clarify that

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	three presents the same problem described in comments 1 and 2 [in comments 15.67 and 15.68].	subsurface intakes typically allow for higher water quality, which can significantly reduce operation and maintenance costs.
15.72	Draft Staff Report Pg. 55, Section 8.3.2.1.1: Subsurface Intakes. California does not have any fractured karstic carbonate aquifers, therefore, the reference to the vertical well in Oman should be removed from the Staff Report.	Disagree. The reference is clear concerning the type of vertical intake well and provides an example of a desalination plant using vertical intake wells.
15.73	Draft Staff Report Pg. 72, Section 8.5.1.2: Multiport Diffusers. The Staff Report states that it is unclear how Jenkins and Wasyl (2013) estimated entrainment mortality at multiport diffusers to be 16.8 percent of the total entrained volume of dilution water. In response to the comments received from staff, Jenkins et al. significantly revised the subject report and submitted it to the Journal of Environmental Science and Technology for consideration for publication.	Jenkins et al. (2014) did not clarify how the 16.8 percent value was obtained. Please see response to comment 15.20.
15.74	Draft Staff Report Pg. 88, Section 8.6.2.3: Flow Augmentation. Change year of publication of Department of Fish and Game study to 1989. Additional information about flow augmentation studies at Red Bluff was submitted to the State Board in February 2014 during the preparation of the Amendment. This information is being resubmitted and is included as Attachments 8 and 9 of Poseidon's comments on the Desalination Amendments. We hope that in revising the Staff Report, the State Board will consider this information about flow augmentation.	Please see response to comment 15.19.
15.75	Draft Staff Report Pg. 88, Section 8.6.2.3: Flow Augmentation. The second paragraph of this section states that there are no empirical data that have estimated egg, larvae and small juvenile mortality as low-turbulence pumps. Please see the studies referenced in comment 7 for empirical studies on juvenile fish mortality using low-turbulence pumps. Also see the study referenced in comment 6 for a comparison of the entrainment mortality associated with flow augmentation using low-impact pumps to the entrainment associated with multiport diffusers.	Please see response to comment 15.19.
15.76	Draft Staff Report Pg. 99, Section 8.7.3: Brine Mixing Zone. The Staff Report incorrectly states that facilities using flow augmentation should also be able to meet 2 ppt above ambient with 100 meters. Depending on	Disagree. If the volumetric ratio of augmentation seawater to brine waste is great enough, then the salinity of the total discharge at end-of-pipe should be near ambient levels. Also, please see responses

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	ambient mixing conditions (tides, wind, waves, current, temperature) in the receiving water, the Carlsbad project requires greater than 100 meters to ensure strict compliance with the proposed 2 ppt standard.	to comments 15.14, 15.58, and 6.11.
15.77	Draft Staff Report Pg. 151, Section 12.1.7: Greenhouse Gases. The Staff Report incorrectly states that direct and indirect greenhouse gas emissions were not estimated for the Carlsbad facility. Please see Poseidon's Energy Efficiency and Greenhouse Gas Minimization Plans for the Carlsbad and Huntington Beach desalination facilities included in this Attachment 2 to Poseidon's comments on the Desalination Amendments and revise Table 12-17 and associated text in the Staff Report.	The paragraph has been amended to reflect the submitted GHG studies and Table 12-17 has been changed to reflect the estimated values. Changes to document – Section 12.1.7 Greenhouse Gases First paragraph under “Results of Previous Environmental Impact Analyses” – delete and replace with paragraph that follows. If the citations used in the existing paragraph are not cited elsewhere in the document, remove them from the References. *“Poseidon Resources Surfside LLC (Poseidon) developed estimates of the greenhouse gas emissions associated with the operation for the Carlsbad facility (Poseidon 2008) and the Huntington Beach facility (Poseidon 2010). The Carlsbad report provides a single estimate of total annual emissions while the Huntington Beach report provides estimates for four configuration options. The estimates of electrical use and gross indirect CO2 emissions are presented in Table 12-17.”* Table 12-17 – delete Pacific Institute citation and replace with (Poseidon 2008; 2010); change kWh to MWh/year; change Carlsbad electricity to 274,400; change Carlsbad GHGs to 97,165; change Huntington Beach electricity to 289,715–318,744; change Huntington Beach GHGs to 82,908–91,215.
15.78	On behalf of Poseidon, we request that the State Board consider the entire Water Code section 13142.5(b) administrative record that was before this Board during its consideration of the administrative appeal of the San Diego Regional Board's determination for Poseidon's Carlsbad project, and was also before the Court of Appeal in Surfrider Found. v. Cal. Reg 'l Water Quality Control Bd., 211 Cal. App. 4th 557 (2012) ("Surfrider"). We believe that the evidence before the State Board at that time continues to be relevant to this proceeding. We believe that the State Board has retained and referred to a copy of the record in this current proceeding, but we would be happy to resubmit another copy to	Comment noted. The administrative record from the administrative appeal of the San Diego Regional Board’s determination for Poseidon’s Carlsbad project, which was also before the Court of Appeal in *Surfrider Found v. Cal. Reg’l Water Quality Control Bd*., 211 Cal. App. 4th 557 (2012), will be included in the administrative record of the proposed Desalination Amendment.

Please note all tables and figures referenced are present at the end of this document

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	the Board's staff if necessary.	
15.79	Section 13142.5(b) Mandates Only Feasible Measures to Minimize Marine Life Intake and Mortality Marine life impacts from desalination facilities in California are regulated by section 13142.5(b), which provides: For each new or expanded coastal powerplant or other industrial installation using seawater for cooling, heating, or industrial processing, the best available site, design, technology, and mitigation measures feasible shall be used to minimize the intake and mortality of all forms of marine life. Section 13142.5(b) thus requires a site and project specific determination as to the "best available" measures that are "feasible" for a given project to address intake and mortality of marine life, including by entrainment and impingement.	Clarifying language has been added to the proposed Desalination Amendment and the Staff Report with SED to ensure the language is consistent with the statutory language.
15.80	Regional Boards Should Expressly be Permitted to Conduct Feasibility Analysis That is Consistent with Surfrider As described in Poseidon's separate letter on the Amendment submitted herewith, one of the primary purposes of the Amendment is to provide procedures for Regional Boards to implement Water Code section 13142.5(b) for desalination facilities. Section 13142.5(b) requires evaluations of "the best available site, design, technology and mitigation measures feasible" to minimize the intake and mortality of all forms of marine life at new or expanded desalination facilities. Water Code § 13142.5(b). However, the Amendment and the SED are silent as to the Court of Appeal's analysis of section 13142.5(b)'s feasibility requirement in Surfrider, the only reported decision to interpret section 13142.5(b). Surfrider addressed a challenge to the San Diego Regional Board's adoption of an NPDES permit for the Carlsbad project, Order No. R9-2006-0065, which applied the California Environmental Quality Act's	Consistent with the *Surfrider* decision, the State Water Board has included a definition of "feasibility," using the definition set forth in CEQA. Please see response to comment 6.12.

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	("CEQA") definition of "feasible" to the Board's section 13142.5(b) analysis. The Surfrider opinion includes specific guidance on the assessment of "feasibility" under section 13142.5(b) and the factors that will support a finding of infeasibility. First, because "feasible" is not defined in the Water Code, the Court of Appeal held that the San Diego Regional Board properly applied the following definition from CEQA: "'feasible' means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors." Surfrider, 211 Cal. App. 4th at 582 (citing Pub. Res. Code § 21061.1). Second, Surfrider also recognizes that, as with CEQA, economic considerations generally may be factored into the feasibility analysis. Third, the Court of Appeal affirmed that Regional Boards, like CEQA lead agencies, properly may structure the analysis of alternatives "around a reasonable definition of underlying [project] purpose and need not study alternatives that cannot achieve that basic goal." Id. (citing In re Bay-Delta, 43 Cal. 4th 1143, 1166 (2008). The Amendment and the SED should make clear that Regional Boards shall continue to apply CEQA's definition of feasibility to section 13142.5(b) analysis as upheld by the Court of Appeal in Surfrider. This would provide clear guidance to the Regional Boards on the implementation of section 13142.5(b) regarding one of the most critical and contentious issues in applying section 13142.5(b), and prevent any misinterpretation or misapplication of the Amendment. The Amendment and the SED should discuss the Surfrider holding and clarify that Regional Boards may conduct their section 13142.5(b) analysis in the same manner that was upheld in that case. If the State Board believes other definitions of feasible also could apply, the SED should identify those definitions and explain why they might be applicable. The State Board should not depart from the interpretation upheld in the only reported decision interpreting section 13142.5(b) without explanation and analysis.	
15.81	The SED Fails Adequately to Assess the Feasibility of Subsurface Intakes	The Staff Report with SED already acknowledges that subsurface intakes may not always be feasible and analyzes factors for feasibility in

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	Poseidon does not dispute the SED's conclusion that subsurface intakes - when feasible - are the preferred technology for minimizing intake and mortality during desalination operations, because, if properly constructed, subsurface intakes can eliminate impingement and entrainment. (SED, at 54.) Poseidon also appreciates the SED's determinations that site and facility specific factors need to be evaluated to determine the feasibility of subsurface intakes, and that surface intakes may be permitted where subsurface intakes are infeasible. (SED, at 58.) The SED appropriately recognizes that the feasibility of subsurface intakes is limited by the following factors: (i) favorable geologic conditions, (ii) significant environmental impacts from construction, (iii) limited intake capacity (i.e., inability to provide desired intake volume for large-scale desalination plants), and (iv) aesthetic impacts (for beach wells). (SED, at 54-55.). Poseidon notes that other feasibility considerations that also must be considered include temporary and permanent impacts to recreational resources, and the ability for the subsurface intake to be constructed within a reasonable period of time and in accordance with economic considerations. The SED should be revised to include a more detailed analysis of the feasibility of subsurface intakes in order to more accurately inform the public about the type of desalination facilities likely to be developed in California, and their environmental impacts. The analysis should, among other things, incorporate findings that were made by multiple regulatory agencies regarding the infeasibility of subsurface intakes for Poseidon's Carlsbad desalination project. Finally, the SED should also address whether subsurface intakes are "available." A key part of the determination of "availability" for crucial equipment in important infrastructure that must perform on a reliable basis is whether the technology can be purchased and installed with a warranty of performance and whether there is a track record of performance at other commercial scale facilities. Section 13142.5(b) requires the best "available" site, design, technology and mitigation that is "feasible." Whether or not an intake technology is available depends in large part on its feasibility.	Section 8.3. The proposed project includes flexibility for dischargers to choose surface intakes if subsurface intakes are found infeasible. Evaluation of the feasibility of subsurface intakes for a specific project and evaluation of facility specific impacts is beyond the scope of this Programmatic CEQA document. See responses to comments 13.47 and13.71.

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15.82	The SED Should Discuss the Findings of Multiple Agencies that a Subsurface Intake for the Carlsbad Project Would be Infeasible As described above, the feasibility analysis under Water Code section 13142.5(b) includes "environmental" considerations. Thus, even if a subsurface intake would provide the greatest minimization of intake and mortality during desalination operations, other environmental impacts must be considered and may preclude selecting a subsurface system. The SED, however, does not address these issues. The SED's discussion of impacts from subsurface intakes is cursory, and should be revised to address, at a minimum, the following issues: - Harm to marine life and coastal habitat during construction, including the potential for such impacts to be permanent; - The potential for subsurface intakes to draw in water from subsurface formations that is difficult to treat; - The potential for subsurface intakes to draw water from wetlands or water that is the subject of a more senior water right; - Aesthetic impacts from siting wells or other infrastructure on the beach; - Public access and recreation impacts resulting from construction or maintenance of subsurface systems; - Increased energy usage or greenhouse gas emissions from subsurface intakes; and - Conversion of seafloor habitat to an engineered filtration system. As described in greater detail below, requiring a subsurface intake for the already- permitted Carlsbad project -which multiple agencies determined was infeasible - could result in significant environmental impacts. For the reasons described below, the SED should analyze the potential impacts associated with installing a subsurface intake for the Carlsbad project. If there is to be no additional or updated evaluation of subsurface intakes at	A discussion of why subsurface intake facilities are not feasible for a specific project is beyond the scope of a programmatic document and is appropriately addressed at the project-specific level, such as was done for the Carlsbad project.

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	Carlsbad as part of this SED, then the Board must base its decisions in this proceeding on the existing administrative record also before the Board from the appeal of the San Diego Regional Board's approval of the Carlsbad project to this Board, and the subsequent Surfrider case before the Court of Appeal.	
15.83	The SED Must Describe the Existing Environmental Baseline and Potential Direct and Indirect Effects Existing physical conditions are referred to as the "baseline," or "the physical environmental conditions in the vicinity of the project, as they exist ... at the time the environmental analysis is commenced ..." CEQA Guidelines § 15125(a). For purposes of the SED's consideration of the Amendment's effect on the Carlsbad project, the "baseline" for environmental review is the existing environment in light of Carlsbad project as permitted and under construction. More generally, for evaluation of the Amendment's impact statewide, the baseline is the existing environment throughout California. Communities for a Better Env 'tv. S. Coast Air Quality Mgmt. Dist., 48 Cal. 4th 310, 320-21 (2010) (baseline must reflect "existing physical conditions in the affected area"). The SED must therefore evaluate the reasonably foreseeable impacts of the Amendment on the Carlsbad project, including the possible requirement to construct a subsurface impact if feasible. Additional reasonably foreseeable impacts of the Amendment on the Carlsbad project are described throughout this letter.	Under the proposed Desalination Amendment, the Carlsbad facility is considered a conditionally permitted facility. It has all of its permits and approvals, is under construction, and the regional water board made a determination pursuant to Water Code section 13142.5(b). The San Diego Regional Water Quality Control Board issued a conditional Water Code 13142.5(b) determination based on the operating conditions where the Carlsbad Desalination plant is co-located with the Encina Power Station. See, San Diego Water Board Order R9-2006-0065, Finding 4. Once the Encina Power Station permanently ceases operations and the Discharger proposes to independently operate the existing Encina Power Station seawater intake and outfall for the benefit of the Carlsbad desalination facility, the San Diego Regional Water Board specifically found that it will be necessary to evaluate whether, under those conditions, the Carlsbad Desalination facility complies with the requirements of Water Code section 13142.5(b). The San Diego Water Board also found that Poseidon will have more flexibility in how it operates the intake structure and outfall and additional and/or better design and technology features may be feasible for future stand-alone operating conditions, necessitating a new Water Code section 13142.5(b) determination. This will include an evaluation of the best available site, design, technology, and mitigation measures feasible to minimize intake and mortality of all forms of marine life. Staff did review environmental documentation for the Poseidon project and included relevant information in Section 12.1. An endorsement of Poseidon's Carlsbad facility design choices, or a discussion of why subsurface intake facilities are infeasible for a specific project is beyond the scope of a programmatic document and is appropriately addressed at the project-specific level, as was done for the Carlsbad project. See also response to comment 13.48.
15.84	The SED Should Acknowledge Previous Findings on Subsurface Intakes	Please see responses to comments 15.83 and 13.48.

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	for the Carlsbad Project In light of the existing baseline described above, the SED should discuss the detailed analysis of subsurface intakes undertaken for the Carlsbad project by the City of Carlsbad, the Coastal Commission, the San Diego Regional Water Quality Control Board, and the State Lands Commission. Each of these agencies found that a variety of subsurface intakes were infeasible for the Carlsbad project on several grounds. Opinions upholding these approvals were issued by multiple reviewing courts, including the San Diego County Superior Court and the Fourth Appellate District. The grounds for each respective agency's determination that subsurface intakes are infeasible for the Carlsbad project are described below.	
15.85	Coastal Commission: The Coastal Commission concluded that subsurface intakes (offshore infiltration galleries, beach wells, horizontal wells, and an offshore intake) are infeasible and would be more environmentally damaging than "stand-alone" operation of the Project. Subsurface intakes "would result in greater environmental impacts than the proposed project due to destruction of coastal habitat from construction of the intake systems, the loss of public use of coastal land due to numerous intake collector wells that would be located on the beach, and the adverse environmental impact to coastal resources during the construction... " (Coastal Commission Findings, at 51.) The Coastal Commission further concluded that subsurface intakes were infeasible at Carlsbad "due to site-specific geologic and/or water quality conditions, which render the water untreatable, and the increased and prohibitive costs of such systems." (Id.) The Coastal Commission's findings were upheld in a final decision by the San Diego Superior Court (Case No. 37-2008-00075727), and the State Lands Commission's reliance on the Coastal Commission's findings was upheld by the California Court of Appeal. San Diego Coastkeeper v. California State Lands Commission, 2010 Cal. App. Unpub. LEXIS 9797 (2010).	Please see responses to comments 15.83 and 13.48.
15.86	Regional Board: The San Diego Regional Board found subsurface intakes (including vertical and horizontal beach wells, slant wells, and infiltration galleries) infeasible for the Carlsbad project due to (1) limited production capacity of the subsurface geological formation, (2)	Comment noted.

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	insufficient sediment depths in the vicinity of the site, (3) poor water quality of the collected source water, (4) economic infeasibility (in light of evidence showing that subsurface intakes would add $400 to $600 million to the construction costs of the plant, frustrating a key project objective of supplying water at or below the cost of imported water supplies). (San Diego Regional Board Order No. R9-2009-0038 (May 13, 2009), at p. 8.) The Regional Board's decision was upheld in the only reported decision interpreting Water Code section 13142.5(b), Surfrider Found. v. Cal. Regional Water Quality Control Bd., 211 Cal. App. 4th 557 (2012).	
15.87	City of Carlsbad: The City of Carlsbad's certified EIR found alternative intake technologies to be infeasible and lacking in environmental benefit. The EIR concluded that the approved open intake would not cause significant impacts from entrainment or impingement during stand-alone operations because, among other things, the small proportion of marine organisms lost to entrainment and impingement as a result of the project would not have a substantial effect on the species' ability to sustain their populations. (Carlsbad Project EIR, at 4.3-35 to 4.3-36, 4.3-42.) With respect to vertical intake wells, the EIR concluded that the siting, construction and operation of 100 vertical beach wells in Carlsbad was impractical, would not provide environmental benefit, and could cause significant environmental impacts. (Carlsbad Project EIR, at 6-6.) In addition, horizontal beach wells would require 25 large wells along 4 miles of the Carlsbad coastline, causing significant impacts to aesthetics and recreation. (Id.) Finally, the EIR determined that the construction of offshore infiltration galleries would cause potentially significant impacts to biological resources. (Carlsbad Project EIR, at 6-6 to 6-7.) A direct challenge to the EIR was dismissed in 2011 by the San Diego County Superior Court in Case No. 37-2009-00061008-CU-TT-CTL.	Comment noted.
15.88	State Lands Commission: The State Lands Commission's reliance, as a responsible agency, on the Carlsbad EIR's finding that the project would not cause significant marine life impacts during stand-alone operations was upheld by the Court of Appeal against a lawsuit asserting that a Supplemental EIR was required. San Diego Coastkeeper v. California State Lands Commission, 2010 Cal. App. Unpub. LEXIS 9797 (2010).	Comment noted.

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15.89	The SED Must Disclose the Amendment's Foreseeable Impacts on the Carlsbad Project It is reasonably foreseeable that one of the outcomes of the adoption of the Amendment is that the Carlsbad project will need to be retrofitted with a subsurface intake. The Amendment applies to desalination facilities, and there is no exception for the Carlsbad plant. Moreover, the Carlsbad plant will be going through a re-permitting process before the San Diego Regional Board in the coming months. Therefore, to the extent that the Amendment may apply to the Carlsbad plant, the SED needs to evaluate the environmental effects of a subsurface intake in Carlsbad. El Dorado Union High School Dist. v. City of Placerville, 144 Cal. App. 3d 123 (1983). Poseidon believes the only potentially technically feasible subsurface approach for Carlsbad is a lagoon-based infiltration gallery. All other subsurface options have already been eliminated as infeasible and environmentally damaging by the evaluations described above. The SED therefore must evaluate the likely environmental impacts of this option, as information on this option has been provided by Poseidon and is in the State Board's record. The layout of the potential subsurface infiltration gallery is shown in Attachment 4. Preliminary investigations show that the footprint of this gallery would cover much of the lagoon east of Interstate 5, as well as the entire middle and outer lagoon. The area that would be affected by the subsurface infiltration gallery is composed of precisely the habitat that produces the fish eggs and larvae that a subsurface intake is intended to protect. Therefore, in order to save the fish in Agua Hedionda Lagoon, Poseidon would have to destroy much of their natural habitat. The SED must therefore analyze the potential biological impacts that would result from requiring a subsurface infiltration gallery for the Carlsbad project, as well as other potentially significant environmental impacts or economic feasibility considerations. For example, even though a shallow gallery may not have water quality impacts, the SED must analyze whether there are any potential impacts from contaminated sediments or minerals that would make a subsurface intake infeasible.	Please see responses to comments 15.83 and 13.48.

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15.90	The SED's Discussion of the Fukuoka District Desalination Facility is Misleading The SED cites to the Fukuoka Desalination Facility in Japan as an example of a feasible existing infiltration gallery with "excellent performance" during its first five years. (SED, at 57.) The Fukuoka infiltration gallery, however, is a one-of-a-kind intake system uniquely set in an embayment with no similar facility in the world. It is a proprietary technology with little performance data available and provides no basis to show the feasibility of infiltration galleries generally. Given the limited opportunities to replicate the one-of-a-kind system in California, and Fukuoka's refusal to provide operating data, the SED should not rely on Fukuoka as evidence that infiltration galleries are feasible. In order to fully evaluate Fukuoka as part of this proceeding, the State Board should seek data on whether any commercial construction companies are willing to provide a warranty of performance for this type of infiltration gallery system. Proceeding forward in reliance on the Fukuoka Desalination Facility is misleading to the public and belies the feasibility issues associated with infiltration galleries, which must be part of infrastructure which must be reliable to provide a long term, reliable water supply to the public.	The conceptual diagram of the Fukuoka Seawater Desalination Plant is available online and includes the equipment name, equipment type, material, specifications, electric machinery, and number of units. http://www.f-suiki.or.jp/english/seawater/plant.php. Regardless of whether or not the technology is proprietary, the subsurface intakes at the Fukuoka Desalination Facility in Japan have been operating successfully with minimal maintenance for over eight years. A recent article in the Sacramento Bee reported, *“One of the first large subsurface intakes at a major desalination plant, in Fukuoka, Japan, has shown no need for maintenance at all. Tom Missimer, a geology professor at Florida Gulf Coast University and a longtime consultant in the desalination industry, suspects a natural cleaning process is at work. Tiny worms and other organisms in the seabed eat sediments, algae and other material that could clog the intakes, he said. Then those feeders excrete hard pellets that become a new filter material.”* After eight years, the seabed filter system at Fukuoka seems to be self-sustaining, Missimer said, "If something wasn't cleaning it, it would have clogged a long time ago," said Missimer, who was a consultant on the Fukuoka plant.” Additionally, the City of Long Beach was operating subsurface intakes successfully, but ultimately shut the project down due to the high energy cost associated with desalination (Weiser 2014) Read more here: http://www.sacbee.com/news/state/california/water-and-drought/article3017597.html The Fukuoka Desalination Facility and the City of Long Beach’s pilot project were some of the first of their kind, but they are a good example where subsurface technology works. The City of Long Beach’s pilot project demonstrated that infiltration galleries are technically feasible and the Fukuoka Desalination Facility demonstrated subsurface intakes are technically and economically feasible.
15.91	Likewise, the SED should be revised to include a discussion of the	The Staff Report and SED does not include a discussion of the

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	subsurface intake used for a desalination facility at San Pedro del Pinatar in Spain. We understand that the plant had significant fouling problems with the intake and, according to the Coastal Commission's findings, planned to rely on an open ocean intake for its primary source of seawater going forward.	subsurface intakes used at the San Pedro del Pinatar facility in Spain because we do not have any references or literature regarding any problems it may have had with the intake system. We are aware that WateReuse reported the San Pedro del Pinatar facility was unable to use subsurface intakes for the facility's expanded intake due to hydrogeological constraints. But that the first 17 MGD phase of the facility that uses subsurface intakes is operating without issues. (WateReuse 2011) References containing information regarding operational issues with the San Pedro del Pinatar facility's subsurface intakes were not provided by the commenter or other commenters during the public comment period.
15.92	The SED Should Assess the Economic Feasibility of Subsurface Intakes Although Appendix G to the Amendment includes a study purporting to describe the economic costs of complying with the Amendment's proposed policy, the SED does not attempt to assess whether compliance with the Amendment, including its preference for subsurface intakes, will be economically feasible for future projects. As discussed above, economic feasibility must be considered under section 13142.5(b), most notably with regard to whether the costs of constructing and operating desalination plants are such that desalinated water can be competitively priced.	The State Water Board is not required to make a determination if subsurface intakes are feasible, economically or otherwise, for specific projects. However, the State Water Board is aware that the issue of technical and economic feasibility is currently being evaluated by an Independent Scientific Technical Advisory Panel (ISTAP) convened and facilitated by CONCUR, Inc. under the auspices of the California Coastal Commission and Poseidon Resources (Surfside) LLC. The ISTAP released the "Final Report: Technical Feasibility of Subsurface Intake Designs for the Proposed Poseidon Water Desalination Facility at Huntington Beach, California" on October 9, 2014. This report evaluated technical feasibility of 9 different subsurface intake designs and determined that two alternatives were technically feasible. The Phase 2 analysis that will take a broader look at overall feasibility of subsurface intakes, including costs, lifecycle costs, and broader environmental impacts is currently underway. For Phase 2 status updates, please visit: http://www.concurinc.com/project/coastal-commission-poseidon-jff-process/. Should the ISTAP determine that subsurface intakes are not feasible, the proposed Desalination Amendment provides a mechanism whereby surface intakes may be permitted. In order to clarify that analysis of feasibility for subsurface intakes must include consideration of costs, the draft Desalination Amendment has been amended in to include a definition of "feasible" to be consistent with that set forth in CEQA: ". . . capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic,

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		environmental, social and technological factors." (Please also see response to comment 6.12) Any future determination as to best available site, design, technology and mitigation measures feasible for any facility will consider the criteria provided in the Desalination Amendment with these considerations in mind. For comparison, note that, pursuant to CEQA, feasibility of alternatives is to be evaluated within the context of a proposed project. "The fact that an alternative may be more expensive or less profitable is not sufficient to show that the alternative is financially infeasible. What is required is evidence that the additional costs or lost profitability are sufficiently severe as to render it impractical to proceed with the project." *SPRAWLDEF v. San Francisco Bay Conservation and Development Commission* (2014) 226 Cal.App.4th 905, 918.
15.93	Further, Public Resources Code section 21159(c) requires that an environmental analysis under CEQA take into account economic factors. The estimated cost of the lagoon-based subsurface infiltration gallery is provided in Attachment 4. Preliminary estimates show the cost of this gallery to be approximately $615 million if coupled with a multi-port diffuser to over $793 million if installed in conjunction with brine dilution using flow augmentation.* Desalination plants will not be developed if water cannot be sold at a competitive price using reliable infrastructure built with a warranty of performance. Without assessing the economic feasibility of the subsurface intakes preferred by the Amendment, the SED fails to sufficiently explain their viability or justify their selection as the preferred intake technology. * The estimated construction cost for the 100 MGD subsurface intake to be used with the multiport diffuser is $232 million and the estimated construction cost for the multi-port diffuser is $383 million. The estimated construction cost for the 300 MGD subsurface intake to be used with flow augmentation is $793 million, and the estimated construction cost for the low-impact pump station and associated fish screens and bar racks is approximately $43.8 million.	Please see response to comment 15.92. Further, subsurface intakes provide the greatest protection for marine organisms, as well as potentially lowering operational plant costs (Missimer et al. 2013, MWDOC 2010, response to comment 15.2, and also see section 8.3.2 of the Staff Report with SED).

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15.94	The Amendment Should be Consistent with the SED's Technology-Neutral Approach Concerning Brine Discharge As described in Poseidon's comments on the Amendment, staff's recommendation with respect to brine discharge technology is to amend the Ocean Plan to establish statewide requirements for the use of the "most protective brine discharge method after a facility specific evaluation." (Staff Report at 93.) Poseidon supports staff's technology-neutral approach, which is specifically mandated under Water Code section 13142.5(b). However, the Amendment departs from the staff's recommendation, and proposes multiport diffusers as the second preferred brine discharge technology, following comingling brine with an existing wastewater stream. The Amendment cannot endorse multiport diffusers without substantial evidence supporting preferential treatment for this technology. Pub. Res. Code § 21168.5. Poseidon recognizes that, in some instances, multiport diffusers may be the preferred brine discharge strategy. But there is no basis to presumptively favor diffusers over other strategies, or to impose burdensome compliance requirements only on non-diffuser discharge strategies, when the State Board admittedly has not assessed the entrainment mortality that diffusers will cause.	The proposed Desalination Amendment and Staff Report with SED do not take a technology neutral approach. The basis for favoring commingling brine with wastewater and then multiport diffusers is substantial and a complete discussion is provided in section 8.6 of the staff Report with SED. Also, please see responses to comments 15.6, 15.7, 15.39, 15.40, 15.41, 15.42, and 15.44. Additionally, there is not enough information regarding other discharge strategies to include them in a discussion of where to rank them in order of preference for brine discharge technologies. Flow augmentation is the only alternative brine disposal technology that has been proposed, but there is not sufficient information to compare the impacts from a flow augmentation system to multiport diffusers. The commenter has provided references to the State Water Board (see attachments 8, 9, and 10 of the comment letter), but this information does not adequately quantify the impacts from the entire system or even portions of the proposed system. The studies on Archimedes screw pumps look at fish that are too large and could be excluded by an intake screen and did not disprove the assumption that there is 100 percent mortality for entrained organisms (attachments 8 and 9 of the comment letter). Intake studies need to be done on eggs, larvae, and juveniles that are less than 20 mm in length in order to properly characterize intake mortality. The information provided in Jenkins et al. (2014) did not sufficiently add to the information about the impacts of flow augmentation systems (please see response to comment 15.20). The proposed Desalination Amendment includes the opportunity to use innovative technologies, but an owner or operator choosing this path must demonstrate to the satisfaction of the regional water board in consultation with the state Water Board that the alternative technology is as protective of water quality and the related beneficial uses of ocean waters as multiport diffusers. The flexibility in the Desalination Amendment comes with additional requirements that are not burdensome, but will ensure we continue to protect California's valuable marine resources.
15.95	The SED Should Clarify That Proposed Brine Discharge Strategies Must	Disagree. Please see responses to comments 15.6 and 15.7.

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	Demonstrate That Their Intake and Mortality is Equivalent to the 23% Estimated Mortality Rate for Diffusers While Poseidon disagrees that diffusers should be labeled as the preferred technology in all circumstances, if the Amendment is going to do so, it must provide the evidentiary basis for this determination, including detailed evidence regarding the marine life mortality expected from this technology. The SED requires, for any brine discharge strategy other than a diffuser (aside from commingling with existing wastewater), that a proposed facility demonstrate that its technology will be "as protective" as multiport diffusers. (SED, at 92.) Given the stated lack of data on the effectiveness of multiport diffusers, the SED relied on the existing evidence that 23 percent of the total entrained volume of diffuser dilution water are killed by exposure to lethal turbulence. (SED, at 72-73.) Because this estimate is the only estimate presented in the SED, and is the only substantial evidence in the record of diffuser mortality, it should be explicitly established as the target for projects seeking to demonstrate that alternate brine disposal technologies may perform better than multiport diffusers. If staff believes that other estimates may apply, those estimates must be acknowledged and analyzed in the SED, and any substantial evidence supporting those estimates provided.	
15.96	The SED Should Analyze the Impacts of Installing a Diffuser for the Carlsbad Project The SED should disclose evidence in the administrative record of estimated diffuser impacts for the Carlsbad project. As with subsurface intakes, the SED should analyze the reasonably foreseeable impacts of the Amendment, which may include requiring the installation of a multiport diffuser for the Carlsbad project. See Laurel Heights Improvement Ass 'n v. Regents of Univ. of Cal., 47 Cal. 3d 376, 396 (1988); Wal-Mart Stores, Inc. v. City of Turlock, 138 Cal. App. 4th 273, 290-91 (2006). The SED and the Amendment do not explicitly exempt the Carlsbad project from the Amendment's brine disposal requirements. Therefore, as described above in the context of subsurface intakes, it is reasonably foreseeable that if the Amendment is adopted, the Carlsbad project may need to be retrofitted with a multiport diffuser. Therefore, the	The Staff Report with SED is a programmatic document and as such has sufficiently described the potential impacts of several brine disposal methods. The Staff Report with SED assumes that 23percent of the organisms entrained using multiport diffusers will be killed. This is in agreement with the Jenkins, et al., article submitted with the comments that estimated 16.8 percent to 23 percent of organisms would suffer lethal and sub-lethal injuries. The Staff Report with SED and the proposed Amendment also assume 100 percent mortality when flow augmentation is proposed as a means for brine disposal. Although studies show that low velocity pumps have low mortality impacts on entrained organisms, there are no studies available showing the effect on entrained organisms at the point where augmentation water mixes with the brine waste (e.g., osmotic shock). These effects are unknown and could be significant. The proposed Amendment allows for the use of flow augmentation if the owner or operator empirically demonstrates

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	SED must disclose that the only evidence in the record shows that the impacts for diffusers would be much greater than augmented seawater intake, as described below.	that it is as protective of marine life as multiport diffusers. The appropriate time to evaluate potential scenarios for specific projects is at the project-level review.
15.97	The Water Authority and Poseidon have presented the State Board with substantial evidence that high-velocity diffusers are not the environmentally preferred option for the Carlsbad project. For example, the studies included in Attachments 8, 9, and 10 show that flow augmentation using low impact pumps, with 200 million gallons per day ("MGD") of dilution water, would injure between 72,600 - 280,000 organisms per day and place at risk 1- 5 percent of the dilution water to entrainment mortality. By contrast, use of a high velocity diffuser at Carlsbad would require 950 MGD of dilution water, injure 4,415,000 to 9,985,783 organisms per day, and place at risk 16.8 to 38 percent of the dilution water to entrainment mortality.	Disagree. Please see response to comment 15.20
15.98	Additional information about the flow augmentation studies at Red Bluff was submitted to the State Board during the administrative process for the Amendment. See Attachment 8 and 9. A Poseidon representative referenced the need to consider information from the Red Bluff studies at the August 6, 2014 State Board workshop on the Amendment; however, Staff indicated that they had received the information but did not have time to review it. We hope that, in revising the SED, the State Board will add information about flow augmentation technology, which may be best at reducing mortality under Water Code section 13142.5(b).	Please see response to comment 15.19
15.99	The SED Should Assess the Feasibility of Diluting Brine with Commingled Existing Wastewater Streams The Amendment proposes as the preferred method of brine disposal commingling with existing wastewater streams from wastewater treatment plant facilities or once-through cooling facilities. (SED, at 92.) Poseidon agrees that, where feasible, this likely is the environmentally preferred strategy under section 13142.5(b). But the SED fails to sufficiently analyze whether this strategy would ever be viable for a desalination facility in California.	Wastewater from urbanized areas along the California coastline is commonly disposed through ocean outfalls. As a result, these areas are likely to offer the potential for commingling brine with wastewater. An owner or operator would need to get permission and approval from the wastewater agency and regional water board in order to commingle. However, the City of Santa Barbara Desalination Facility, the Monterey Peninsula Water Supply Project, and the South Orange County Water District all commingle brine with wastewater prior to discharging into the ocean. The Carlsbad Desalination Project plans on commingling with cooling water effluent until the power plant shuts down. There are enough potential suitable locations in California to include this as the

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	While the SED acknowledges the likelihood of successfully using commingled wastewater is low, it fails to undertake any concrete assessment of whether there are any suitable locations where this strategy could be employed. Without such analysis, there is no basis to adopt commingled wastewater as the preferred alternative, because its availability is at best illusory. If there are no suitable locations where commingled wastewater could be used, adopting commingled wastewater as a preferred alternative contradicts the mandate of section 13142.5(b) to use the best "available" technology.	preferred alternative. As wastewater recycling increases, we acknowledge the availability of using wastewater for dilution will decrease. However, multiport diffusers are an alternative brine discharge method when commingling is unavailable.
15.100	In addition, such a preference would also conflict with CEQA's mandate that mitigation measures must be concrete and capable of being implemented, rather than hypothetical or illusory. E.g., Sacramento Old City Ass 'n, 229 Cal. App. 3d at 1027 (substantial evidence must support conclusion that mitigation will be effective).	Commingling of wastewater and brine discharge as the preferred brine discharge technology where wastewater would otherwise be discharged to the ocean does not constitute a CEQA mitigation measure, but rather a determination of the best available brine disposal technology feasible, where selected in combination with best available site, design and mitigation measures feasible to minimize intake and mortality of all forms of marine life, in accordance with Water Code section 13142.5(b). Regardless, even if it were found to constitute a mitigation measure subject to the CEQA case law cited, commingling of wastewater with brine would in no case be required where it was not capable of being implemented. The statute requires best available and feasible measures to minimize marine intake and mortality. Note that the draft Desalination Amendment has been revised to define "feasible," using the same definition as CEQA.
15.101	The SED Should Permit Regional Boards to Exercise Their Discretion to Select Appropriate Mitigation The Amendment is intended to provide guidance to Regional Boards in mitigating for desalination-related impacts under section 13142.5(b). (SED at 65-81.) As described in Poseidon's comments on the Amendment, however, certain aspects of the Amendment would be highly disruptive of Poseidon's existing mitigation plans at the Carlsbad project, which is in the final stages of design. As written, the Amendment's mandates would improperly impede the discretion of Regional Boards under section 13142.5(b) to impose appropriate site-specific mitigation, and conflict with other viable approaches,	Please see responses to comments 15.8 and 15.9.

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	including the approach adopted by the Regional Board (and Coastal Commission) for the Carlsbad project. For example, the Amendment requires that the mitigation must be located in the source water body. This provision would require that Poseidon abandon its approved mitigation site and begin developing a new site within the source water of Agua Hedionda Lagoon. Poseidon has spent seven years and invested millions of dollars developing the existing mitigation site that is in the final stages of permitting and will be ready to begin construction next year. Given the limited number of suitable mitigation sites, it would be impractical to limit site selection to the facility's source water body. Consistent with past mitigation siting determinations, the Amendment and the SED should provide Regional Boards with sufficient flexibility to site the mitigation acreage as needed based on the availability of suitable mitigation sites. For example, the Coastal Commission allowed Poseidon to select from a number of suitable sites in the Southern California Bight for its restoration project associated with the Carlsbad project. Following an exhaustive search in and around the Carlsbad project's source water, the Coastal Commission determined that there were no suitable mitigation sites located directly with the project's source water body, and that the best available mitigation site for the Carlsbad project was located within the National Wildlife Refuge at the south end of San Diego Bay, a distance of 50 miles from the facility, where two former salt pools will be restored to sub-tidal and inter-tidal wetlands. The Amendment and the SED should not foreclose the ability of Regional Boards to develop effective, cost-conscious mitigation alternatives for specific facilities. See, e.g., Surfrider, 211 Cal. App. 4th 557 (2012) (upholding Regional Board's discretion in selecting and adopting mitigation plan).	
15.102	The SED Does Not Provide Substantial Evidence Supporting the Mitigation Requirements Proposed in the Amendment The SED recommends updating the Ocean Plan to provide statewide guidance on the appropriate methods for determining the nature and size of a mitigation project to ensure that all desalination-related mortality is	Disagree. There is a substantial basis for requiring the APF to be calculated with additional confidence. Please see responses to comments 15.9 and 21.90.

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	mitigated for a facility. (SED at 65 - 81.) While the SED's mitigation goals are laudable, the SED's analysis is wrong insofar as the mitigation requirements it establishes understate the effectiveness of other approaches and ignore substantial evidence in the record (i.e., the findings of the Regional Board, Coastal Commission, and State Lands Commission for Carlsbad) showing that other mitigation approaches are effective under section 13142.5(b). As described in greater detail in Poseidon's comments on the Amendment, Poseidon is particularly concerned that the SED does not provide a basis for requiring (1) a 90% confidence level for calculating the final area of production foregone ("APF")…	
15.103	The SED Does Not Provide Substantial Evidence Supporting the Mitigation Requirements Proposed in the Amendment...(2) a 1:1ratio in all instances...	Please see responses to comments 15.9 and 21.90.
15.104	The SED Does Not Provide Substantial Evidence Supporting the Mitigation Requirements Proposed in the Amendment...and (3) mitigation for discharge impacts within the zone of initial dilution.	Disagree. There is a substantial basis for requiring the APF to be calculated with additional confidence. Please see responses to comments 15.9 and 21.90.
15.105	If the SED intends to adopt these [15.102-15.104] requirements, it must provide substantial evidence in support of its conclusions. Pub. Res. Code § 21168.5.	Comment noted. Please see, response to comments 15.9 and 21.90.
15.106	The SED should also recognize that other mitigation ratios have been determined to be successful at mitigating desalination-related impacts. For example, a mitigation plan that included one acre of estuarine habitat restoration for every 10 acres of open ocean habitat impacted by the project was determined to be appropriate for the Carlsbad project, which restored estuarine wetlands to compensate for open ocean species, because successfully restored wetland habitat is ten times more productive than a similar area of nearshore ocean waters. See California Coastal Commission, Revised Condition Compliance Findings for Permit No. E-06-013 (approved December 10, 2008).	Please see response to comment 21.90.
15.107	The SED's Proposed Mitigation Requirements Lack a Nexus or Rough Proportionality to Marine Life Impacts at the Carlsbad Facility	Please see responses to comments 15.8, 15.9, and 15.10.

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	As described above, the San Diego Regional Board already identified the entrainment and impingement impacts at Carlsbad, and found that those impacts will be fully mitigated by the mitigation program selected. It would be inappropriate to require a new approach for the same anticipated losses, since there has been no factual change suggesting that there will be more entrainment and impingement.	
15.108	Moreover, it would be an abuse of discretion for the State Board to make a different conclusion on the same set of facts without any evidence that the existing mitigation for the Carlsbad project would be ineffective. Pub. Res. Code § 21168.5 (a prejudicial abuse of discretion occurs when agency has not proceeded in the manner required by law or if the determination or decision is not supported by substantial evidence).	Please see, responses to comments 15.8 and 15.9. The draft Desalination Amendment has been amended to allow the regional water boards to consider existing mitigation projects associated with conditionally permitted facilities. Additional mitigation may be required for additional impacts not previously considered where those impacts constitute an increase in intake and mortality resulting from new construction or new operating impacts.
15.109	Poseidon's recent calculations show that the mitigation approach in the Amendment could increase the Carlsbad project's mitigation requirements from 55.4 acres to more than 130 acres. There is thus no nexus, nor rough proportionality between the SED's proposed mitigation standard and marine life impacts at the Carlsbad project, particularly in light of the fact that physical conditions at the Carlsbad project have not changed since the Regional Board's determinations. The SED's proposed standard would bear no reasonable relationship to the Carlsbad project's actual impacts, as it would require substantially more mitigation than necessary to fully mitigate impacts from the Carlsbad project. The SED's proposal thus violates mitigation standards under CEQA, and also goes beyond the mandate of section 13142.5(b), which requires best available mitigation feasible to minimize marine life intake and mortality from a project, but nothing more.	Please see, responses to comments 15.8 and 15. 9.
15.110	Governmental conditions must have a sufficient nexus and be "roughly proportional" to a project's impacts to meet constitutional requirements. See Nollan v. California Coastal Comm., 483 U.S. 825 (1987); Dolan v. City of Tigard, 512 U.S. 374 (1994). For example, Dolan held that a city planning commission's conditional permit approval constituted an unconstitutional taking when it required a property owner seeking to expand an electric and plumbing supply store to dedicate a 7,000 square	Please see, responses to comments 15.8 and 15.9. The draft Desalination Amendment has been amended to allow the regional water boards to consider existing mitigation projects associated with conditionally permitted facilities. Additional mitigation may be required for additional impacts not previously considered where those impacts constitute an increase in intake and mortality resulting from new construction or new operating impacts.

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	foot greenway for flood control and a bike path on her property because such conditions were not roughly proportional to the project's impacts. This "rough proportionality" does not require a precise mathematical calculation, but requires the agency make some sort of an "individualized determination that the required dedication is related both in nature and extent to the impact of the proposed development." Dolan, 512 U.S. at 391; see also Rohn v. City of Visalia, 214 Cal. App. 3d 1463 (1989) (conditions must bear reasonable relationship to project impacts). Here, requiring Poseidon to provide substantially more mitigation than necessary to fully mitigate impacts from the Carlsbad project would not be "proportional" to the Carlsbad project's impacts on marine life.	
15.111	The SED Fails to Analyze the Environmental Effects From Increased Reliance on Other Water Supply Sources That Could be Triggered by the Amendment The SED's discussion of environmental impacts is focused exclusively on desalination. The SED fails to assess existing conditions in light of environmental impacts from other current water supply options, including without limitation impacts stemming from transporting water significant distances or water recycling.	The use of imported, local, or recycled water supplies within an area is an existing condition and any impacts associated with those activities are occurring and ongoing. This is the "baseline condition" and any increased reliance on these sources of water would also be considered part of the existing conditions. Adoption of the proposed Amendment will not change these conditions. There is no evidence, nor assurance, that reliance on these water sources will actually diminish when desalinated water supplies become available, therefore, no change in the physical environment, as it relates to water supply from existing sources, can be assumed. See also the response to comment 14.18.
15.112	The SED also fails to analyze the potential effect of the Amendment on the use and demand for alternative water supply sources, and the indirect environmental effects that could occur as a result. By way of example, the SED must analyze the extent to which requirements imposed through the Amendment, such as the preference for subsurface intakes and diffusers, could foreseeably render desalination facilities prohibitively expensive or difficult to permit, such that there would be a greater reliance on imported water or other water supply sources. El Dorado Union High School Dist. v. City of Placerville, 144 Cal. App. 3d 123 (1983). The SED should discuss the potential impacts that would result from increased demand for these alternative sources.	See response to 15.111. Further, *El Dorado Union High School Dist. v. City of Placerville* (1983) [144 Cal. App. 3d 124] (*El Dorado Union*), bears no relevance to this comment. *El Dorado Union* addresses the direct impact of a new subdivision on the school district and the failure of the city to address those direct impacts in its EIR. The Courts found that there was substantial evidence in the record to show the project would have a significant impact on the school district and the city erred in making a finding of no impact. Since adoption of the proposed Amendment will not change the existing condition as it relates to water supply, no discussion is required.
15.113	Among other things, relying on alternative sources of water would result	Comment noted. See response to 15.111.

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	in the need to export more drinking water from the Delta, which could place greater strains on the biology/marine life in the Delta. In addition, greater imports of water from the Delta, the Colorado River, or other distant locations could increase greenhouse gas emissions with resulting climate change impacts.	
15.114	Additional storage and transportation water in the absence of desalination options could also require the construction of water supply infrastructure, with associated environmental impacts.	Comment noted. See response to 15.111.
15.115	The SED should be revised to assess the potential of the Amendment to cause increased reliance on other water supply sources and their reasonably foreseeable environmental impacts. For example, the EIR for the Huntington Beach plant analyzed alternative water supply options in determining the environmentally superior alternative: "Water planning professionals have forecasted that water demands would increase in the Southern California area, and have specifically identified resource targets to help meet projected demands, including local seawater desalination facilities...Consequently, adoption of the "No Project" alternative would result in shifting the obligation for meeting a portion (up to 56,000 acre-feet per year [afy]) of future water demands from the project to: (1) increased conservation efforts (efficiency improvements and reduced consumption); (2) increased use of imported water supplies; (3) increased use of groundwater supplies; (4) construction of additional local water supply projects; and/or (5) construction of seawater desalination projects elsewhere in Orange County. Therefore, in some instances, the environmental impacts associated with the "No Project" alternative may be greater than those associated with the project." (Huntington Beach Draft Subsequent EIR at p. 6-3.) Thus, increased desalination may be the environmentally superior alternative to other water supply options, and additional restrictions on desalination may result in additional adverse environmental impacts.	See response to 15.111. Further, new water supplies, whether from desalination or some other source, has have growth- inducing impacts. The example provided from the Huntington Beach facility EIR for determining the “environmentally superior alternative” is more an exercise in justification rather than project alternative analysis. Construction of desalination facilities does not preclude an increased demand of on other water resources.
15.116	The SED should also specifically analyze the impacts that the additional	See responses to 15.111 through 15.115.

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	restrictions proposed in the Amendment may have on the Carlsbad plant, which has already been approved by the State Board, is under construction, and will begin producing water in 2016. The SED should analyze the potential impacts associated with a delay in the Carlsbad plant's ability to produce desalinated water, or a disruption in the plant's operations. These impacts would include the loss of 7 percent of the county's water supply and the necessity of resorting to alternative water supplies. More broadly, the SED should consider the unintended consequences of unplanned downtimes for desalination plants, including pulling water from other over-subscribed sources and potential regional water supply impacts.	
15.117	The SED Does Not Provide any Basis for the 36-Month Studies Required in the Amendment The Amendment would require 36-month studies for (1) entrainment data if an applicant is seeking to use an alternative to fine screens on a surface seawater intake, (2) baseline benthic modeling for an applicant seeking a facility-specific salinity standard, and (3) the entrainment study for the mitigation plan. The SED, however, does not evaluate or attempt to support the 36-month duration for these studies, and there is no justification for this time period. The SED is silent as to any scientific basis for a three-year study of baseline benthic modeling to determine if a facility-specific salinity standard is appropriate, and is similarly silent as to any basis for a three-year entrainment study to determine whether larger screens may be used. The SED fails to explain why a three-year entrainment study is required to inform the determination of whether fine screens are beneficial. To the extent the State Board believes a 36-month study is required, the rationale for each study should be assessed in the SED, and be supported by substantial evidence.	Please see response to comment 15.5
15.118	The SED must also disclose that requiring 36 months of studies would disrupt or delay urgently needed desalinated water supply sources in the face of an extreme drought.* The SED should also clarify whether there is an exception to the 36 months of studies for existing plants. For example, for Poseidon's Carlsbad project, requiring three-year studies would impede Poseidon from fulfilling the timeline for re-permitting Carlsbad in	Please see response to comment 15.5

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	light of the planned 2017 Encina Power Station shut-down and could result in the plant being idle for years. Specifically, Poseidon is conducting an entrainment pilot test to assess whether alternative screens combined with low-impact pumps are beneficial for the Carlsbad plant. Standard protocol for entrainment studies is 12 months. Without substantial evidence that a three-year study is required, the SED should clarify that a Regional Board approved pilot test combined with historic entrainment data relied upon for CEQA review and permitting by the Regional Board and Coastal Commission will suffice for the entrainment study required for the plant's mitigation plan. *The SED should also analyze other potential delays and disruptions related to the use of smaller screens. Smaller screens may become impacted by red tide algae or other biological contaminants that could result in water fouling and additional plant shutdowns or disruptions.	
#16	**Richard Svindland, California American Water**	
16.1	Table 2-1, Page 14 [of the Staff Report with SED]: Include the Sand City BWRO in Table 2-1 Desalination facilities located on the California Coast. The Owner is the City of Sand City. The Operator is California American Water, the Purpose is Municipal/domestic, the Ownership is Public, Production Capacity (MGD) is 0.3 MGD and the Status is Active.	Table 2-1 was based on information from Cooley et al. 2006 and has since been updated based on the information provided in this comment.
16.2	Figure 2-1, Page 15 [of the Staff Report with SED]: Include the Sand City BWRO on Figure 2-1 Existing coastal desalination facilities in California. The latitude and longitude of the Sand City BWRO facility is: 36d36'41.09"N, 121d51'16.92'W and is located as shown below: [see comment letter]	Figure 2-1 was based on information from Cooley et al. 2006 and has since been updated based on the information provided in this comment.
16.3	Table 2-2, Page 17[of the Staff Report with SED]: Station ID 5: Delete "Regional Desalination Project" from the Project Partner title. Please note, that the Regional Desalination Project was a project jointly proposed by California American Water, Marina Coast Water District and the Monterey County Water Resources Agency. For various reasons that project is not moving forward, but it is not tied in any way to the People's Water Desai Project that is listed in the Table.	Table 2-2 was based on information from Cooley et al. 2006 and has since been updated based on the information provided in this comment.

Please note all tables and figures referenced are present at the end of this document

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16.4	Table 2-2, Page 17 [of the Staff Report with SED]: Please include California American Water's proposed desalination project named the Monterey Peninsula Water Supply Project (MPWSP). This project is currently under review by the California Public Utilities Commission and is the project that we are pursuing to comply with SWRCB Order 95-10 and the 2009 CDO. The Project Partner would be California American Water. The location is North Marina, Monterey County. The production capacity (MGD) is 9.6 MGD. The intake is subsurface and the brine discharge is commingled with wastewater.	Table 2-2 was based on information from Cooley et al. 2006 and has since been updated based on the information provided in this comment.
16.5	Figure 2-2, Page 18 [of the Staff Report with SED]: Include the MPWSP on Figure 2-2 Proposed desalination facilities in California as of 2014. The latitude and longitude of the MPVVSP desal plant is: 36d42'54.86"N, 121d46'22.11"W and is located as shown below: [see comment letter]	Comment noted. Table 2-2 was based on information from Cooley et al. 2006 and has since been updated based on the information provided in this comment.
16.6	Section 8.3.2.1.1, page 55 [of the Staff Report with SED], first bulleted item: In the first bullet. Delete Marina Coast Water District and replace it with Sand City BWRO. It should be noted that the Marina Coast Water District does have a 0.3 MGD desal plant that is inactive which is located at the western end of Reservation Road in the City of Marina.	Section 8.3.2.1.1 of the Staff Report with SED was updated based on the information provided in this comment.
16.7	Section 8.3.2.1.2, page 55 [of the Staff Report with SED]: Under Slant Wells, we believe it is important to note in the text and document the slant well that has been constructed and been running at Doheny State Beach Park at Dana Point for several years. A copy of one of many reports on the project can be found at: www.usbr.gov/research/AWT/reportpdfs/report152.pdf	Section 8.3.2.1.2 of the Staff Report with SED was updated based on the information provided in this comment.
16.8	Table 12-1, page 119 [of the Staff Report with SED]: Change the Major On-site Features to read as follows: "Main structures RO Building, control room/administration building, media filtration pretreatment area, post treatment and disinfection area, chemical storage and handling facility, two 300,000 gallon filtered seawater storage tanks, two 750,000 gallon finished water storage tanks, pump stations, power sub--station, brine storage basin, solids handling basins, product water pipeline(s), brine conveyance pipeline, and a raw	Table 12-1 of the Staff Report with SED was updated based on the information provided in this comment.

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	water pipeline."	
16.9	Table 12-1, page 119 [of the Staff Report with SED]: Change the Offsite Features to read as follows: "Drill and install up to 10 (8 active, 2 standby) subsurface slant wells on a 376 acre parcel which is currently used for sand mining and contains approximately 7,000 feet of shoreline. A 42- inch diameter, 14,300 foot long source water main. A 24-inch diameter, 6,300 foot long pipeline to convey RO brine to an existing wastewater treatment plant and outfall. Over 20 miles of up to 36-inch diameter, pipeline(s) to convey potable water to California American Water's existing system and as necessary to accommodate basin return flow obligation, if any, and related appurtenances. Two 3 million gallon ground storage tanks, three booster pump stations and two aquifer storage and recovery wells."	Table 12-1 of the Staff Report with SED was updated based on the information provided in this comment.
#17	**Anthony T. Jones, IntakeWorks**	
17.1	I would be happy if the Board decides to make a preference toward subsea intakes. However, this restricts the proponents and their designers from deciding the best course of action for the specific site in question.	Desalination intakes for new or expanded facilities are regulated under Water Code section 13142.5(b), which states, "For each new or expanded coastal powerplant or other industrial installation using seawater for cooling, heating, or industrial processing, the best available site, design, technology, and mitigation measures feasible shall be used to minimize intake and mortality of all forms of marine life." This section of the Water Code requires an owner or operator to minimize intake and mortality of all forms of marine life by identifying the best available alternative for each of the four factors individually, and then select the best combination of factors that in combination minimize intake and mortality of all forms of marine life. Subsurface intakes are the preferred technology because of the reasons described in section 8.3 of the Staff Report. Section L.2.d(1)(a) of the proposed Desalination Amendment requires subsurface intakes unless they are infeasible. When determining subsurface feasibility, the regional water boards will consider the factors listed in section L.2.d(1)(a)i. of the proposed Desalination Amendment. This list of

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		factors includes a variety of site-specific considerations. Subsurface intakes will not be feasible in all cases, but they should be considered first before all other intake options because they are the best means to minimize intake and mortality of all forms of marine life.
17.2	Staff did not include a specific slot size for intakes. Is it in the Water Board's interest to define a standard slot gap? Over-regulation at this early stage in the development of desalination project can also lead to problems and unintended consequences. The determination of the slot size and approach to the problem should be determined by the proponent of the desalination system and their design consultants.	Comments were solicited for a range of screen slot sizes (0.5, 0.75, 1.0 mm). The State Water Board selected one screen slot size based on the best available science and after considering public comments. The selection of a single screen slot size will ensure: the protection of related beneficial uses of ocean waters, that there is statewide consistency in regulating desalination intakes, and that the regulation will be in accordance with Water Code section 13142.5(b). Please see response to comment 15.4 regarding the selection to 1.0 mm slot size screens. The comment that the proposed screen slot sizes would be “over-regulating.” is not well supported. Section 8.3.1.2.3 of the Staff Report with SED discusses how intake screens with slot sizes ranging from 0.5 mm to 1.0 mm can be used to reduce entrainment of marine life. Section 8.3.1.2.3 of the Staff Report with SED also looks at other screen slot sizes. West Basin Municipal Water District and other project proponents have commented that they have some concerns with screens with slot sizes less than 1.0 mm, but that 1.0 mm slot size screens are feasible and functional. (CalDesal and West Basin) Since the commenter did not elaborate on their concern with potential “problems and unintended consequences” with the proposed slot sizes, a response to those concerns cannot be formulated. As mentioned in response to comment 17.1, desalination intakes for new or expanded facilities are regulated under Water Code section 13142.5(b) that requires an owner or operator to minimize intake and mortality of all forms of marine life by using the best available site, design, and technology feasible. Mitigation measures will be used after implementing the best available site, design, and technology. Subsurface intakes are considered the best available intake technology because they do not impinge or entrain organisms (Staff Report with

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		SED section 8.3). However, subsurface intakes are not feasible in all cases. When subsurface intakes are infeasible, an owner or operator can use a screened intake. Studies have shown that smaller slot sizes are better in terms of protecting marine life. (EPRI 2005; Weisberg et al. 1987; Tenera Environmental 2013b) Since subsurface intakes do not impinge or entrain marine life, it is important that intake screens on surface intakes minimize intake and mortality of marine life to the maximum extent feasible.
17.3	Vastly different coastal geology is observed in the State of California north of Point Conception versus the shorelines in Southern California. I personally do not have a problem with regional decisions on direct intake designs.	Comment noted.
17.4	Concerning the Brine Discharge draft amendments, I concur with Staff Recommendation that Desal Proponents should evaluate dispersal methods relative to site-specific characteristic. And we would be in favor of defusing brine via flow augmentation, only if augmented waters are drawn thru subsurface intakes to eliminate impingement and entrainment mortality.	Flow augmentation systems that use subsurface intakes are ideal because there would be no additional operational mortality attributed to the intake or discharge if the system provides an adequate volume of water for brine dilution. This alternative for a facility is incentivized by the fact that the mitigation requirements would be significantly reduced if not eliminated entirely. During stakeholder outreach for the project, project proponents mentioned the importance for site-specific considerations. Additionally, the State Water Board would like to allow for future technological innovations in plans and policies. Flexibility for both site-specific considerations and future technological innovations has been included in the proposed Desalination Amendment. For brine discharges, commingling brine with wastewater is the preferred alternative and discharging brine through multiport diffusers is the next preferred brine discharge alternative when wastewater is unavailable for dilution. Multiport diffusers rapidly disperse and dilute brine; however, there is shearing-related mortality that may result when using this discharge technology. (Foster et al. 2013). Even though there may be some marine life mortality associated with discharging through multiport diffusers, the Expert Review Panel on Entrainment Impacts and Mitigation recommended them as a preferred alternative for

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		discharging undiluted brine. In order to leave the opportunity for future technological innovations, staff included an option in the proposed Desalination Amendment for alternative brine disposal technologies, including flow augmentation. The alternative brine disposal technologies would have to be as protective as multiport diffusers. This approach accommodates for site-specific considerations and future technological innovations. Whereas limiting flow augmentation systems to subsurface intakes would prevent flexibility for an owner or operator.
17.5	I would caution the board that the conclusion on the multi-diffuser port is from mathematical models. My understanding of the model is that the models do not take into account double diffusivity (diffusion of the water and diffusion of the salt).	It is unclear what is meant by “I would caution the board that the conclusion on the multi-diffuser port are from mathematical models.” We assume the commenter is saying the mortality data associated with multiport diffusers has been solely studied through modeling and not through empirical studies. Chapter III.L.2.a.(1) of the proposed Desalination Amendment enables the regional water boards to require an owner or operator to perform additional studies to assess diffuser-related mortality. It is also unclear what the significance of the second portion of the comment is. Additional clarification is needed in order for staff to respond.
17.6	I concur with Staff Recommendation on salinity management of 2 ppt at the edge of the zone of initial dilution of 100m radius from discharge point. Giving the Desalination Proponent a means to define facility-specific salinities limits for receiving waters is reasonable given our state of knowledge.	Comment noted.
17.7	One final thought, the process of separating the potable water (0.5 ppt) from seawater (33.5 ppt) involves work. The molecules are more organized than when they entered the system. The release of the concentrated reject (67 ppt) back into the environment is a source of energy that could be tapped. Experiments we have performed looked at discharging brine into seawater are presented below. Due to the miscibility of the two solutions, attaining an outcome of 2 ppt is quite easily done.	Comment noted.

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#18	**Ron Davis, CalDesal and the Association of California Water Agencies**	
18.1	The Board should and we believe does recognize desalination as an important local and regional sustainable water supply and reliability option in order to improve water supply reliability, to help reduce reliance on imported water and in the face of climate change, to better meet future regional and local needs.	Comment noted.
18.2	The Ocean Plan Amendments should recognize the site-specific nature and unique marine habitat at each proposed location for a desalination facility. The salinity objective should be based on site-specific species that could be impacted by the facility. Feasible intakes and brine disposal methods require site specific investigation to determine the most cost-effective approach that is protective of water quality and would produce the necessary supply capacity for the project.	One of the project goals, as stated in Section 4.3 of the Staff Report, is to: *“Provide a consistent statewide approach for minimizing intake and mortality of all forms of marine life, protecting water quality, and related beneficial uses of ocean waters. Meeting this goal will address the need for a uniform statewide approach for controlling adverse effects of desalination facilities that are not currently addressed in the Ocean Plan or the Statewide Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling (Once-Through Cooling [OTC] Policy).”* During stakeholder outreach, many stakeholders expressed the desire for flexibility in the proposed Desalination Amendment to accommodate for site-specific conditions. The proposed Desalination Amendment meets the project goal of providing a consistent statewide standard that is protective of the environment, while at the same time providing flexibility for site-specific considerations and future technological innovations. For example, chapter III.L.2.b contains siting factors for the regional water board to consider and analyze when determining the best available site feasible for a desalination facility. Chapter III.L.2.d.(1)a.i. includes a long list of site-specific factors to be considered when determining the feasibility of subsurface intakes. Chapter III.L.2.d allows for the use of equally protective alternative intake and discharge technologies and the proposed Desalination Amendment includes an opportunity for an owner or operator to apply for an alternative receiving water limitation for salinity. Please see response to comment 6.10 regarding the use of site-specific species for determining alternative receiving water limitations for salinity.

Please note all tables and figures referenced are present at the end of this document

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18.3	The Ocean Plan Amendments need to incorporate a definition of "feasibility" that takes into consideration economic feasibility when applying the amendment provisions which is consistent with CEQA.	Please see response to comment 6.12.
18.4	The Ocean Plan Amendments should not identify a preferred "Best Available" technology over others. The Ocean Plan Amendments should establish a standard based on sound science for intakes and brine disposal, and allow a project proponent to develop the most suitable technology and design that meets both the project's capacity needs and that meets the objectives of Section 13142.5(b) of the water code. There should be only a one track approach to intakes and not the two track approach for intakes as originally proposed by staff.	Water Code section 13142.5(b) requires that industrial installations (desalination facilities) using seawater, shall use the "best available site, design, technology, and mitigation measures feasible to minimize intake and mortality of all forms of marine life." The State Water Board commissioned a number of Expert Review Panels that identified the best available intake and discharge methods for desalination facilities and their conclusions were based on sound science. The proposed Desalination Amendment and Staff Report were also subjected to an external scientific peer review. We identified preferred technologies that are based on the conclusions from the Expert Review Panels and scientific peer review. In order to provide a consistent statewide approach for minimizing intake and mortality of all forms of marine life, protecting water quality, and related beneficial uses of ocean waters, the proposed Desalination Amendment includes a hierarchical ranking of intake and discharge technologies that are based on the conclusions from the Expert Review Panels and scientific peer review. For additional information on why certain technologies have been identified as preferred or best available, please see Foster et al. 2012 and 2013, Roberts et al. 2013, and responses to comments 15.2, and 15.6.
18.5	CalDesal is open to a mitigation fee, but we believe it is critical that the fee have a direct nexus to the potential impacts of a project and that it should be calculated and applied one time to cover all marine organism mitigation requirements for a project, inclusive of all state permitting agencies. Assuming the Board is able to develop a mitigation fee that CalDesal and other stakeholders can support, CalDesal submits that each desalination project proponent should have the option of paying the mitigation fee or building their own mitigation project or utilizing an existing restoration project. Moreover, CalDesal is ready to work with the appropriate state agencies to pass legislation to set up the mechanics for the mitigation fee. In addition, the magnitude and significance of the impacts on the overall marine environment should be understood in	The proposed Desalination includes placeholder language that allows an owner or operator to pay in-lieu mitigation funding. The Expert Review Panel on Mitigation and Fees for the Intake of Seawater by Desalination and Power Plants developed a per million gallon fee that was based on existing power plant mitigation projects that could be applied to mitigation of impacts from desalination facilities. (Foster et al. 2012) Stakeholders were generally unsupportive of the fee developed by Foster et al. (2013) when the issue was discussed during stakeholder outreach meetings in June and July of 2013. Stakeholders on both sites (proponents and NGOs) wanted a resource economist to participate in the development of the in-lieu mitigation fee and committed to work together to find a resource economist to develop a

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	context to the larger issues of concern: overfishing and pollution.	fee. We did not include a dollar amount for the mitigation fee because of the negative feedback received during the stakeholder outreach and because further research indicated that the cost of mitigation projects can be highly variable. We agree that the magnitude and significance of the impacts on the overall marine environment is important. However, Water Code Section 13142.5(b) requires consideration and mitigation of all forms of marine life. Consequently, the mitigation fee needs to compensate for mortality of all forms of marine life that is associated with the construction and operation of a desalination facility. Furthermore, there is no mitigation program at present in California that can accept and spend the mitigation funds and that also mitigates for desalination impacts. We have heard that stakeholders would like to move forward in the development of such a program and to establish a mitigation fee for seawater intake at desalination facilities. While there is interest in participating as a collaborator on this issue, the State Water Board does not have the resources at this time to take a lead role. Please also see response to comment 29.7.
18.6	The Ocean Plan Amendments should allow alternative brine discharge technologies where such technologies used in conjunction with site-specific conditions would result in marine life protection comparable to that of other methods that would meet the Section 13142.5(b) requirements. Such technologies include flow augmentation and co-mingling with wastewater discharges. With respect to brine discharge from brackish groundwater recovery facilities, co-mingling with treated municipal wastewater should be allowed as long as receiving water objectives are met. Furthermore, the point of compliance for such facilities should be at the end of the Zone of Initial Dilution for wastewater outfalls or at the end of the Brine Mixing Zone for dedicated multiport brine disposal lines.	Commingling brine with wastewater is the preferred brine discharge method because it best minimizes intake and mortality of all forms of marine life. The next preferred method is discharging brine through multiport diffusers because they are the second best method for minimizing intake and mortality of all forms of marine life. The proposed Desalination Amendment does provide flexibility for alternative brine disposal technologies as long as an owner or operator can demonstrate to the regional water board that the alternative technology provides a comparable level of protection of all forms of marine life as multiport diffusers (See chapter III.L.2.d.(2)(d)). Chapter III.L.2.d allows for commingling brine with wastewater and chapter III.L.3 requires that the receiving water limitation for salinity be met for facilities that commingle. We agree the point of compliance for such facilities should be at the end of the zone of initial dilution for wastewater outfalls discharging positively buoyant plumes or at the end of the brine mixing zone as defined in the proposed Desalination Amendment for 1) dedicated multiport brine disposal lines, and 2)

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		facilities that commingle brine with wastewater, but the volume of wastewater is not sufficient to dilute the brine to levels lower than natural background salinity and the resulting commingled discharge is negatively buoyant.
18.7	Existing or planned facilities that have been approved by the California Coastal Commission as of the effective date of the Ocean Plan Amendments should be considered "existing facilities." Application of the Ocean Plan Amendments to "existing facilities" should be limited to desalination plants that are required to submit a new report of waste discharge due to significant changed conditions. All new and expanding desalination facilities must comply with requirements in the Ocean Plan Amendments. The Ocean Plan Amendments should include an exemption for existing and future facilities with intake capacities less than a certain size to be determined through further discussion between the State Board and stakeholders.	The proposed Desalination Amendment defines “existing facilities” as those that have been issued an NPDES permit and all building permits and other governmental approvals necessary to commence construction (including any required approval by the California Coastal Commission) for which the owner or operator has relied in good faith on those previously-issued permits and approvals and commenced construction of the facility beyond site grading prior to the effective date of the amendments. The commenter would seek to have an existing facility include one for which the owner or operator has obtained approvals but otherwise taken no action to commence construction. California case law governing development and vested rights distinguishes between “soft” development costs such as land, options, planning and design, versus “hard” construction costs. See, Raley v. California Tahoe Regional Planning Agency (1977) 68 Cal.App.3d 965, 985-6. The proposed definition of an existing facility seeks to ensure that an owner or operator who has, in good faith, complied with all regulatory requirements and commenced construction of a desalination facility, is not thereafter required to revisit earlier determinations. A facility planned, but never built, should not be afforded the same protections. Exemptions based upon intake capacity may not be protective of the marine environment. Site-specific considerations such as distribution of marine life and biological productivity within an area proposed for a desalination facility intake are such that any uniform exemption based upon intake volume is unlikely in all cases to meet best available site, design, technology and mitigation measures feasible to minimize intake and mortality of all forms of marine life, as directed by Water Code section 13142.5(b).
18.8	CalDesal supports the protection of larval, juvenile, and adult stages of marine life through the use of marine protective technologies (e.g.,	A mitigation credit may be applied, but based on the conclusions from the Expert Review Panel on Desalination Plant Entrainment Impacts

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	wedge wire screens) to avoid impingement and minimize entrainment losses. Project applicants should be credited for using such marine protective technologies when calculating Empirical Transport Model (ETM) for mitigation purposes since the ETM methodology assumes open intakes.	and Mitigation (Foster et al. 2013), screens reduce entrainment of all organisms present in seawater by no more than one percent. Therefore, the credit for a mitigation screen should be no more than one percent. Subsurface intakes do not impinge or entrain marine life and consequently do not require mitigation for operational-related mortality; however, they are not feasible at all locations. Screens with small slot sizes (0.5 to 1.0 mm) can be installed at open seawater intakes to reduce entrainment of adult organisms and larger larvae. Smaller organisms like phytoplankton will still be entrained even if screens with very small (<0.5 mm) slot sizes are used. These small organisms are a critical component of the marine ecosystem because they form the base of the marine food web. Per the requirements set forth in Water Code section 13142.5(b), an owner or operator of a new or expanded desalination facility will be required to mitigate for any entrainment mortality that occurs at a screened intake. The Expert Review Panel on mitigation recommended using the empirical transport model coupled with the area of production forgone (ETM/APF) method to assess mitigation at desalination intakes. The ETM/APF model is based on an open pipe or unscreened intake. The ETM/APF model assumes that the species that are assessed in the model represent the species that are not assessed, including organisms that are too small to include in the ETM/APF model. The Expert Review Panel was asked how to adjust the mitigation acreage for entrainment reduction devices like screens. The Expert Review Panel provided a clear method for how to appropriately apply the entrainment reduction to the APF calculation. Additionally, the Expert Review Panel reported that while screens can be an effective tool for reducing entrainment of larger larval organisms, when all organisms in seawater are considered, screens reduce entrainment mortality less than one percent. (Foster et al. 2013), A regional water board could credit an owner or operator one percent of their mitigation acreage that would be required for the facility's

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		intake-related impacts when using a screened intake. An owner or operator should not be allowed to determine their own mitigation credit for their facility because factors used the mitigation credit calculation can dramatically affect the resulting mitigation credit. There are concerns that an owner or operator would incorrectly calculate and apply the entrainment credit to the ETM/APF calculation, which could result in insufficient mitigation for the facility's impacts. In 2013, West Basin Municipal Water District submitted a report called "Entrainment: Intake Entrainment 5 Step Calculation" to the State Water Board. The mitigation assessment method described in the report used a "whole-life cycle" approach and head capsule entrainment modeling data (to factor in the entrainment reduction from the screens) to come up with an entrainment ratio which they then applied to the acres required for mitigation. The State Water Board asked the Expert Review Panel to review West Basin's mitigation credit method and their comments are in Appendix 4 of the Final Report for Desalination Plant Entrainment Impacts and Mitigation (http://www.swrcb.ca.gov/water_issues/programs/ocean/desalination/docs/erp_final.pdf). In their review, the Expert Review Panel stated, "There are a number of questions/issues that need to be addressed prior to a substantive assessment of WBMWD (2013)." Some of the conclusions and assumptions in West Basin's report were not adequately explained and their mitigation assessment method incorrectly applied the "credit" they calculated to the mitigation model, which significantly reduced the acres required for mitigation. The ETM/APF mitigation model is complicated enough without having to do additional studies and calculations to determine and apply a mitigation credit. As mentioned earlier, the method used to determine the mitigation credit can significantly influence the end result. Figure 18.8-1 below demonstrates how the entrainment credit can change depending on the size of organisms included in the calculation. The ETM/APF study in the proposed Desalination Amendment only

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		requires the analysis of organisms 0.3 mm and larger. Organisms smaller than 0.3 mm should be factored in to the entrainment reduction calculation; however, we do not require an owner or operator to sample organisms smaller than 0.3 mm. In order to holistically assess entrainment, an owner or operator would be required to do additional studies to measure entrainment of organisms smaller than 0.3 mm. The regional water board can apply a one percent credit for the screens because it would 1) provide a consistent statewide standard for mitigation credit for screens, 2) prevent an owner or operator from having to perform additional studies, and 3) would prevent the risk of inadequate mitigation resulting from either the use of an inappropriate mitigation assessment model or an incorrect calculation in the ETM/APF model.
18.9	The entrainment study requirements set forth in the desalination amendments should be consistent with standard protocols for such studies including but not limited to 12 month duration, 335 micron mesh nets, study specific confidence intervals, and allowance for use of existing data collected using standard protocols. The approach recommended by CalDesal, discussed in further detail below, is called the Reproductive Ocean Impact Methodology (ROIM). This procedure synchronizes existing methodologies recommended by the Expert Review Panel's final report, Empirical Transport Model (ETM) and the Area of Production Forgone (APF). This approach also integrates the Whole Life Cycle Methodology to calculate total entrainment and mitigation.	Regarding study duration, please see response to comment 15.5. Regarding the mesh sampling net requirement, please see response to comment 15.48. Please see response to comment 21.90 Regarding confidence intervals. The proposed Desalination Amendment allows the use of existing data at the discretion of the regional water boards. Regarding the use of a Whole Life Cycle Methodology (e.g. ROIM, AEL, and FH), under Water Code section 13142.5(b), new or expanded industrial (desalination) facilities using seawater are required to mitigate for mortality of all forms of marine life. A definition of "all forms of marine life" was added to the proposed Desalination Amendment and is defined as "all life stages of all marine species." This definition includes eggs, sperm, zygotes, larvae, and juveniles. Whole Life Cycle assessment methods factor in the high natural mortality of these life stages and consider their losses in terms of affects to the population. While Whole Life Cycle assessment methods can assess impacts at a population level, it does not consider or mitigate for the effects on the food web. Furthermore, Whole Life Cycle assessment methods do not provide mitigation for all forms of marine life and would not be a mitigation assessment method to meet the mitigation obligations in Water Code section 13142.5(b). Combining a ROIM approach with an ETM/APF analysis is also inappropriate because it

Please note all tables and figures referenced are present at the end of this document

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		would also not provide mitigation for all forms of marine life and consequently would not meet the mitigation obligations in Water Code section 13142.5(b).
18.10	Definition of the term "feasible" It is important that this term be defined and be consistently utilized. It should be noted that in the recent Court of Appeals Decision in Surfrider Foundation v. Cal. Regional Water Quality Control Board, 211 Cal. App. 4th 557 (2012), the court upheld the use of the definition of "feasible" under CEQA. Under CEQA, "feasible" means "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social and technological factors". The Coastal Act relies on the same definition. For consistency, the SWRCB should incorporate this same definition and include it under Definitions. Page 17- Add Definition of "Feasible": FEASIBLE means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social and technological factors.	Please see response to comment 6.12.
18.11	Clean Up Inconsistent Language Section 13142.5(b) application to intake and brine disposal should be made consistent throughout the document. The terminology, "Best available site, design, technology and mitigation feasible... "needs to be consistent and used throughout the document. For example, Page 2, sections L.1.c. and L.2. - "Best available" needs to be inserted before site, and "feasible" inserted after Measures. There are other places in the document where similar abbreviated versions are used and these should be all made the same per 13142.5(b).	Please see response to comment 6.1.
18.12	13142.5(b) Determination Process Page 2. L.2.a. [of the proposed Desalination Amendment] This section describes how regional boards would conduct 13142.5(b) determinations with guidance from the SWRCB. Their determinations would be based on	Please see response to comment 6.2.

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	information provided by the project proponent. We are concerned that the regional boards would in essence have the ability to make critical design decisions regarding intakes, yet lack technical expertise and resources to carry out the provisions in this section. We urge the SWRCB to consider restructuring this section. Project proponents should submit 13142.5(b) studies and determination analysis using the same guidelines described. Regional boards would then be responsible for reviewing the project applicant's best available site, design, technology and mitigation measures feasible to make their determinations and ensuring it is consistent with this section with support from the SWRCB. We recommend that the second sentence in the first paragraph on Page 2 under item 2.a.(1) be changed to read: "This request shall include sufficient information that demonstrates that the project provides the best available site, design, technology and mitigation measures feasible which shall be used to minimize the intake and mortality of all forms of marine life in its request for a Water Code section 13142.5(b) determination to --for-- the regional water board to conduct the analyses described below."	
18.13	Consultation with other agencies. Page 3. L.2.a.(4) [of the proposed Desalination Amendment]. This provision requires regional boards to consult with other state agencies but states the regional boards would not be limited by prior rulings made by these agencies. Allowing regional boards to add on to rulings made by other agencies after the fact undermines the permitting process and creates regulatory uncertainty. We suggest this section require the regional boards to consult with and make consistent their determinations with other state agencies.	Each agency is responsible for implementing requirements based on their individual authorities. The proposed Desalination Amendment encourages interagency collaboration and the Water Boards will consider findings made by other agencies when making their determinations. However, the determinations made by the regional water boards must be consistent with their authorities. Requiring the regional water boards to make their findings consistent with other agencies could constitute an unacceptable delegation of authority to other agencies with different mandates. Unless otherwise directed, the State and regional water boards may not defer to other agencies in requiring protection of beneficial uses of waters of the state. Also, please see response to comment 12.18.
18.14	Size of project must be left to the project proponent. Page 4. L.2.b.(1) [of the proposed Desalination Amendment]. This provision (under determination of the best site available), brings into the Ocean Plan the determination whether the proposed ocean desalination facility is needed and whether the proposed project is consistent with an	The proposed Desalination Amendment was revised to consider the identified need, rather than regional need, for desalinated water consistent with applicable adopted county general plans, integrated regional water management plans, or urban water management plans, or other water planning documents if these plans are unavailable. The proposed Desalination Amendment language in chapter III.L.2.b.(2)

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	integrated regional water management plan or an urban water management plan and County or City general plans regarding growth. This determination is beyond the scope of the statutory requirement under Section 13142.5, as project size is clearly not part of the determination of the best available site, design, technology or mitigation. Water supply agencies, not the State Board or Regional Boards, are responsible for determining the need for local resource developments. Water supply agencies typically utilize a diverse set of water sources to provide a reliable supply to ensure that the basic health and safety demands of California can be met on a near- and long-term basis. Typically, the need and sizing options for a project are considered long before permitting for the project begins. This includes any number of water agency plans and evaluations. Need is considered during the project planning phase and CEQA process before permits such as the Coastal Development and NPDES permit are obtained. This provision has the potential to undermine water agency resource plans, CEQA, and related documents after the fact and is not the function of the Regional Boards. For these reasons we urge the SWRCB to consider removing this provision. In the event that the SWRCB keeps this provision, it should be expanded to also include water agency Water Master Plans, Water Resource Plans, Regional Integrated Water Resources Plans, Water Reliability Plans, and related facility planning documents.	(formerly (1)) does not propose that the Water Boards will be determining the need for desalinated water. But it requires that need for desalinated water be considered in context of minimizing intake and mortality of all forms of marine life per Water Code section 13142.5(b). The amount of water a facility takes in through a surface intake is within the statutory authority of Water Code section 13142.5(b) because the intake volume from a surface intake is directly related to the amount of impingement and entrainment. Taking in less water through a surface water intake is a siting or design element that would minimize intake and mortality of all forms of marine life. The provision in chapter III.L.2.b.(2) helps to ensure that project is not built to an unnecessary scale based on inflated water needs. The language "A design capacity in excess of the water need for desalinated* water shall not be used by itself to declare subsurface intakes as not feasible.*" was moved to the technology section (chapter III.L.2.d.(1)(a)), but also included to ensure that an owner or operator would not declare subsurface intakes infeasible based on inflated water needs. There were two primary alternatives for this section of the proposed Desalination Amendment. The first option would be to require an owner or operator to use subsurface intakes for as much of the intake water as possible. This means if a facility needed 20 MGD and could only do 5 MGD subsurface, they would have to use a subsurface intake for 5 MGD and the rest with a surface water intake or find an alternative water supply option. It would be inappropriate to apply this standard to all desalination facilities without considering site-specific factors. The regional water boards may still determine a combination of subsurface and surface intakes is the best available intake technology feasible. However, we recognize that this will have to be determined on a project-specific basis. The second alternative, which is the approach that was taken in chapter III.L.2.b.(2) of the proposed Desalination Amendment, is to have an owner or operator demonstrate an actual need for the water. It is appropriate to consider the regional need because there is a concern that an owner or operator may have an incentive to choose to build a surface intake because of the cheaper capital costs. In the absence of

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		any provisions, it is possible for an owner or operator to use inflated regional water need numbers to rule out the feasibility for subsurface intakes. Please also see response to comment 6.3.
18.15	Determination that Subsurface Intakes are infeasible by the Regional Board. Page 6, L.2.d.(1)(a)i. [of the proposed Desalination Amendment] allows the Regional Board to make a determination that subsurface intakes are infeasible based on their analysis of specified criteria, including "presence of sensitive habitats, presence of sensitive species, energy use, impact to freshwater aquifers, local water supply, and existing water users..." This section should allow mitigation of impacts and not be solely used by the Regional Board to determine that a subsurface intake is infeasible due to a finding of the presence of any of these criteria. The following language should be added: "Project mitigation measures and monitoring programs that would minimize impacts to coastal resources shall be considered by the Regional Water Board in such determinations."	Please see response to comment 6.5.
18.16	Feasibility re: lifecycle cost/site specificity Page 6. L.2.d.(1)(a)i. [of the proposed Desalination Amendment] on page 6 defines factors to be considered in determining if a sub-surface intake is infeasible, and includes "life-cycle" costs as a factor. We agree that project life-cycle costs should be considered. However, due to site- and project-specific variables, the pre-treatment benefits of sub-surface intakes and related maintenance costs must be considered on a case by case basis. For example, beach wells may encounter Iron and Manganese water quality issues that could require higher pre-treatment costs. Likewise, maintenance costs for infiltration galleries and other alternative intakes are relatively unknown and could be significant. We request the SWRCB consider adding language to clarify that actual life-cycle cost estimates that will used in the feasibility analysis, as generic cost savings estimates would not be applicable to all projects.	There are no provisions in the proposed Desalination Amendment language preventing an owner or operator to use the actual project life cycle cost when determining the feasibility of subsurface intakes.

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18.17	Siting Issues Page 4. L.2.b.(6) [of the proposed Desalination Amendment]: This provision requires intakes and outfalls "to the extent feasible" to be sited to maximize the distance from MPAs and SWQPAs. Later provisions also call for using ETM--empirical transport modeling to estimate intake entrainment areas. The ETM entrainment areas for most intakes will almost always include MPAs. New intakes and outfalls are already disallowed in MPAs and other protected areas. We agree that MPAs and other protected areas are important and need to be considered in the 13142.5(b) determination. Depending on site-specific variables, it is possible that the most protective available intake site might not be the maximum distance from an MPA or MPA cluster. For instance, the maximum distance from two MPAs could be sensitive rocky bottom habit that could otherwise be avoided. Consider adding language to clarify these types of cases or provide additional guidance.	Comment noted. Please also see response to comment 6.4. The regional water boards will take all of these site-specific factors into consideration when determining the best available site feasible for desalination intakes and discharges. There are existing provisions in the Ocean Plan for intakes and discharges into Marine Managed Areas (chapter III.E.). Chapter III.L.2.b.(7) (formerly (6) was revised to clarify that there is an exception for intake structures without associated construction-related marine life mortality (e.g. slant wells) because subsurface intakes were already permitted in chapter III.E.5.(d)(2) permitted sub-seafloor/subsurface intakes in SWQPA-GPs as long as there were studies showing no predicted impingement and entrainment of marine life. The language in chapter III.E.5.(d)(2) was revised to include considerations of construction-related mortality in the studies as well. Chapter III.L.2.b.(7) and chapter III.E.5.(d)(2) are now consistent in that there will be no subsurface intakes allowed in a MPA or SWQPA unless an owner or operator can demonstrate that there is no impingement or entrainment or construction-related mortality (e.g. subsurface intakes excluding infiltration galleries.
18.18	Also, the presence of a MPA in the ETM zone of a potential intake should not be the grounds for infeasibility for screened or alternative intake. Consider adding a statement that once the 13142.5(b) determinations regarding the best site, design, technology and mitigation are complete, the intakes are sufficiently protective of MPAs. The presence of an MPA in a project's ETM entrainment zone should not be cause for disallowing a screened open water intake. Otherwise, there would be nowhere along the coast where they could be sited. We would also oppose any effort to make the presence of an MPA in an ETM zone used as justification for additional mitigation in the APF calculations, as they would already be accounted for in the APF methodology. The staff report on page 61, Section 8.4.4 suggests studies may be used "to demonstrate to the regional water boards that a surface intake will not impact a SWQPA or MPA." We recommend adding this option in the Ocean Plan amendments.	Due to how the MPA network was established to function, many of the MPAs are strategically located so there is interconnectivity among the designated areas. We agree that it may be challenging if not impossible to avoid entraining eggs, larvae, and juvenile organisms that may have originated from a MPA or SWQPA. For this reason, we also agree that if a facility's source water body overlaps with a MPA or SWQPA, surface intakes should not automatically be disallowed. This is another reason subsurface intakes are preferred because they are not restricted by the "maximum distance" requirement since they do not impinge or entrain marine life. This is why the provision to site a surface intake at the maximum distance feasible from a MPA or SWQPA was included. Siting a surface intake at the maximum distance feasible from these protected areas will reduce the impact on the areas. Adding the language the commenter provided, "to demonstrate to the regional water boards that a surface intake will not impact a SWQPA or MPA." would produce results in direct contrast with the expressed wishes in comment 18.18 because one could argue that demonstrating

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		a facility with a source water body that overlaps a MPA or SWQPA is having an effect or "impacting" the designated area. The language would eliminate the possibility of having a surface water intake if the source water body had the potential to overlap or impact a MPA or SWQPA.
18.19	Assuring a "no impact' standard is impossible to comply with as it is possible that some slight increase in salinity from the discharge could reach an MPA or SWQPA under unusual ocean conditions. Since there is natural variation in ocean salinity, it would be difficult to comply with an average condition and this should be changed to not exceeding the natural salinity that would occur at any time.	Please see response to comment 6.4.
18.20	Based on these comments, we suggest the following modifications: Page 4. L2.b.(2) [of the proposed Desalination Amendment] - Change "avoid" to "minimize" to be consistent with Section 13142.5(b). Page 4. L2.b.(6) [of the proposed Desalination Amendment]: "Discharges shall be sited at a sufficient distance from a MPA or SWQPA based on dispersion modeling so that there are no significant impacts from-the discharge on a MPA or SWQPA --and so-- such that the salinity within the boundaries of a MPA or SWQPA does not exceed natural --background-- salinity. --To the extent feasible, intakes shall be sited so as to maximize the distance from a MPA or SWQPA.--"	Please see response to comment 6.4.
18.21	Combining surface and open ocean intakes Page 6. L.2.d.(1)(a)ii [of the proposed Desalination Amendment]. It is hard to imagine a project where constructing two separate intakes would be a preferred intake alternative. First, there would be the construction costs and marine environment impacts for two intakes instead of one. There would likely also be increased on-shore environmental and land use impacts from additional required infrastructure. The added construction and mitigation costs would likely make this option infeasible from a life-cycle cost perspective. Also, using a combination of intakes creates potential treatment design and operational issues due to the	Please see responses to comments 15.3 and 15.34.

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	different source water qualities. For these reasons, we request the SWRCB to consider removing this provision or at least clarifying how it would and when it would be applied.	
22	Recommendation for screen size is 1mm. Page 6. L.2.d.(1)(c)ii [of the proposed Desalination Amendment]: The SWRCB has solicited advice for what screen size to require for open water intakes. We note first that wedge-wire and related screens have not been implemented in a full scale project in the marine environment, and project proponents are acting in good faith in supporting this alternative and performing additional research to ensure this is a viable option and protective of the marine environment. West Basin MWD (West Basin) has completed several studies of wedge-wire screen performance in the past few years. West Basin's most recent research evaluated 0.5 mm, 1.0 mm, and 2.0 screens in real-world operating conditions. The results of the study showed 0.5 mm screens are susceptible to fouling and clogging in real-world conditions, whereas 1.0 mm and 2.0 mm screens were significantly less prone to fouling. Screen fouling is a crucial factor in slot size selection. Frequent fouling increases intake maintenance costs and potentially elevates intake velocities in areas of the screens that are not fouled. Results of West Basin's studies, as well as similar studies performed by the Santa Cruz Water District, have been provided to SWRCB staff and the expert panels. West Basin is conducting additional studies on material selection for wedge-wire screens to address the high corrosion and biofouling potential of the marine environment. CalDesal supports West Basin's recommendation that the SWRCB require a slot size of no smaller than 1.0 mm. Screens with 1.0 mm slot sizes can eliminate impingement, and balance significantly reduced entrainment impacts with minimized screen fouling.	Comment noted. For additional information on screen slot size, please see response to comment 15.4.
18.23	As proposed, potential for recycling would prohibit co-disposal of brine with municipal wastewater.	Please see response to comment 6.6.

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	Page 7. L.2.d.(2)(a) [of the proposed Desalination Amendment]. For this provision, we suggest the following modification: "The preferred technology for minimizing mortality of marine life resulting from brine* disposal is to commingle brine* with wastewater (e.g., agricultural, sewage, industrial, powerplant cooling water, etc.) that would otherwise be discharged to the ocean, --unless the wastewater is of suitable quality and quantity to support domestic or irrigation uses--." We deleted "unless the wastewater is of suitable quality and quantity to support domestic or irrigation uses" for a number a reasons. First, while water reuse and recycling should certainly be encouraged many factors play into whether reuse and recycling are feasible, and it should be up to the water agencies to determine whether the water can be reused or recycled. The suitability of the water in and of itself should not preclude a desalination facility from being able to commingle its brine effluent with the wastewater. In any event, if a future recycling project is planned which may reduce the volume of wastewater available for the dilution of brine, a regional water board may condition the permit on the availability of the wastewater pursuant to Section L.2.a.(5).	
18.24	For purposes of commingling brine discharge with wastewater for disposal, the standard water quality objectives, testing and mixing zone analysis appropriate to POTW discharges should apply. Such standards allow for a zone of initial dilution and impacts are assessed outside of this zone of initial dilution. This is consistent with the Expert Panel's recommendation that brine discharge be regulated by the mixing zone approach where water quality standards must be met at the mixing zone boundary: "Because discharges can be designed to result in rapid initial dilution around the discharge, we recommend that they be regulated by a mixing zone approach wherein the water quality regulations are met at the mixing zone boundary. The mixing zone should encompass the near field processes, defined as those influenced hydrodynamically by the discharge itself. These processes typically occur within a few tens of meters from the discharge, therefore we conservatively recommend that	The language in chapters III.L.2.d.(2)(c) and (d) do not address the point of compliance, but rather how to compare alternative brine disposal technologies. The receiving water limitation in chapter III.L.3.b states that salinity should be "measured no further than 100 meters (328 ft) horizontally from the discharge." The point of compliance for an owner or operator will depend on whether they are going to demonstrate compliance with the receiving water limitation for salinity or an effluent limitation that is developed based on the receiving water limitation for salinity. Chapter III.L.3.b includes the receiving water limitation for salinity and an equation for determining an effluent limitation to meet the receiving water limitation. An owner or operator can demonstrate compliance with the receiving water limitation by monitoring salinity in the receiving water. Turbulent mixing, as described in the definition of initial dilution in the Ocean Plan, may be complete within 100 meters from the outfall. But an owner or

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	the mixing zone extend 100 m from the discharge structure in all directions and over the whole water column." (Management of Brine Discharges to Coastal Waters: Recommendations of a Science Advisory Panel, March 2012, Executive Summary at ii). "Water quality objectives must be met at the edge of a regulatory mixing zone that extends vertically through the water column up to 100 m from the discharge structure in all directions." (Id. at 45) To require impact analysis and mitigation of these impacts within the brine mixing zone appears to be inconsistent with the Expert Panel's recommendation and the existing regulatory scheme. As such, we propose the following modifications: Page 7. L.2.d.(2)(c) [of the proposed Desalination Amendment]. "the owner or operator to analyze the brine* disposal technology or combination of brine* disposal technologies that best reduces the effects of the discharge of brine* on marine life due to intake-related entrainment, osmotic stress from elevated salinity,* turbulence that occurs during water conveyance and mixing, and shearing stress at the edge of the brine mixing zone or zone of initial dilution --point of discharge--." Page 8. L.2.d.(2)(d) [of the proposed Desalination Amendment]. "Brine* disposal technologies other than wastewater dilution and multiport diffusers,* such as flow augmentation,* may be used if an owner or operator can demonstrate to the regional water board that the technology provides a comparable level of protection. The owner or operator must evaluate all of the individual and cumulative effects of the proposed alternative discharge method on marine life mortality, including (where applicable); intake-related entrainment, osmotic stress, turbulence that occurs during water conveyance and mixing, and shearing stress at the edge of the brine mixing zone or zone of initial dilution --point of discharge--..."	operator would monitor salinity in the receiving water 100 meters from the outfall in all directions. Since the receiving water limitation for salinity applies throughout the water column, monitoring for salinity should occur from the seafloor to the sea surface. Alternatively, an owner or operator can demonstrate compliance with the receiving water limitation for salinity by developing an effluent limitation and monitoring salinity at the end of pipe. In this case, an owner or operator must conduct mixing zone studies to calculate Dm, which is the minimum probable initial dilution expressed as parts seawater per part brine discharge. Chapter III.L.3.b.(2)(b) states that "the owner or operator shall develop a dilution factor (Dm) based on the distance of 100 meters (328 feet) or initial dilution, whichever is smaller" and "The dilution factor (Dm) shall be developed within the brine mixing zone* using applicable water quality models that have been approved by the regional water boards in consultation with State Water Board staff" was added to clarify that the fixed distance referred to in the definition of initial dilution that will be used to determine Dm must be no larger than 100 meters. The point of compliance for salinity will depend on whether an owner or operator chooses to demonstrate compliance with a receiving water limitation for salinity or an effluent limitation. Please see response to comment 6.11 for how the definition of brine mixing zone was revised related to this issue.

Please note all tables and figures referenced are present at the end of this document

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18.25	Brine Mixing Zone and Mitigation Page 9. L.2.e [of the proposed Desalination Amendment]. For facilities which commingle brine with wastewater as a discharge option, the NPDES permit governing the wastewater discharge should be fully protective of marine life impacts. So long as the brine does not result in any exceedance of NPDES permit limits, compliance at the edge at the zone of initial dilution should be sufficiently protective of marine life impacts and should not require any further mitigation. Consistent with the above comments on brine mixing zone and compliance, we suggest the following changes to this provision: "Mitigation for the purposes of this section is the replacement of marine life or habitat that is lost due to the construction and operation of a desalination facility* after minimizing marine life mortality through site, design, and technology measures. The owner or operator may choose whether to satisfy a facility's mitigation measures pursuant to chapter III.L.2.e.(3) or, if available, L.2.e.(4). The owner or operator shall fully mitigate for all marine life mortality associated with the desalination facility.* With respect to brine disposal, where wastewater is commingled with brine as a disposal option, so long as the NPDES permit discharge water quality standards are met, compliance at the edge of the zone of initial dilution* shall be presumed to be fully protective of marine life impacts sustained from brine disposal."	Please see response to comment 15.11.
18.26	Brine Discharges and Shear Stress Mortality As discussed above, analysis of impact should occur outside of the mixing zone or zone of initial dilution. The requirement to evaluate shearing impacts should not apply to commingled brine/wastewater discharge. Existing POTWs are not required to mitigate for entrainment and shearing losses that might occur from wastewater disposal within the zone of initial dilution. Such losses are expected to be quite low or non-existent for the low pressure wastewater outfall diffusers. The Expert Panel recognized that there is no published evidence of mortality due to diffuser jets and that shearing losses from diffusers would likely be low	Language was added to clarify the receiving water limitation for salinity shall be met at the edge of the zone of initial dilution or brine mixing zone. Please see response to comment 15.11.

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	because exposure to damaging turbulence is on the order of seconds. (See Desalination Plant Entrainment Impacts and Mitigation, October 9, 2014 at p.3). The Expert Panel noted that "literature reports of damage to larvae caused by turbulence are generally based on longer exposure times." (See Id.). Given the lack of scientific evidence demonstrating the potential for mortality impacts from diffusers, we recommend the following modifications to this provision: Page 9. L.2.e [of the proposed Desalination Amendment]. Add the following to the end of the paragraph: ... The owner or operator shall fully mitigate for all marine life mortality associated with the desalination facility. "This provision shall not apply to brine disposal by commingling with wastewater." Page 10. L.2.e.(1)(b) [of the proposed Desalination Amendment] Modify as follows: "For operational mortality related to discharges, the report shall estimate the area in which salinity* exceeds 2.0 parts per thousand above natural background salinity* or a facility-specific alternative receiving water limitation (see § L.3) outside of the brine mixing zone* or zone of initial dilution*. The area in excess of the receiving water limitation for salinity* shall be determined by modeling and confirmed with monitoring. The report shall use any acceptable approach for evaluating mortality that occurs due to shearing stress resulting from the facility's discharge --including any incremental increase in mortality resulting from a commingled discharge--. This section does not apply to commingled brine discharges with wastewater."	
18.27	Receiving Water Limitation for Salinity - Compliance with "Natural Background Salinity" as worded is non-attainable. Page 13. L.3 [of the proposed Desalination Amendment]. Under Receiving Water Limitations for Salinity, the "natural background salinity" is to be used. The definition provided for "natural background salinity" is a 20 year average or a site specific average based on new data collected at	Please see responses to comments 15.17 and 13.130.

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	the discharge point on a weekly basis over 3 years. Using long term averages would make it impossible to comply with the allowable 2,000 mg/l maximum incremental increase above ambient or reference salinity when natural salinity levels exceed their average condition. Instead, we would recommend using natural salinity conditions.	
18.28	Receiving Water Limitation for Salinity, the Alternate Method should allow use of site specific most sensitive species that are found in the impacted habitat. Page 14. L.3.c.(1)(b) [of the proposed Desalination Amendment]. To provide for appropriate flexibility without causing any additional impact, site specific habitat species that occur and would be affected by the discharge should be used in the determination of the appropriate receiving water limitation for salinity. For example, it makes no sense to use rocky habitat species in sandy or muddy bottom habitats and vice versa. It would seem better to use the most sensitive species that have developed protocols for the impacted habitat. Otherwise, this provision undermines the site-specific allowances in the provision, as the limit would never be lower than the 2,000 mg/L found in the expert panel.	Please see response to comment 6.10.
18.29	Receiving Water Limitation for Salinity: No Observed Effect Level versus Lowest Observable Effect Level Page 14. L.3.c.(3) [of the proposed Desalination Amendment]. The procedure set forth in the OPA for establishing facility-specific receiving water limits uses a different, and more restrictive, standard of salinity than the standard that is used as a guideline throughout the entire draft OPA. Throughout the draft OPA, and throughout Roberts et al. 2012 (upon which much of the draft OPA is based), it is stated that red abalone are the most sensitive species tested, with a LOEL (Lowest Observable Effect Level) of 35.6 ppt-or approximately 2.1 ppt above ambient (in southern California waters). Thus, it is argued, a maximum regulatory salinity increase of2 ppt is reasonable because it protects the most sensitive species. However, the language in the draft OPA for alternative receiving water limitations uses a completely different standard, which is NOEL (No Observable Effect Level). The NOEL value, according to	Please see response to comment 15.12.

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	Philips et al. (2012) is 34.9 ppt, or approximately only 1.4 ppt above ambient (in southern California waters). Consequently, an operator that wishes to establish a site-specific receiving water limit under the OPA is being held to a more restrictive salinity standard. CalDesal requests that the OPA be amended such that the facility-specific alternative receiving water standard be based on the same standard that will be used to establish the statewide receiving water limit of 2 ppt - the lowest observed effect level (LOEL).	
18.30	Monitoring Reporting Plan and Brine Mixing Zones Page 16. L.4.a.(1) [of the proposed Desalination Amendment]: "Facility-specific monitoring" should be clarified, particularly for commingled brine and wastewater facilities. Such monitoring should occur in the receiving waters at stations representative of the area within the waste field where initial dilution is completed, i.e., at the edge of the brine mixing zone or zone of initial dilution. In addition, we recommend the following changes to this provision: "An owner or operator must perform facility-specific monitoring to demonstrate compliance with the receiving water limitation for salinity,* and evaluate the potential effects of the discharge within the water column, bottom sediments, and the benthic communities. Facility-specific Monitoring is required until the regional water board determines that a regional monitoring program is adequate to ensure compliance with the receiving water limitation. Receiving water monitoring for salinity shall be conducted at the boundary of the defined brine mixing zone* or zone of initial dilution* and shall be conducted at times when the monitoring locations are most likely affected by the discharge. The monitoring and reporting plan shall be reviewed, and revised if necessary, upon NPDES permit renewal. The regional water board may require additional monitoring at the desalination facility, however, compliance with water quality objectives is to be determined at the edge of the brine mixing zone* or zone of initial dilution*."	Please see response to comment 8.10.
18.31	Definition of Brine Mixing Zone	Please see response to comment 6.11.

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	Page 16 [of the proposed Desalination Amendment]. The Definition of Brine Mixing Zone (BMZ) should be specified that it is for dedicated brine disposal discharge lines equipped with multiport diffusers and that it does not apply to conventional wastewater outfalls that may be used for commingling brine for disposal. Further, the BMZ definition should be consistent with the mitigation requirements in the draft amendment and as now written would inadvertently prohibit brine disposal. As currently defined, acutely toxic conditions are to be prevented in the BMZ. Whether brine discharge is considered acutely toxic depends on how dilution is factored in. If dilution is not factored in, it would be impossible to prevent acutely toxic conditions. When brine firsts enters the ocean from the diffuser it is about twice the concentration of seawater undergoing dilution in the BMZ and would be acutely toxic. The very purpose of the BMZ is for dilution of the brine to prevent acute and chronic toxicity from concentrated seawater at the edge of the BMZ. Acute toxicity should be met at the edge of the BMZ as recommended by the Expert Panel (September 23, 2013 workshop presentation and March 2012 Expert Panel Final Report). Granite Canyon Lab work provided chronic toxicity evaluations for brine but not for acute toxicity. It is not possible at this time to know if some distance within the BMZ could be established for acute toxicity as now done in the NPDES permits for wastewater outfalls for constituents other than salinity. We recommend that under the definition for BMZ on page 16, that the third sentence of the definition be changed to read as follows: "The brine mixing zone is an allocated impact zone where water quality criteria can be exceeded as long as acutely and chronic toxic conditions due to elevated salinity are prevented at the edge of the brine mixing zone and the designated use of the ocean water beyond the brine mixing zone is not impaired as a result of the brine discharge --mixing zone--.	
18.32	The draft Desalination Amendments also propose to limit the salinity increase to a maximum of 2 ppt over natural ocean salinity background, at a ftxed distance of 100 meters from the point of discharge. The distance of 100 meters appears to be based on the multiport diffuser.	Please see responses to comments 15.14, 15.58, and 6.11.

Please note all tables and figures referenced are present at the end of this document

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	(Staff Report at page 98). The Desalination Amendments definition for brine mixing zone includes a mechanism for establishing a larger brine mixing zone: "the brine mixing zone shall not exceed 100 meters...unless otherwise authorized in accordance with this plan." However, the Desalination Amendments currently do not include a process for establishing a larger brine mixing zone, which would limit the brine discharge to the multiport diffuser. This appears to be an oversight, and we recommend that it be addressed in follow-up revisions.	
18.33	Add definition of "zone of initial dilution": Page 18. Definitions. We recommend the following definition be added to the amendment to the extent our proposed language above is adopted: "ZONE OF INITIAL DILUTION is a regularly shaped area (e.g., circular or rectangular) surrounding the discharge structure (e.g., submerged pipe or diffuser line) that encompasses the regions of high (exceeding standards) pollutant concentrations under design conditions.	A separate definition for the zone of initial dilution would be redundant and confusing because initial dilution is already defined in the Ocean Plan as: *"INITIAL DILUTION is the process which results in the rapid and irreversible turbulent mixing of wastewater with ocean water around the point of discharge. For a submerged buoyant discharge, characteristic of most municipal and industrial wastes that are released from the submarine outfalls, the momentum of the discharge and its initial buoyancy act together to produce turbulent mixing. Initial dilution in this case is completed when the diluting wastewater ceases to rise in the water column and first begins to spread horizontally.* *For shallow water submerged discharges, surface discharges, and nonbuoyant discharges, characteristic of cooling water wastes and some individual discharges, turbulent mixing results primarily from the momentum of discharge. Initial dilution, in these cases, is considered to be completed when the momentum induced velocity of the discharge ceases to produce significant mixing of the waste, or the diluting plume reaches a fixed distance from the discharge to be specified by the Regional Board, whichever results in the lower estimate for initial dilution."* The zone of initial dilution refers to the spatial area where initial dilution occurs.
18.34	L.2.e.(1)(a) [of the proposed Desalination Amendment]. Comment 1: Entrainment study duration:	Please see response to comment 15.5.

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	The OPA should permit the use of 12 months of entrainment data which conforms to the guidelines for entrainment impact assessment included in Appendix E of the Staff Report. (Guidance Documents for Assessing Entrainment Including Additional Information on the Following Loss Rate Models: Fecundity Hindcasting (FH), Adult Equivalent Loss (AEL) and Area of Production Forgone using an Empirical Transport Model (ETM/APF). These guidelines, written by members of the SWRCB 's Expert Review Panel, state that entrainment sampling that is done for 12 months is a reasonable period of sampling because the entrainment estimated by the ETM method is "much less subject to inter-annual variation. (Id. at 97.) Therefore, a 12 month study would be adequate to account for variation in oceanography conditions and larval abundance and diversity such that the abundance estimates are reasonably accurate. All of the intake assessments in California, except one, have been conducted for a period of one year. A 36 month study would be excessive and would cause potentially costly delays in project development. We urge the SWRCB to change the entrainment study period from 36 consecutive months to 12 consecutive months.	
18.35	L.2.e.(1)(a) [of the proposed Desalination Amendment]. Comment 2: 200 micron mesh not required: As noted on page 70 of the Staff Report, the Expert Review Panel III recommended the ETM/APF method that relies on the 335 micron mesh net to calculate mitigation levels because: - This method has historically been used in California to determine mitigation for entrainment at power plants and is widely accepted in the scientific community; - Compensates for all entrained species and not just commercially valuable fish taxa; - Utilizes representative species (e.g. fish larvae sampled using a 335 micron mesh net) that can be used as proxy species for rare, threatened, or endangered species, which may be challenging to acquire adequate data for. The creation of habitat benefits all species in the food web	Please see response to comment 15.48.

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	regardless of whether or not they were assessed in the ETM/APF model.	
18.36	L.2.e.(1)(a) [of the proposed Desalination Amendment]. Comment 3: 90 percent confidence interval: Section L2e(1)(a). The uniform application of a 90 percent confidence interval does not take into consideration the varying levels of uncertainty associated with ETM/APF estimates. This proposal should be submitted for peer review by the Intake Expert Review Panel for review and guidance on development of a methodology for establishing the appropriate confidence interval based on site-specific interpretation of site specific entrainment data.	Please see response to comment 21.90.
18.37	This is a concern because specifying a 90% confidence interval also has the potential to exponentially increase the acreage of land necessary to insure compliance if individual species curves are used. Appendix E shows exponential increases in required acreage after the 60% confidence interval. In Appendix E-164, the mitigation calculation for the Encina plant increases as much as 1.5 times from 80% to 90% confidence interval if individual species curves are used. If the SWRCB keeps the 90% confidence interval in the regulations, it should be based on the "Means of species" and not "Measurements from individual species" as shown in Appendix E.	Please see response to comment 21.90.
18.38	L.2.e.(1)(a) [of the proposed Desalination Amendment]. Comment 4: Use of existing entrainment data: Consistent with Section L2d(1)(c)iii, the OPA should allow the use of existing entrainment data that meets the guidelines in Appendix E. Base on comments 1-4, CalDesal recommends the following revisions to L.2.e.(1)(a) [of the proposed Desalination Amendment], pages 9-10: "For operational mortality related to intakes, the report shall include a detailed entrainment study. The entrainment study shall be --at least 36-- 12 consecutive months and sampling shall be designed to account for variation in oceanographic conditions and larval abundance and diversity such that abundance estimates are reasonably accurate. At their	Please see responses to comments 15.5 and 21.90.

Please note all tables and figures referenced are present at the end of this document

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	discretion, the regional water boards may permit the use of existing entrainment data for the facility to meet this requirement. Samples must be collected using a mesh size no larger than 335 microns and individuals collected to the lowest taxonomical level practicable. --Additional samples shall also be collected using 200 micron mesh to provide a broader characterization of other entrained organisms.-- The ETM/APF analysis* shall be representative of the entrained species collected using 335 micron net. The APF* shall be calculated using a --90 percent-- confidence interval between 50 and 90 percent to account for variation in the site-specific entrainment data. The actual confidence interval to be used by the regional water boards shall be consistent with the procedures established by the Intake Expert Review Panel. An owner or operator with subsurface* intakes is not required to do an ETM/APF analysis* for their intakes and is not required to mitigate for intake-related operational mortality. The regional water boards shall permit the use of existing entrainment data from the facility from studies conducted in conformance with the Guidelines for Entrainment Impact Assessment set forth in Appendix E.	
18.39	Mitigation in brine mixing zone Page 10. L.2.e.(l)(b) [of the proposed Desalination Amendment]. Standard practice under the Ocean Plan is that dischargers do not mitigate for impacts within the ZID. Consistent with this approach, CalDesal recommends the following changes to this paragraph: "--For operational mortality related to discharges, the report shall estimate the area in which salinity* exceeds 2.0 parts per thousand above natural background salinity* or a facility specific receiving water limitation (see § L.3). The area in excess of the receiving water limitation for salinity* shall be determined by modeling and confirmed with monitoring. The report shall use any acceptable approach for evaluating mortality that occurs due to shearing stress resulting from the facility's discharge, including any incremental increase in mortality resulting from a commingled discharge.-- No mitigation shall be required for brine concentrations in excess of 2 ppt in the brine mixing zone."	Please see response to comment 15.11.

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18.40	APF sizing determinations Page 11. L.2.e.(3)(b)ii [of the proposed Desalination Amendment]. Consistent with past APF siting and sizing determinations, the OPA should provide the regional water board sufficient flexibility to adjust the mitigation acreage as needed based on the expected productivity of the type of mitigation to be provided compared to the actual productivity within the facility's source water body. For example, the Coastal Commission (CCC) determined that 64 acres were needed to mitigate for the open ocean species entrained by the Carlsbad project. However, in recognition of the impracticality of creating 64 acres of offshore open water habitat and recognizing the relatively greater productivity rates per acre of estuarine wetlands habitats, the CCC allowed the offshore impacts to be "converted" to estuarine mitigation areas. The CCC determined that successfully restored wetland habitat would be ten times more productive than a similar area of nearshore ocean waters. Based on this determination, for every ten acres of nearshore impacts, the Carlsbad project was allowed to mitigate by creating or restoring one acre of estuarine habitat. Although this approach would result in "out of kind" mitigation, the CCC found it would produce overall better mitigation because not only is it not practical to create nearshore, open water habitat, and that habitat type is already well-represented along the shoreline. Whereas creating or restoring coastal estuarine habitat types would support a long-recognized need to increase the amount of those habitat types in Southern California. (See E-06-013- Condition Compliance for Special Condition 8, Poseidon Resources Corporation, Marine Life Mitigation Plan, December 8, 2008.)	Please see response to comment 15.9.
18.41	Location of the mitigation project. Page 11. L.2.e.(3)(b)ii [of the proposed Desalination Amendment]. Given the limited number of suitable mitigation sites, it would be impractical to limit site selection to the facility's source water body. Consistent with past mitigation siting determinations, the OPA should provide the regional water board sufficient flexibility to site the mitigation acreage as needed based on the availability of suitable mitigation sites. For example, the CCC allowed the Carlsbad project to select from a number of suitable	Please see response to comment 15.8.

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	sites in the Southern California Bight for its restoration project. Following an exhaustive search in and around the Carlsbad facility's source water, the Coastal Commission (CCC) determined that there were no suitable mitigation sites located directly with the project's source water body, and the best available mitigation site for the Carlsbad project was located at the south end of San Diego Bay, a distance of 50 miles from the facility (See E-06-013 -Condition Compliance for Special Condition 8, Poseidon Resources Corporation, Marine Life Mitigation Plan, December 8, 2008.)	
18.42	200 Micron Mesh. Page 11. L.2.e.(3)(b)ii [of the proposed Desalination Amendment]. See comment 2 above. See also Expert Review Panel Report on Intake Impacts and Mitigation. Specifically page 1 of Appendix 1 which states in part: "The key assumption of APF that makes it useful...it should reflect the impacts to measured and unmeasured resources (e.g., to invertebrate larvae). This is because its calculation assumes that those species assessed [those species captured on the 335 micron mesh] are representative of those not assessed [those species smaller than 335 micron]. Practically, this means that should the amount of habitat calculated using APF be created or substantially restored, the habitat will support species that were assessed as well as those that were not assessed in the ETM. Importantly, that amount of habitat will also compensate for impacts to species only indirectly affected. This means that should the mitigation take place according to APF estimates there will be no net impact."	Please see response to comment 15.48.
18.43	Compensatory Acreage for Mitigation Projects Page 11. L.2.e.(3)(b)ii [of the proposed Desalination Amendment]. This provision also requires that "compensatory acreage" be added to a mitigation project if the mitigated area is affected by entrainment from the facility. It has the potential to create an endless loop where increased mitigation leads to increased entrainment requiring increased mitigation. Also, if the goal of mitigation is to restore similar habitat near the project site, this provision creates an incentive to locate projects far from the project. To avoid this possibility we suggest removing this provision.	Please see response to comment 13.147.

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18.44	Based on the four proceeding comments, CalDesal recommends the following revisions to Page 11. L.2.e.(3)(b)ii [of the proposed Desalination Amendment]. "The owner or operator shall demonstrate that the project fully mitigates for intake--related marine life mortality by including acreage that is at least equivalent in size, of the APF* calculated in the Marine Life Mortality Report above, unless the regional water board determines that the mitigation habitat is of higher productivity than the facility's source water body (e.g., open ocean vs. estuarine mitigation habitat), in which case, the regional water board shall adjust the quantity of the mitigation acreage such that the productivity of the mitigation habitat provided matches that of the APF times the productivity of the source water body. The owner or operator shall attempt to locate the mitigation project within the facility's source water body,* and shall do modeling to evaluate the areal extent of the mitigation project's production area* --to confirm it--overlaps the facility's source water body.* --Impacts on the mitigation project due to entrainment by the facility must be offset by adding compensatory acreage to the mitigation project. The regional water board may require additional habitat for entrained organisms between 200 and 335 microns.--"	Chapter III.L.2.e.(3) was revised to: 1) allow out-of-kind mitigation for impacts to soft-bottom or open water species and habitats, 2) allow the regional water boards to apply mitigation ratios, 3) remove the mitigation requirement for species between 200 and 335 microns. Also, please see responses to comments 115.9, 15.8, 15.48, and 13.147.
18.45	Mitigation ratio should be linked to quality of restored habitat. Page 39, Section L.2.e. (3)(b)iii [of the proposed Desalination Amendment]: Similar to the above comments, we recommend changes to this provision. "The owner or operator shall demonstrate that the project also fully mitigates for the discharge-related marine life mortality projected in the Marine Life Mortality Report. If the regional water board determines that the mitigation habitat is of higher productivity than the facility's source water body (e.g., open ocean vs. estuarine mitigation habitat), the regional water board shall adjust the quantity of the mitigation acreage required such that the productivity mitigation habitat provided fully mitigates for the discharge-related marine life mortality projected in the	Chapter III.L.2.e.(3) was revised to: 1) allow out-of-kind mitigation for impacts to soft-bottom or open water species and habitats, 2) allow the regional water boards to apply mitigation ratios, 3) remove the mitigation requirement for species between 200 and 335 microns. Also, please see responses to comments 15.9, 15.8, 15.48, and 13.147.

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	Marine Life Mortality Report. For each acre of discharge-related disturbances as determined in the Marine Life Mortality Report, an owner or operator shall restore one acre of habitat unless the Board determines that a mitigation ratio --greater-- less than 1:1 is warranted due the higher productivity of the mitigation site compared to that of the disturbed area.--If needed.--"	
18.46	Mitigation of construction related marine life impacts. Page 12, Section L.2.e.(3)(b)iv [of the proposed Desalination Amendment]. The following changes are intended to be consistent with the statement in OPA section 2.e.(1).(c) which states the regional water board may determine that the construction-related disturbance does not require mitigation because the disturbance is temporary and the habitat is naturally restored. "The owner or operator shall demonstrate that the project also fully mitigates for --the-- any permanent construction-related marine life mortality projected in the Marine Life Mortality Report. For each acre of discharge-related disturbances as determined in the Marine Life Mortality Report, an owner or operator shall restore one acre of habitat unless the Board determines that a mitigation ratio less --greater-- than 1:1 is warranted due the higher productivity of the mitigation site compared to that of the disturbed area. The regional water board may determine that the construction-related disturbance does not require mitigation because the disturbance is temporary and the habitat is naturally restored, or has otherwise been mitigated by the owner or operator.	Please see responses to comments 18.44.
18.47	Mitigation Fee Flexibility Page 12, Section L.2.d.(4) [of the proposed Desalination Amendment]. SWRCB should permit both mitigation projects and a mitigation fee to account for the total facility impact and mitigation and not leave this decision up to the RWQCB. If and when a fee-based mitigation option is developed, we recommend the provision include assurances that the mitigation paid for covers the total required mitigation for all permitting agencies. We recommend the following revision for this section:	The proposed Desalination Amendment was revised to allow an owner or operator to choose to complete a mitigation project, or provide funding if an appropriate fee-based mitigation program is available, or the regional water board may allow a combination of both options. At this time, we are not aware that any fee-based mitigation program exists for impacts associated with desalination facilities and meets all of the requirements in chapter III.L.2.e.(4)(a). The language was included as a placeholder for when an appropriate program is developed and the regional water board determines that an appropriate fee-based

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	The SWRCB will allow both a project and fee based mitigation approach for a facilities impacts to be allowed. The mitigation fee should pay into a mitigation project that meets the requirements of L.2.e.(3).	mitigation program exists. The State Water Board has no authority to provide assurances that mitigation fees will cover the total required mitigation for all permitting agencies. This proposal would require legislative action. The mitigation fee option in chapter III.L.2.e is to compensate for intake and mortality of all forms of marine life at a seawater desalination facility per Water Code section 13142.5(b). The regional water board may consider previous mitigation requirements made by other agencies, but is ultimately responsible for implementing mitigation per Water Code section 13142.5(b).
18.48	We believe that the substitute environmental documentation (SED) is flawed in so far as it fails to consider the impacts of the proposed regulations to the extent that the regulations may limit ocean desalination and reduce the capacity of potential desalination projects due to additional costs and intake and discharge requirements. The threshold of significance referenced by the SED is that desalination projects in general can cause significant impacts to utilities and service systems if the Draft Amendments (the project) were to "require or result in the construction of new water or wastewater treatment facilities or the expansion of existing facilities, the construction of which could cause significant environmental effect." (SED at p. 171).	Please see response to comment 13.38. The commenter does not provide a basis for concluding that the project would require or result in the construction of new water or wastewater treatment facilities."
18.49	In their present form, the Draft Amendments present significant obstacles to ocean desalination projects including but not limited to the following: - Requirement of subsurface intakes unless the regional water board determines that subsurface intakes are infeasible (L.2.d.(1)(a)); - Possible requirement of a less than 1.0 mm slot size screen for surface water intakes (L.2.d.(1)(c)(ii)); - Wholesale restriction on commingling brine with treated wastewater where the wastewater is of suitable quality and quantity to support domestic or irrigation uses (L.2.d.(2)(a)); and - Requirements to analyze impacts at the point of discharge as opposed to the edge of the brine mixing zone (or zone of initial dilution for wastewater outfalls) (L.2.d.(2)(c) and (d)). As discussed above, many of these requirements as written (and others)	Disagree. The Staff Report with SED need not include analysis of other sources of water. First, many of the commenter's assertions about why the amendments present significant obstacles to ocean desalination are either incorrect and/or have been addressed through revisions to the proposed Desalination Amendment. Specifically: Regarding the first issue, the commenter is correct that subsurface intakes are the preferred approach where feasible. For additional discussion of why the proposed Desalination Amendment does not take a technology neutral approach for intakes, please see response to comment 15.2. However, as noted in the economic analysis (Appendix G of the Staff Report with SED), it does not follow that this represents an economic obstacle to desalination when lifecycle costs are considered.

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	are problematic for water agencies, and they could preclude the development of many ocean desalination projects. If future ocean desalination projects are included in the water agencies' plans and such projects are removed, other water supply projects or expansion of existing projects must be implemented. These potential replacement projects should have been analyzed for potential impacts.	Regarding the second issue, the revised plan allows the use of screens with 1.0 mm slot or mesh sizes when subsurface intakes are infeasible (see also response to comment 15.4). Regarding the third issue concerning commingling brine with treated wastewater, the proposed Desalination Amendment has been revised to remove the apparent (and unintended) restriction on commingling brine (please see response to comment 6.6). Regarding the fourth issue, the commenter is correct that the proposed Desalination Amendment requires mitigation for intake and mortality of all forms of marine life that occurs as the result of a seawater desalination discharge (Water Code § 13142.5(b)). Here, the proposed Desalination Amendment does not create a new requirement, but simply provides direction to the regional water boards on how to consistently apply it. For additional information about analyzing impacts at the point of discharge as opposed to the edge of the brine mixing zone, please see response to comment 15.11. Nevertheless, even if the commenter's assertions had been valid, there still would not be a need to analyze the impacts of alternative sources of water. The situation provided by the commenter is hypothetical and requires a level of speculation that is not required of a CEQA analysis. We do not have sufficient information to know how desalination facilities are incorporated into a hypothetical agency plan or whether desalination would be considered part of the environmental baseline (see response to comment 15.111). For example, it is not known whether the hypothetical water agency has proposed desalination as an alternative to consider at a later date (e.g. not part of the baseline), as a primary water supply or as an emergency supply, which would impact the frequency and quantity of intake and discharge. Similarly, it is not known what alternative water supply options would be available to the water agency to consider in the future. Without such information, it is neither feasible nor reasonable to evaluate potential impacts of replacement projects. The Staff Report with SED does address a reasonable range of

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		alternatives, as described in Section 12.2 and 12.3 of the Staff report. Sections 12.1 and 12.4 of the Staff Report with SED discuss the potential impacts from the desal facilities in general and more specifically from the identified reasonably feasible methods of compliance. Sections 8.3 and 8.6 also include discussions on technical feasibility. Economic costs are discussed in Section 9 based on the economic analysis contained in Appendix G. The sections cited represent "a reasonable range of environmental, economic, and technical factors" as required to be "take[n] into account" as part of the environmental analysis. Apart from claiming that the proposed requirements are problematic for water agencies and may result in additional costs (see response to comment 18.49 for specific treatment of these issues), the commenter provides no detail to illustrate why the cited factors have not been adequately considered.
18.50	We believe that the SED fails to perform an adequate environmental analysis of reasonably foreseeable methods of compliance. The SED purports to analyze the reasonably foreseeable methods of compliance in the analysis of project alternatives yet it does not seem that economic and technical factors have been adequately considered. For example, such factors do not appear to have been adequately considered in the obstacles described above.	The Staff Report with SED addresses a reasonable range of alternatives, as described in Section 12.2s and 12.3. Sections 12.1 and 12.4 of the Staff Report with SED discuss the potential impacts from the desal facilities in general and more specifically from the identified reasonably feasible methods of compliance. Sections 8.3 and 8.6 also include discussions on technical feasibility. Economic costs are discussed in Section 9 based on the economic analysis contained in Appendix G. The sections cited represent "a reasonable range of environmental, economic, and technical factors" as required to be "take[n] into account" as part of the environmental analysis. Apart from claiming that the proposed requirements are problematic for water agencies and may result in additional costs (see response to comment 18.49 for specific treatment of these issues), the commenter provides no detail to illustrate why the cited factors have not been adequately considered.
#19	**Hillary Hauser, Heal the Ocean**	
19.1	And in response to concerns about desalination in Santa Barbara, HTO is investigating the possibility of developing a cost feasibility study for the expansion of Santa Barbara's current recycled facility (now being refurbished with microfiltration technology) to an indirect potable reuse (IPR) recycled water facility that fully allocates Santa Barbara's approximately 7.8 MGD of wastewater supplies. We believe IPR offers a	Comment noted.

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	more environmentally friendly and cheaper alternative with no potential marine life impacts and reduced energy needs while providing a significant potential supply of water through groundwater recharge to the City.	
19.2	Need for Additional Analysis of Impacts to Recycled Water Use While Heal the Ocean will not attempt to comment on all aspects or the scope of the "Proposed Desalination Amendment and Staff Report" ("Report") we submit that the Report does not include sufficient analysis of the negative effects on the development of potential statewide recycled water supplies in that comingling wastewater with brine discharge as a means of brine disposal will reserve wastewater - as wastewater. This could have an impact on the development of statewide recycled water supplies, and the State's recycled water goals. Chapter 11 of the [Staff] Report [with SED] - "The Need to Develop and Use Recycled Water" - states that the "proposed Desalination Amendment is not expected to impact or increase the need for water cycling." Unfortunately, an expansion of desalination, and associated brine discharge via comingling with wastewater supplies, would have an impact on future recycled water use across the state. The State's recycled water goals aim for 1.5 million AFY of production by 2020, and approximately 2.5 million AFY by 2030. Heal the Ocean's own research found that coastal cities and wastewater districts discharged approximately 1.5 million AFY in 2005. This ocean discharge represents a significant amount of the 2020 and 2030 goals, even when considering the approximate 670,000 AFY of recycled water produced statewide in 2009. The Report maintains that the "availability of this wastewater for recycling does not require that it be recycled," and it may be true that there is no requirement for any recycling at all, but in order to meet the state's recycled water goals, a significant amount of wastewater discharged to the ocean will have to be converted to recycled water. Allocating a growing amount of wastewater supplies for comingling with wastewater could increasingly jeopardize the State's recycled water goals.	Water Code section 13142.5(b) requires that new and expanded desalination facilities use the “best available site, design, technology, and mitigation measures feasible” to minimize intake and mortality of all forms of marine life. Commingling brine with wastewater (including: agricultural, industrial, power plant cooling water, treated municipal wastewater, etc.) is the preferred alternative for brine disposal because it is the best way to minimize intake and mortality of marine life and to protect water quality and other related beneficial uses of ocean waters. The proposed Desalination Amendment is structured so that commingling with wastewater is the preferred alternative, but if that wastewater is unavailable for commingling, an owner or operator of a desalination facility has other brine disposal options. The proposed Desalination Amendment enables the regional water boards to conditionally permit desalination facilities that plan on commingling brine with treated wastewater so that if the wastewater becomes unavailable for brine dilution, the facility would be required to install multiport diffusers or use an equally protective alternative brine disposal method. Consequently, commingling brine with treated wastewater will not have an impact on future recycled water production or use across the state (see section 11.4 of the Staff Report with SED for more information).

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	We find erroneous the statement that the "proposed (amendment) language emphasizes that the wastewater for brine dilution is water that would otherwise be discharged into the ocean and is not of either suitable quality or quantity for domestic or irrigation purposes." This is incorrect! Virtually all wastewater can be reused for water recycling in either potable or non-potable applications through the use of appropriate treatment technologies. Communities that opt to construct desalination plants that comingle wastewater with brine discharge will eliminate or reduce their ability to develop recycled water supplies in the future. The staff report should make explicit that comingling for brine discharge will affect the availability of wastewater for recycled water supplies, potentially limiting the ability to meet State recycled water goals, and limiting communities' options for developing future recycled water supplies.	
19.3	Non-Substantive Comments Page 113 [of the Staff Report with SED]: The 2009 survey of State recycled water use should be edited to make clear that recycled water use increased by 144,000 AFY between 2001 and 2009. The current language states that overall recycled water use in 2001 was 144,000 AFY, while the actual recorded level in 2001 was 525,000 AFY. Suggested language: "The survey indicated that eight to ten percent of municipal wastewater is recycled in reuse projects and that recycled municipal wastewater increased --from-- by approximately 144,000 acre-feet --in-- between 2001 to 2009, to over 669,000 acre-feet in 2009."	Staff made the suggested changes in the Staff Report with SED.
19.4	Conclusion We believe the State should be encouraging recycled water as a sustainable alternative to desalination whenever possible. A water system that discharges significant quantities of treated wastewater into the ocean to only tum around and treat that ocean water is nonsensical. Instead, we should eliminate discharges, replace those discharges with water recycling, and avoid the associated environmental impacts of desalination.	Comment noted.

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19.5	While desalination may be inevitable for some communities, the purpose of the Staff Report is to lay out the facts, and HTO requests that the Report include the impact of desalination on future statewide recycled water supplies and the State's recycled water goals.	Staff has added language to section 11.4 of the Staff Report with SED addressing the impacts of the proposed Desalination Amendment on the future of water recycling in California. The Draft California Water Plan Update 2013 includes additional information about the State's recycled water goals and statewide mandates in addition to brackish groundwater and seawater desalination in California. The Draft California Water Plan Update 2013 can be accessed here: http://www.waterplan.water.ca.gov/cwpu2013/prd/index.cfm
#20	**John Steinbeck, Tenera Environmental**	
20.1	The Draft Amendment appears to use the OTC Policy as the basis for the language in the amendment. Although I would urge you to verify this with the other scientists who were members of the Expert Panel, the general feeling of the group was that the small volumes of the intakes for most desalination plants would result in minimal impacts to ocean species. Therefore, we did not feel that the large-scale intake assessments used for power plants would be necessary for desalination plants and any minor impacts could be addressed through a fee paid for the volume of water used by the plant. This approach would greatly simplify the permitting for these facilities and provided an ongoing source of funding for coastal enhancement projects throughout the state.	The OTC Policy is used as the basis for the language in the Draft Desalination Amendment to the Ocean Plan because of the similar environmental impacts that occur during operation of the facilities' changes. Even though the volume of water withdrawn from desalination facilities is typically significantly lower than the water withdrawn by OTC facilities, impingement and entrainment of marine life will still occur at desalination facilities using screened surface intakes. The purpose of the OTC Policy was to eliminate or significantly reduce the intake of seawater at facilities in order to prevent marine life mortality. Even though it may not seem like it, "seawater… is not just water. It is habitat and contains an entire ecosystem of phytoplankton, fishes, and invertebrates." (York and Foster 2005) These small organisms form the base of the marine food web and are a vital part of the marine ecosystem. In addition, desalination facilities have impacts to marine life from the brine discharges that do not occur with OTC facilities. New and expanded seawater desalination facility intakes will be regulated under Water Code section 13142.5(b) rather than 316(b), which by its own terms applies is applicable only to cooling water intake structures. Water Code section 13142.5(b) requires that facilities use the best available site, design, technology, and mitigation measures feasible to minimize the intake and mortality of all forms of marine life. Since the desalination process requires the use of water, the intake of seawater cannot be completely eliminated. But requiring compliance with the provisions in Water Code section 13142.5(b) will support the same goals of the OTC Policy by ensuring desalination facilities are

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		constructed and operated in the most protective manner prior to requiring mitigation. Even though the desalination intake volumes will be far less than OTC facilities, there is still the potential for significant negative impacts on the marine ecosystem. Mitigation for any residual impacts is required by California Water Code section 13142.5(b). During the amendment development, staff proposed using a fee-based mitigation program. Stakeholders did not agree with the Foster et al. (2012) fee recommendation and had discussed hiring a resource economist to develop an appropriate fee. There has not been any follow-up on these discussions, but it was clear that stakeholders did not want the fee recommended by Foster et al. (2012) in the proposed amendment. Additionally, there is not an in-lieu mitigation funding program that is established for these types of impacts. The amendment language does include the option to pay an in-lieu fee for mitigation that will be available once a program is developed at which time, the regional water boards will determine an appropriate mitigation fee.
20.2	One of our concerns was that the standard approach for calculating mitigation used for power plant projects would result in numerous small restoration projects that would be difficult to manage, and more likely to fail. The fee-based approach was derived from mitigation banking which offers several advantages over on-site, permittee led restoration mitigation programs. In 1995, the USEPA, the Army Corps and several other agencies issued joint memoranda and guidance on mitigation banking under the Section 404 regulating program aimed at wetlands mitigation (60 F.R. 13711 and 60 F.R. 58605). The agencies stated that the key advantages to mitigation banking over other approaches to restoration mitigation included economies of scale, in particular they state that pooling financial planning, regulatory and scientific resources can increase the potential for success by funding projects that are "not practicable" to many smaller project-specific proposals. Consolidation also increases the potential for the establishment and long-term management of successful mitigation. Mitigation banking was given preference in 1998 by Congress as the approach to offset wetland impacts from federally funded transportation projects if banks were	It is true that smaller mitigation projects would be more difficult to manage and that the chance of success in pooling mitigation banking funds would be greater. The Desalination Amendment provides options for mitigation: 1) complete a mitigation project, or 2) provide funding for a fee-based mitigation program. The Desalination amendment outlines mitigation requirements for replacement of marine life or habitat to ensure successful implementation of the project. Currently, there are no existing programs that can accept and manage in-lieu funds for coastal mitigation projects. Until such a program is established an owner or operator must complete their own mitigation project, which may include mitigating additional acres of habitat associated with an existing project. In fact, the regional water boards should encourage this approach to ensure a mitigation project is successful.

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	approved in accordance with the 1995 guidance provided by the National Research Council (NRC).	
20.3	My comments also address the prescriptive approach to compliance in the Draft Amendment that provides unnecessary detail, while also leaving out many of the important issues that need to be considered when selecting an intake location or technology. For example, the Draft Amendment asks for input on the selection of a specific slot size for screens that would be used at surface ocean intakes. Since the language mentions slot opening, the assumption is that this refers specifically to wedgewire screens. This selection should be based on site-specific factors especially for use of wedgewire screens that require adequate cross flow. Other site-specific factors include the level of debris which may make the use of wedgewire screen technology infeasible. The current language does not seem to allow for other screening systems currently available or in development. Finally, the species composition at a site is a critical factor in the selection of an appropriate screen or slot opening. The SWRCB should be providing language that provides for as much flexibility in the selection and development of intake technologies as possible. A separate guidance document could be developed that would detail the site-specific factors that would need to be considered in determining the best intake technology available for a specific project.	Comments were requested from stakeholders on information regarding screened slot sizes of 0.5 mm, 0.75mm, and 1 mm. The intent was to investigate which size is the most appropriate to minimize intake and mortality of marine life while still being operationally functional. The State Water Board would then select one screen slot size and include it as a requirement for all screened intakes. Nothing in the proposed Desalination Amendment and the Staff Report with SED prevents the use of fine mesh screens and the amendment allows the use of equally protective screening technologies. The wedgewire screen slot size was selected because information was most abundant on the performance of these screen types. Please see response to comment 15.4 regarding the selection of a 1.0 mm slot size screen. Each new or expanded desalination facility will undergo the process of attaining a Water Code section 13142.5(b) determination that will evaluate in detail the site-specific factors to be considered in determining the best intake technology available for a specific project.
20.4	Amendment Section L.2.b.(1) Suggested Change: "Consider whether the identified regional need for desalinated water identified is consistent with any applicable general or coordinated plan for the development, utilization or conservation of the water resources of the state, such as a county general plan, an integrated regional water management plan or an urban water management plan. --A design capacity in excess of the identified regional water need for desalinated water shall not be used by itself to declare subsurface intakes as feasible--" Rationale: No intake design should be dismissed without consideration of numerous factors. This indicates that the policy will give preferential consideration to	The intent of the last line, suggested to be removed, is to ensure that the amount of water produced is the amount of water required to meet the identified need for desalinated water. It is environmentally protective to produce only the amount of desalinated water that is needed. This clause prohibits declaring subsurface intakes as infeasible solely because the design capacity exceeds the identified need. This ensures that the environmentally superior option of subsurface intakes is considered first and used to the extent possible. The proposed Desalination Amendment is still adequately flexible in that if subsurface intakes are not feasible, a screened surface water intake can be used for all or a portion of the intake. Or alternatively, a plant can be scaled down or redesigned so that subsurface intakes can be used. Also, regional needs can be met by other water resources like water recycling or groundwater storage when water is abundant.

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	subsurface intakes. In many cases these have been shown to fail. The environmental impacts are largely unstudied, and some technologies such as infiltration galleries have the potential to result in impacts that are likely much greater than a well-designed screened ocean intake.	"A design capacity in excess of the identified regional water need for desalinated water shall not be used by itself to declare subsurface intakes as feasible--" was moved to chapter III.L.2.d.(1)(a) of the proposed Desalination Amendment. The commenter did not provide references for the statements that "in many cases these [subsurface intakes] have been shown to fail" or that "infiltration galleries have the potential to result in impacts that are likely much greater than a well-designed screened ocean intake." These statements are inconsistent with the information provided in section 8.3.1.2.3 of the Staff Report with SED and all of the citations therein.
20.5	Amendment Section L.2.c.(2) Suggested Change: "If the regional water board determines that subsurface intakes are infeasible and surface water intakes are proposed instead, analyze potential designs for those intakes in order to minimize --the Area Production Forgone (APF). The intake shall be designed to minimize--entrainment of organisms when operational." Rationale: The inclusion of APF as a criterion does not make any sense as it may not be feasible to calculate estimates of APF at a location. Also, APF may not provide any insight into the levels or effects of entrainment and may actually be independent of entrainment levels. Minimizing entrainment should be the primary criterion.	Chapter III.L.2.c.(2) of the proposed Desalination Amendment was revised to replace APF with minimize intake and mortality of all forms of marine life. There are methods other than Area Production Forgone to estimate entrainment of organisms. The ETM/APF was used because an owner or operator using a screened surface intake will be required to do the study anyway, but it is recognized that an owner or operator may want to assess screen efficacy using an alternative method. Whole Life Cycle methods should not be used for the comparison because they cannot adequately compare impacts to eggs, larvae, and smaller juveniles. The comparison should evaluate intake and mortality of all forms of marine life, including a broad range of species, morphologies, and sizes, not just larger juveniles and adults. Please also see response to comment 29.2 that addresses similar issues with using different methodologies to evaluate the effectiveness of an intake screen. The methodology used to evaluate intake efficacy at minimizing intake and mortality of all forms of marine life must be approved by the regional water board in consultation with the State Water Board. The ETM/APF method is still the most appropriate method for mitigation assessment that is currently available.
20.6	Amendment Section L.2.d.(1)(a) Suggested Change: "The regional water board shall require intakes that minimize effects on the environment, in consultation with State Water Board staff."	The preference for subsurface intakes is supported in the Staff Report with SED. Please see response to comment 15.2. Subsurface intakes are the environmentally preferred intake option because they do not impinge or entrain marine life. Additionally, subsurface wells will have

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	Rationale: The original policy language gives preference to subsurface intakes without providing without any legal basis for the policy. At the very least this policy statement should be backed by a balanced assessment of intake technologies that is open to scrutiny (comment) by industry and the public. The policy basis should include environmental and economic appraisals of viable technology alternatives. Subsurface intakes will not be feasible for many projects, have unknown environmental effects (adverse or beneficial), may represent a significant economic burden on California's water supply, and are known to fail. For example the Desal Expert Panel Report states that, "As indicated in WateReuse report (2011b), the largest seawater desalination facility with a subsurface intake in operation at present is the Pedro Del Pinatar (Cartagena) desalination plant in Spain where the first 64,000 m3 per d (17 mgd) phase of the project used subsurface HDD wells. Site-specific hydrogeological constraints made it impossible to use similar intake wells for plant expansion, and the second 64,000 m3 per d (17 mgd) phase of this project was constructed with an open ocean intake. Another example of a larger facility with an indirect intake is the Fukuoka plant in Japan that has an intake volume of 103,000 m3 per d (27.2 mgd) and uses a large constructed infiltration gallery with an area of 20,000 m2 (4.9 acres) in the shallow nearshore ocean waters at a depth of 11.5 m (38ft). While details were not available for this report, there have been challenges in operating this intake system." Other environmental impacts, such as the significant greenhouse gas emissions and disturbance of benthic organisms from subsurface intakes, need to be evaluated carefully against such things as the minimal effects of any entrainment losses on fish populations and other positive benefits being sited. Other environmental implications of subsurface intakes must be thoroughly studied prior to establishing a rule favoring subsurface intakes. Other factors that need to be considered include the acquisition of required lands to support needed wells and significant additional infrastructure to transport water from expansive wells to desalination sites).	minimal to no construction-related impacts on marine life. Substantial supporting data are provided in sections 8.3 and 12.2 of the Staff Report with SED for detailed information supporting the preference for subsurface intakes. There is strong support from the environmental community, some of the policy peer reviewers, and agencies like the California Coastal Commission for preferentially requiring the use of subsurface intakes. Some are urging that desalination facilities should only be permitted when subsurface intakes are feasible. While subsurface intakes may not be feasible at all locations, they should be considered before any other alternatives because they are the most protective of the environment. The proposed Desalination Amendment does allow the use of screened surface intakes or an equally protective intake alternative when subsurface intakes are infeasible. Furthermore, the technical and economic feasibility of subsurface intakes was evaluated in the Staff Report with SED and has been supported in the scientific literature. (Missimer et al. 2013) There may be technical challenges with improperly sited subsurface intakes and not all sites have hydrogeological conditions that will support subsurface intakes. The reliability of subsurface intakes depends largely on the geologic and hydrologic conditions of the site, which makes well-designed investigative studies critical prior to siting and constructing a pilot facility. We are aware that the San Pedro del Pinatar desalination facility in Murcia, Spain was unable to use subsurface intakes for the 17 MGD (product water) Phase II expansion (WateReuse 2011); however, the facility is successfully operating subsurface intakes for the facility's Phase 1 that has a 17 MGD production capacity. (Malfieto and Ortego 2006) Additionally, the commenter did not provide a reference for the statement that "there have been challenges in operating this intake system" in reference to the subsurface intakes at the Fukuoka Japan facility. There is recent information that is in direct contrast to this statement. As discussed in response to comment 15.90, the subsurface intakes at the Fukuoka Desalination Facility in Japan have been operating successfully with minimal maintenance for over eight years. (Weiser 2014)

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		The Staff Report with SED evaluates greenhouse gas emissions and the disturbance of benthic organisms from a programmatic level in section 12. An owner or operator must evaluate these factors on a project-specific basis to meet their CEQA obligations; however, the State Water Board is not required to evaluate the same factors on a project-specific level. Furthermore, it is unlikely that the temporary benthic disturbance that may or may not occur will be less significant than ongoing mortality that will occur during the operation of a surface water intake. Construction of subsurface wells may result in no marine life mortality if the well heads are set back from the beach. (Figure 5a in Missimer et al. 2013) There is a high probability of construction-related marine life mortality for subsurface infiltration galleries that will require mitigation. The effects of entrainment of fish populations may not be detectable; however, the losses may be significant from an ecosystem standpoint. The majority of organisms that are entrained in surface intakes are small but are a critical component of the marine ecosystem because they form the base of the marine food web. Lastly, it is unlikely that there will be “significant additional infrastructure to transport water from expansive wells to desalination sites” but we acknowledge that construction-related impacts for the installation of infrastructure must be quantified and mitigated for. The evaluation of construction-related impacts is already included in the proposed Desalination Amendment language.
20.7	Amendment Section L.2.d.(1)(a)i. Suggested Change: "The regional water board shall consider the following criteria in determining feasibility of subsurface intakes: geotechnical data, hydrogeology, benthic topography, oceanographic conditions, volume of water required. impacts on the marine environment and biological communities, presence of sensitive habitats, presence of sensitive species, energy use; impact on freshwater aquifers, local water supply, and existing water users; desalinated water conveyance, existing infrastructure, co-location with sources of dilution water, design constraints (engineering, constructability), and project life cycle cost.	The existing list provides guidance to the regional water boards of factors to consider when determining the feasibility of subsurface intakes. The list will help guide the feasibility determination if subsurface intakes are feasible. The entirety of chapter III.L.2 is under the scope of consideration of impacts to marine life and is already included in considerations in numerous other places in chapter III.L.2.

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	Project life cycle cost shall be determined by evaluating the total cost of planning, design, land acquisition, construction, operations, maintenance, mitigation, equipment replacement and disposal over the lifetime of the facility, in addition to the cost of decommissioning the facility. In addition, the regional water board may evaluate other site- and facility-specific factors. Other land based considerations must include the fact that the preferred location for land based wells might be in areas that would likely be restricted from use (Coast Act Impacts)." Rationale: Delete entire section, or at least add consideration of impacts to marine environment.	
20.8	Amendment Section L.2.d.(1)(a)ii. Suggested Change: "The regional water board --may find-- shall consider whether a combination of subsurface and surface intakes, operated together or at separate times, is the best feasible alternative to minimize intake and mortality of marine life." Rationale: It is unclear to me why this statement is necessary.	The regional water boards have the authority to determine that a combination of subsurface and surface intakes is the best available intake technology feasible. The language in chapter L.2.d.(1)(a)ii was included it to highlight that subsurface technologies should be used to the maximum extent feasible.
20.9	Amendment Section L.2.d.(1)(b) Suggested Change: "--Installation and maintenance of a subsurface intake shall avoid, to the maximum extent feasible, the disturbance of sensitive habitats and sensitive species.--" Rationale: On the basis of suggested changes to §L.2.d.(1)(a), this would already be considered.	Please see response to comment 20.8.
20.10	Amendment Section L.2.d.(1)(c) Suggested Change: "The regional water board may approve a surface water intake subject to the following conditions."	The intent of the existing proposed Desalination Amendment language is to have an owner or operator assess the feasibility of a using subsurface intake prior to considering the use of a surface water intake.
20.11	Amendment Section L.2.d.(1)(c)i. Suggested Change: "The regional water board shall require that surface water intakes be	This comment will be addressed with the appropriate screen slot size that would best reduce impingement and entrainment, while still

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	screened with the screen opening design selected to appreciably reduce the intake and mortality of the marine organisms at the project site."	providing a reliable through-screen water supply. The term "appreciably reduce" is vague and would result in regulatory inconsistencies. Requiring the use of standard screens will ensure intake requirements are consistent statewide. Please see response to comment 15.4.
20.12	Amendment Section L.2.d.(1)(c)ii. Suggested Change: "--In order to reduce entrainment, all surface water intakes must be screened with a (0.5 mm [0.02 in] 0.75 [0.03 in] 1.0 mm [0.04 in]) or smaller slot size screen when the desalination facility is withdrawing seawater.--" (NOTE: The State Water Board intends to select a single slot size, but is soliciting comments on whether 0.5 mm, 0.75 mm, 1.0 mm, or some other slot size is most appropriate to minimize intake and mortality of marine life.) Rationale: Predefining the screen or slot opening for wedge wire screens does not allow for consideration of the conditions and species at an intake location. Also the text seems to confuse slot openings which refer to wedgewire screen and openings for screen mesh. The selection of a specific slot opening for wedge wire screens is unnecessary as the manufacturers can customize the slot openings to a large degree allowing the intake to be customized to the specific site conditions. This section does not provide any information on the need for adequate cross flow to allow a wedgewire screen to operate efficiently, or the potential for technology that might utilize square or other shape mesh. The screen opening needs to be selected based on the species at a location and not prescribed in a policy.	The Staff Report with SED typically referred to "slot size," which is a measure for wedgewire screens because these will be the most commonly used screens in the nearshore ocean environment. Fine mesh screens may also be used and if used, should have a 1 mm by 1 mm mesh size. However, from a technical feasibility standpoint, cylindrical wedgewire screens will most likely perform better in the nearshore ocean waters, particularly if equipped with an active cleaning system (e.g. Intake Screens Inc.). Various intake locations will have different species and sizes of organisms present and that screen efficacy varies based on species and size of the organism. But the intention of the proposed Desalination Amendment is to require the smallest opening possible while taking into consideration potential increases in operational challenges. We solicited comments on sizes of screen opening to establish the point when the screen opening is as small as possible but does not compromise the ability of a facility to operate. While some feedback suggested that 0.5 mm opening would be best, there are concerns that 0.5 mm openings may pose operational challenges at this point in time. The proposed Desalination Amendment includes a requirement that screen slot size is no larger than 1.0 mm because it would be feasible at all open ocean intakes and reduce entrainment while ensuring regulatory consistency. If the proposed Desalination Amendment were to relect the approach suggested by the commenter, it is probable that an owner or operator would elect to use a screen with larger openings that is less protective of marine resources even when screens with smaller openings are feasible because screen with larger openings pose fewer operational challenges. The proposed Desalination Amendment does allow flexibility in that it provides an option to use an alternative intake method

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		as long as the method provides equivalent reduction in intake and mortality of all forms of marine life that is provided by a screen with 1.0 mm slot size or 1.0 mm by 1.0 mm mesh size. Please see response to comment 15.4.
20.13	Amendment Section L.2.d.(1)(c)iii. Suggested Change: "An owner or operator may demonstrate an alternative method of preventing entrainment through a pilot study designed to demonstrate the effectiveness of the alternative." Rationale: See comments on selection of specific screen or slot openings. Any study designed to demonstrate the effectiveness of a screening technology would not use an ETM-type assessment. The purpose of ETM is to estimate the impacts due to entrainment on a source population of marine organisms. The pilot study would need to detect the reduction in entrainment resulting from the technology. The designs and sampling approaches for the two studies are entirely different and specifying that the study needs to be conducted for 36 months indicates the absence of any understanding of the goal of this type of study. Similar to the ETM, the study will be estimating a percentage reduction which would show little variation among years as long as the species composition of larvae was similar among years. A defined set of goals need to be established so that any project being assessed can be measured appropriately against that set of goals. Based upon the results of the assessment, appropriate mitigation steps, where required, might be possible to meet or exceed the established goals.	We agree that there are alternative methods that could be applied to measure the effectiveness of an alternative screening technology. The ETM/APF model could be applied because as the commenter states, “the purpose of ETM is to estimate the impacts due to entrainment on a source population of marine organisms” and ultimately the study should evaluate intake and mortality of the source population of marine organisms for the alternative screening technology and a 1.0 mm screen. The 36 month requirement was included to be consistent with the OTC Policy requirements, but has since been reduced to 12 months (see response to comment 15.5). Even though there are alternative methods that could be applied to measure the effectiveness of an alternative screening technology, the proposed Desalination Amendment includes the ETM/APF method because it can evaluate the efficacy of a screening technology in terms of impacts on the source populations of marine organisms. As mentioned in response to comment 29.2, the assessment method can dramatically change the outcome of an assessment of the relative efficacy of an alternative screening technology. The example provided in 29.2 shows how if the study evaluates organisms larger than 10 mm, entrainment is reduced by 100 percent. If the study evaluates organisms larger than 1.0 mm, entrainment is reduced by 9 percent. But entrainment is reduced by only one percent for organisms 1 to 10 mm, meaning 99 percent are entrained. Whereas overall, entrainment of all forms of marine life is reduced by 1.1 percent using a 1.0 mm slot size screen (see Figure 29.2.1). Even though multiple entrainment assessment methods could be used, it is important that the study is well designed and generates enough data to compare the screens to the alternative screening technology, particularly because the study duration was shortened to at least 12 months (See Appendix E of the Staff Report with SED). There needs to

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		be a high enough abundance of organisms in the water to detect differences between the 1.0 mm screen and the alternative technology. The experiment should also look at a size range from 25 or 30 mm and smaller as well as a diverse range of species since the probability of entrainment is directly related to size and species. Replication of the tests is also critical to ensure the numbers are reproducible and consistent among the tests and can reduce the variability enabling the detection of statistical differences. Additionally, standard quality assurance and quality control protocols should be followed (e.g. controls, replicates). If there are not enough data to compare the intake technologies, the regional water boards may require an owner or operator to extend the study past 12 months. In order to ensure a study is well designed, an owner or operator must submit the proposed study design to the regional water board in consultation with the State Water Board prior to the study commencing. The Water Boards may require an owner or operator to hire a third party contractor to review and approve the study. The oversight of the study design and resulting data will prevent important decisions from being made based on inadequate or inaccurate study designs and the resulting data. No changes were made to the proposed Desalination Amendment because the current approach will ensure a proper assessment of alternative screening technologies. Please see response to comment 15.4.
20.14	Amendment Section L.2.d.(2)(d)i. Suggested Change: "Provide a board approved assessment on the intake entrainment effects." Rationale: Should not require an ETM-type study as volume of intake may not require detailed assessment. Also, modeling could be used to provide an ETM-type assessment.	Please see response to comment 20.13.
20.15	Amendment Section L.2.d.(2)(f) Suggested Change: "Facilities that use subsurface intakes to supply augmented flow water for dilution are also required to provide a board approved assessment of the environmental effects of the intake technology."	When combined together at a desalination facility, subsurface intakes and augmented flow can significantly reduce or eliminate the intake and mortality of all forms of marine life that result from seawater intake and brine disposal. Subsurface flow eliminates impingement and

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	Rationale: Subsurface intakes should not be exempt from evaluation of environmental impacts.	entrainment, and flow augmentation allows for brine discharge at or below ambient salinity concentrations, alleviating the need for multiport diffusers or a mixing zone. The intent of chapter III.L.2.d.(2)(f) is to exempt such a facility from the technology and study requirements of chapter III.L.2.d.(2) . However, this does not exempt such a facility from the requirement to assess environmental impacts as might be required by other parts of the proposed Desalination Amendment or as required by CEQA. For example, construction-related impacts must still be evaluated and mitigated in accordance with chapter III.L.2.e.
20.16	Amendment Section L.2.e. Suggested Change: "Mitigation for the purposes of this section is the compensation of any significant losses --the replacement-- of marine life or habitat --that is lost-- due to the construction and operation of a desalination facility after minimizing marine life mortality through site, design, and technology measures. The owner or operator may choose whether to satisfy a facility's mitigation measures pursuant to chapter III.L.2.e.(3) or, if available, L.2.e.(4)." Rationale: Note that this is setting a policy that all losses are required to be replaced - regardless of whether the losses are significant. Also, as written, the language would not provide for any mitigation that does not provide exact replacement.	Water Code section 13142.5(b) authorizes the State Water Board to require the best available mitigation feasible for all forms of marine life after the best available site, design, and technology are implemented. Unlike other regulations requiring mitigation only for impacts deemed "significant," the proposed Desalination Amendment implements statutory language that requires mitigation for the loss of all forms of marine life, including that which occurs as the result of the construction or operation of a new or expanded seawater desalination facility. Please also see response to comment 15.9 for situations when out-of-kind mitigation will be permitted.
20.17	Amendment Section L.2.e.(1) Suggested Change: "Marine Life Mortality Report. The owner or operator of a facility shall submit a report to the regional water board estimating --projecting-- the marine life mortality resulting from construction and operation of the facility after implementation of the facility's required site design and technology measures." Rationale: The ETM approach does not project entrainment numbers, it estimates the annual mortality due to entrainment. Projecting arguably implies additive annual entrainment, which is wrong. Entrainment remains consistent each year and does not increase with additional years.	Agree. The proposed Desalination Amendment language was revised from "projecting" to "estimating."

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20.18	Amendment Section L.2.e.(1)(a) Suggested Change: "For operational mortality related to intakes, the report shall include a detailed entrainment assessment approved by the regional board. --The entrainment study period shall be at least 36 consecutive months and sampling shall be designed to account for variation in oceanographic conditions and larval abundance and diversity such that abundance estimates are reasonably accurate.-- At their discretion, the regional water boards may permit the use of existing entrainment data from the facility to meet this requirement. If sampling is required, the samples must be collected using a mesh size no larger than 335 microns and individuals collected shall be identified to the lowest taxonomical level practicable. --Additional samples shall also be collected using 200 micron mesh to provide a broader characterization of other entrained organisms. The ETM/APF analysis shall be representative of the entrained species collected using the 335 micron net. The APF shall be calculated using a 90 percent confidence level. An owner or operator with subsurface intakes is not required to do an ETM/APF analysis for their intakes and is not required to mitigate for intake-related operational mortality.--" Rationale: No specifics on the study requirements should be included as the design or even requirements for actual data collection will vary by location. Based on input from the Expert Review Panel no studies should be required for facilities with low volume intakes (probably 30 mgd or less). Also, for many plants the impacts can be estimated using an ETM-based modeling approach, especially at locations where there are some existing data. No additional sampling using a 200 micron net should be required since the impacts estimated from the ETM can be easily extrapolated, in almost all cases, to any planktonic organisms subject to entrainment. ETM is the method used to assess the significance of entrainment mortality. APF is a method for calculating mitigation of taxa for which there is an identifiable adult habitat association. It is not clear why it would be included in a Marine Life Mortality Report. APF converts proportional mortality calculated by the ETM into an area metric (equivalent square kilometers) for appropriate larval taxa. This	The ETM/APF method is the best mitigation assessment method to ensure the direct and indirect environmental effects of surface water intakes are fully compensated for. Additionally, one of the project goals is to ensure there is a consistent statewide approach for controlling adverse effects of desalination facilities. For more information on why the ETM/APF method is required for mitigation assessment, please see section 8.5.1.1 of the Staff Report with SED. Regarding the Expert Review Panel's input that no studies should be required for low-volume intakes (less than 30 MGD), please see response to comment 20.1 for why staff is recommending the current mitigation approach for desalination facilities. Facilities would be able to use existing data at the discretion of the regional water boards, including an ETM-based modeling approach; however, the models must be validated with empirical data. The requirement for additional sampling using a 200 micron net was included in the proposed Desalination Amendment to be consistent with the OTC Policy, but we agree with the commenter that the additional sampling is unnecessary. In Foster et al. (2013), Dr. Peter Raimondi states, "The use of APF allows for the estimation of both the direct and indirect consequences of an impact and provides a currency (i.e., habitat acreage) that may be useful for understanding the extent of compensation required to offset an impact." Please see response to comment 15.48 for more information. The Marine Life Mortality Report should perhaps be more appropriately named the Mitigation Assessment Report. The Marine Life Mortality Report does not ask an owner or operator to count each individual organism that dies as a result of the construction and operation of a facility, but rather to use models like the ETM/APF method to estimate the amount of mitigation, in acres, that is needed to compensate for the loss of organisms. The ETM/APF method is included in the Marine Life Mortality report because it is being used to estimate the impacts of a surface water intake and convert that into an area (in acres) required to compensate for the loss of the marine life.

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	APF estimate is the area required to compensate for the loss of those larval taxa. Therefore it should be included in a mitigation assessment if the ETM assessment concludes a significant impact that requires mitigation.	Regarding the comment that an APF estimate should only be done if the ETM results are deemed significant, Water Code section 1314.25(b) requires consideration of intake and mortality of all forms of marine life without a determination of significance. For more information on why mitigation is being required for all forms of marine life, please see response to comment 20.16.
20.19	Amendment Section L.2.e.(1)(b): "For operational mortality related to discharges, the report shall estimate the area in which salinity exceeds 2.0 parts per thousand above natural background salinity or a facility-specific alternative receiving water limitation (see § L.3). The area in excess of the receiving water limitation for salinity shall be determined by modeling and confirmed with monitoring. The report shall use any acceptable approach for evaluating mortality that occurs due to shearing stress resulting from the facility's discharge, including any incremental increase in mortality resulting from a commingled discharge." No specific comment but is the 2 ppt limit supported by any studies? This seems very low.	The reasoning behind the requirement of 2 ppt above natural background salinity is discussed in detail in section 8.7.1 of the Staff Report with SED. As identified in the Staff Report with SED, the State Water Board staff commissioned a Science Advisory Panel that conducted an extensive literature review on the toxic effects of brine concentrates on marine life. (Roberts et al. 2013) The Panel reported that “benthic infaunal communities and sea grasses are the most sensitive; some communities seem to be tolerant of effects of up to 10 psu increases, while others are affected by increases of only 2-3 psu.” The Panel recommended an incremental salinity limit of no more than 5 percent above natural background salinity to be measured at the mixing zone boundary. The 5 percent limit is approximately a 1.7 ppt increase of above the average salinity of ocean water in California. In addition to the Science Advisory Panel on brine, the State Water Board also commissioned the Marine Pollution Studies Laboratory at Granite Canyon to determine the tolerance of Ocean Plan test species to various concentrations of hyper-saline brine. The Phillips et al. (2012) reported that red abalone were most sensitive to elevated salinity, with an LOEC at 35.6 ppt just 1.6 ppt above natural background. These data were used to develop the staff recommendation of 2 ppt above natural background salinity. However, both the Roberts et al. 2013 and Phillips et al. 2012 cautioned that the current information on salinity tolerance of marine organisms typically looks at short-term and or lethal effects of brine but that there is a need for longer-term chronic toxicity tests using sub-lethal endpoints to better characterize the tolerance threshold. This was reiterated by the Scientific Peer

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		Reviewers of the Desalination Amendment who stated that the 2 ppt limit should be protective in terms of lethal effects, but that sub-lethal effects should also be considered (see reviews by Levin, Gillanders, and Knott). Other reviewers were concerned that the 2 ppt standard would not be conservative enough and reported that in other countries like Australia and Japan, the limit is only 1 ppt (see reviews by Hodges, Levin, and Howarth). In some cases, 2 ppt will be overly-conservative, but in others it may not be conservative enough. Please also see response to comment 13.154.
20.20	Amendment Section L.2.e.(1)(d): "Upon approval of the report by the regional water board in consultation with State Water Board staff, the calculated marine life mortality shall form the basis for the mitigation provided pursuant to this section." This has important implications for APF - as habitat cannot be replaced for several of the taxa commonly entrained in California. It is likely that a strong argument against APF for all taxa effects could be made and that additional mitigation may be required	We recognize that habitat cannot be replaced for some of the entrained species (e.g. pelagic species); however, using the APF method to determine a number of acres for mitigation can still be applied. Please see Staff Report with SED section 8.5.4.1. The intent of III.L.2.e.(3)(b)i. is to ensure that in-kind mitigation is considered first, but allows the regional water boards the flexibility for situations where there may be no suitable habitat to mitigate for some of the entrained species. In some cases, juvenile organisms utilize different habitat from the adults and mitigation could be done for either the juvenile or adult habitat. When habitat restoration truly is not an option for the entrained species, it is up to the discretion of the regional water boards to allow for out-of kind mitigation (see response to comment 15.9) or alternative mitigation methods like contributing to a fish hatchery, a water quality improvement project, or other up-stream mitigation methods. Using the example above, habitat restoration would be done for the 48 acres but in-lieu of mitigating 2 acres for the loss of pelagic species, the regional water board could permit an alternative mitigation approach.
20.21	Amendment Section L.2.e.(2) Suggested Change: "The owner or operator shall mitigate for the marine life mortality determined in the report above by choosing to either complete a mitigation project as described in chapter III.L.2.e.(3) or, if an appropriate fee-based mitigation program is available, provide funding for the program as described in chapter IIIL2.e.(4), or a combination of the two. The mitigation project or the use of a fee-based mitigation program and	The proposed Desalination Amendment was revised to accommodate for both options in chapter III.L.2.e.(3) and (4) to be selected.

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	the amount of the fee that the owner or operator must pay is subject to regional water board approval." Rationale: It may be appropriate to consider both options for some projects, particularly in the case of projects whose range of entrained larval taxa have adult forms that do and do not associate with restorable habitat. See [the following] comments for explanation.	
20.22	Amendment Section L.2.e.(3)(a) Suggested Change: "The owner or operator shall submit a Mitigation Plan. Mitigation Plans shall include an APF assessment of appropriate taxa in order to scale project entrainment and brine disposal effects on larva to appropriate compensatory habitat acreage. The plan should also include project objectives, site selection, site protection instrument (the legal arrangement or instrument that will be used to ensure the long-term protection of the compensatory mitigation project site), baseline site conditions, a mitigation work plan, a maintenance plan, a long-term management plan, an adaptive management plan, performance standards based on the impact assessment and mitigation plan objectives and success criteria, monitoring requirements, and financial assurances." Rationale: See [the previous] comments on the difference between APF and ETM. APF is only appropriate for use with species whose adult forms associate with a restorable habitat. Species without habitat association as adults will not benefit from habitat restoration. Alternative mitigation approaches such as quota buyout and stocking should be considered for taxa with no restorable adult habitat association. These approaches are unlikely to be feasible unless a mitigation banking/in-lieu fee approach is taken.	Please see responses to comments 20.20 and 20.1, and response to comment 15.9 regarding the out-of-kind mitigation that can be done for open coastal and soft-bottom species.
20.23	Amendment Section L.2.e.(3)(b)i.: "Mitigation shall be accomplished through expansion, restoration or creation of one or more of the following: kelp beds, estuaries, coastal wetlands, natural reefs, MPAs, or other projects approved by the regional water board that will mitigate for intake and mortality of marine life	Please see response to comment 20.20 and response to comment 15.9 regarding the out-of-kind mitigation that can be done for open coastal and soft-bottom species. .

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	associated with the facility." NOTE that none of these habitats directly compensate for losses to coastal pelagic fishes such as croakers which are usually entrained in high numbers as larvae. Therefore, there should be consideration of stocking in this list.	
20.24	Amendment Section L.2.e.(3)(b)ii. Suggested Change: "The owner or operator shall demonstrate that the project --fully-- mitigates for intake-related marine life mortality --by including acreage that is at least equivalent in size to APF calculated in the Marine Life Mortality Report above--. The owner or operator shall do modeling to evaluate the areal extent of the mitigation project's production area to confirm that it overlaps the facility's source water body. Impacts on the mitigation project due to entrainment by the facility must be offset by adding compensatory acreage to the mitigation project. --The regional water boards may require additional habitat be mitigated to compensate for the annual entrainment of organisms between 200 and 335 microns.--" Rationale: The APF should not be used as the only criterion used to determine appropriate mitigation. The method has limited value for coastal pelagic fishes. If the ETM is used in the intake assessment then the impacts predicted from the model can be extrapolated as occurring to all planktonic organisms. The ETM estimate is a percentage that is largely affected by the ratio of the intake to source water volumes, therefore the same percentage losses could be used to approximate the impacts to all plankton with the same planktonic duration. The actual impacts to other plankton is most likely much less due to the reduced planktonic duration for most plankton relative to fishes.	Please see response to comment 20.20. Please see response to comment 15.9 regarding the out-of-kind mitigation that can be done for open coastal and soft-bottom species. Please see response to comment 15.48 as to why the 200 micron requirement was deleted.
20.25	Amendment Section L.2.e.(3)(b)iii. Suggested Change: "--The owner or operator shall demonstrate that the project also fully mitigates for the discharge-related marine life mortality projected in the	Disagree with the recommended deletion because it would eliminate the requirement to mitigate for discharge-related impacts and result in inadequate mitigation for a project. Please see response to comment

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	Marine Life Mortality Report above. For each acre of discharge-related disturbance as determined in the Marine Life Mortality Report, an owner or operator shall restore one acre of habitat unless the regional water board determines that a mitigation ratio greater than 1:1 is needed.--" Rationale: As previously noted this will not be possible for many species. Also, mitigation ratios have been used on previous projects.	15.9.
20.26	Amendment Section L.2.e.(3)(b)iv. Suggested Change: "--The owner or operator shall demonstrate that the project also fully mitigates for the construction-related marine life mortality identified in the Marine Life Mortality Report above. For each acre of construction-related disturbance, an owner or operator shall restore one acre of habitat unless the regional water board determines that a mitigation ratio greater than 1:1 is needed.--" Rationale: As previously noted this will not be possible for many species. Also, mitigation ratios have been used on previous projects.	Disagree with the recommended deletion because it would eliminate the requirement to mitigate for construction-related impacts and result in inadequate mitigation for a project. Please see response to comment 15.9.
20.27	Amendment Section L.2.e.(4): "Mitigation Option 2: Fee-based Mitigation Program. If the regional water board determines that an appropriate fee-based mitigation program has been established by a public agency, and that payment of a fee to the mitigation program will result in the creation and ongoing implementation of a mitigation project that meets the requirements of section L.2.e.(3), the owner or operator may pay a fee to the mitigation program in lieu of completing a mitigation project." Note: The Expert Review Panel agreed that this was the best approach for addressing intake effects as the intake volumes are likely to be too small to produce any impacts.	Comment noted. Please see response to comment 20.1.
20.28	Amendment Section L.3.b.(1): "Discharges shall not exceed a daily maximum of 2.0 parts per thousand above natural background salinity to be measured as total dissolved solids (mg/L) measured no further than 100 meters (328 ft) horizontally	Please see response to comment 20.19 and 13.154.

Please note all tables and figures referenced are present at the end of this document

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	from the discharge. There is no vertical limit to this zone." Same comment [as the previous one] - Is the 2.0 ppt supported by data?	
20.29	Amendment Section L.3.c.(1)(a) Suggested Change: "Establish baseline biological conditions at the discharge location and at reference locations --over a 36 month period prior to commencing brine discharge--. The biologic surveys must characterize the ecologic composition of habitat and marine life using measures established by the regional water board. At their discretion, the regional water boards may permit the use of existing data from the facility to meet this requirement." Rationale: Study period should not be specified. The appropriate time period should be determined based on the communities and habitats present and threatened by discharge effects.	Please see response to comment 15.5.
20.30	Amendment Section L.4.a.(2) Suggested Change: "Baseline biological conditions shall be established at the discharge location and at a reference location prior to commencement of construction. The owner or operator is required to conduct studies to --Before-After Control-Impact biological surveys that will-- evaluate the differences between biological communities at a reference site and at the discharge location before and after the discharge commences, preferably using a Before-After Control-Impact design. The regional water board will use the data and results from the study --Before-After Control-Impact surveys-- for evaluating and renewing the requirements set forth in a facility's NPDES permit." Rationale: The term "Before-After, Control-Impact' refers to a type of study design. The suggested language change was made to reflect the fact that the design may not be adaptable to all locations.	Agree. The proposed change has made the appropriate places in chapter III.L.4.a.(2).
#21	**Sean Bothwell, California Coastkeeper Alliance**	
21.1	Seawater desalination proponents are now seeking to continue using the very same intakes regulated and intended to be phased-out under the	The proposed Desalination Amendment does not undermine the Once-Through Colling (OTC) Policy. By its express terms, the

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	Once-Through Cooling (OTC) Policy, thus undermining the Policy's objective of minimizing marine life mortality from entrainment and impingement. Currently proposed desalination facilities will have a detrimental impact on the chemical, physical, and biological integrity of California's waters. Today, California's desalination facilities have a combined design capacity of approximately 6.1 MGD. That capacity would be dwarfed by the 15 seawater desalination plants currently proposed along the California coast, with a combined design capacity of 250 to 370 MGD - a 60-fold increase over today's current capacity.	proposed Desalination Amendment applies only to seawater desalination facilities, and does not apply to power plants. As explained in response to comment 21.29, powerplant intakes and discharges are subject to and regulated under a different statute, even though seawater desalination facilities and OTC facilities have similar intake-related impacts to marine life. Another important difference is in what the intake water is used for: while OTC facilities can function with closed loop systems for cooling purposes; desalination facilities require a continuous source of water supply to produce potable water.
21.2	Our organizations have comprehensively reviewed California's water supply options and have determined ocean desalination should be pursued with caution and only after conservation, stormwater capture, water use efficiency, and wastewater recycling has all been fully implemented. As discussed in [comments 21.130 - 21.134], these preferred alternatives are not only less expensive; they have additional benefits of preventing pollution, contributing to habitat restoration, and reducing energy usage. While we understand local water supply agencies have the authority and discretion whether to develop seawater desalination facilities in their portfolio, it is the State Board's charge to ensure those facilities meet the mandates of State and Federal law.	The State Water Board supports use of alternative water supplies including water recycling and water conservation as described in response to comment 21.130. A goal of the proposed Desalination Amendment is to support the use of ocean water as a reliable supplement to traditional water supplies while protecting beneficial uses. Desalination is another water supply option that can be used in conjunction with other water supplies to ensure areas can meet their water demands. The proposed Desalination Amendment would apply establish an analytical framework for evaluating proposed desalination projects that would use seawater in order to increase availability of potable water supplies. It is up to the water providers to evaluate various supply options and costs of each to make informed decisions about future supplies. Selecting water supply alternatives at a local, regional, or statewide level is not the State Water Board's role and the State Water Board does not intend to prioritize or rank water supply options on a statewide level.
21.3	If and when seawater desalination is appropriate, projects should be appropriately scaled to meet demonstrated water supply needs. Then, project permits should require the best available site and design to accommodate the best available technology to minimize the intake and mortality of marine life; minimize the brine discharge's adverse impacts to the marine environment; and avoid conflict with ecosystem-based management activities, especially ongoing implementation of the Marine Life Protection Act, and climate change and disaster preparedness.	The size of a desalination facility should be appropriately scaled to meet water supply needs. The siting section in chapter III.L.2.b.(2) of the proposed Desalination Amendment requires that regional water boards consider the need for desalinated water consistent with current water planning documents and under chapter III.L.2.d.(1)(a) states that "A design capacity in excess of the need for desalinated* water as identified in chapter III.L.2.b.(2) shall not be used by itself to declare subsurface intakes* as not feasible.*" Staff also updated the language

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		in chapter III.L.2.c, to include size and intake capacity as part of the design considerations in recognition of the fact that the intake volume from a surface water intake is directly proportional to the amount of intake and mortality of all forms of marine life. Nothing in the proposed Desalination Amendment will conflict with existing ecosystem-based management activities or ongoing implementation of the Marine Life Protection Act. Additionally, climate change and disaster preparedness measures are considered when an owner or operator applies to the California Coastal Commission for a Coastal Development Permit.
21.4	Given the expected push for desalination in the near future - and the likely availability of environmentally preferable alternatives - it is critical that the State Board develop statewide standards to minimize the intake and mortality of all forms of marine life. However, substantial changes need to be made to the Amendment in order to achieve the intent of the CWA and Porter-Cologne Act, uphold the OTC Policy, and protect and restore California's marine ecosystems.	As described in the responses below, some revisions have been made to the proposed Desalination Amendment to better clarify and articulate the State Water Board’s vision for protection of the beneficial uses of California’s ocean waters from the impacts associated with desalination. As described in response to comment 21.1, the proposed Desalination Amendment is not intended to address or affect the regulation of powerplants or the interpretation or implementation of the OTC policy.
21.5	Provide Clear Guidance on Conducting a 13142.5(b) Analysis. Generally speaking, we agree with the intent of the Amendment to enforce each element under Water Code §13142.5(b). We agree with the approach of identifying the "best site", "best design" and "best technology" available for "minimizing the intake and mortality of all forms of marine life." These three elements should be fully enforced before turning to mitigation. And mitigation, to the extent it includes after-the-fact restoration, is still required to be "best." It is also a reasonable interpretation of the language to include an analysis of all the three primary elements in combination to ensure that, collectively those elements of a facility meet the standard of "best" and "minimization" of the intake and mortality of all forms of marine life. However, it would undermine the letter and intent of the law if a combination of the elements resulted in less than one element could achieve. For example, choosing a site or design that would effectively preclude the use of the best technology is not a combination that	The proposed Desalination Amendment language provides sufficient direction to the regional water boards to protect beneficial uses without including overly-prescriptive directives that may not be appropriate for all project proposals. The range of alternatives for each individual factor and the final combination of factors could vary for each facility. It would not be appropriate to include additional direction on how the combination of factors should be weighted or assessed as the current language in the proposed Desalination Amendment is sufficiently clear. The proposed language clearly states in Section L.2.a (2) that the regional water boards will look first at the best available site, the best available design, the best available technology, and the best available mitigation measures feasible to minimize intake and mortality of all forms of marine life, independently. Looking at the factors individually helps to identify the best option or options for minimizing intake and mortality of all forms of marine life. After identifying the best available alternatives from the more narrow individual perspective, the regional water board will consider all four factors collectively. Staff recognizes

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	collectively minimizes the intake and mortality of all forms of marine life. The site and design may be the "best" for some other purpose, but clearly not for the purpose of the law. Therefore, the Amendment needs clear definitions and explanations for how the combination of terms are considered, to ensure the process results in full realization of collectively minimizing the intake and mortality of all forms of marine life - rather than leaving ambiguity that would allow a lesser standard. Best is not "some" advantage, and minimize is not "some" reduction-it is the optimum possible.	that some of the best available alternatives may be mutually exclusive, redundant, or infeasible in combination. However, the final combination of alternatives for the four factors will include the alternatives that overall result in the least amount of intake and mortality of marine life. The regional water board would not choose the site or design that would preclude the use of the best technology unless the selection resulted in the least amount of intake and mortality of marine life. The determination is made for best available site and design for minimizing intake and mortality of all forms of marine life, not “best” for any other purpose, and thus is consistent with the requirement in Water Code section 13142.5(b). The proposed Desalination Amendment is written so that the combination of factors selected will be the “optimum possible” and is consistent with the language in Water Code section 13142.5(b).
21.6	Further, the intent of the Amendment should not be to minimize the intake of "some" species at "some" life stage - instead, it should be to minimize the intake and mortality of "all" forms of marine life.	Agree, per comment 21.8, a definition of “all forms of marine life” was added to the proposed Desalination Amendment and “all forms” was added in front of “marine life” in the amendment language and Staff Report with SED as appropriate.
21.7	Consequently, technologies like open-ocean screens as part of a collection of technologies must be shown to be superior at minimizing the intake of all forms of marine life - inclusive of all species of all sizes and life stages. To the extent restoration is part of mitigation, it must ensure replacement of all species lost to the intake - not just replacement of the weight of what is lost (it is not a replacement of general biomass, it is replacement of biomass of "all forms of marine life" lost to intake and mortality).	Chapter III.L.2.e of the proposed Desalination Amendment states that, “The owner or operator shall fully [emphasis added] mitigate for all marine life mortality associated with the desalination facility.” The requirement to “fully mitigate” would prevent mitigation projects that will replace general biomass from meeting the mitigation requirements because replacing with general biomass is not “fully” mitigating. Additionally, the regional water board will review and approve the Marine Life Mortality Report and Mitigation Plan for a facility. The regional water board will have oversight to ensure that the mitigation compensates for intake and mortality of all forms of marine life associated with the facility whether an owner or operator completes their own mitigation project or pays into an in-lieu mitigation funding program.
21.8	We request the State Board incorporate the following definitions into	Disagree. “Best” and “minimize” do not need to be defined because they

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	Appendix 1: "Best" most advantageous. suitable, or desirable: the best way. "Minimize" to reduce to the smallest possible amount or degree. "All forms of marine life" all individual species in all different life stages.	have common definitions that are generally accepted. A definition of "all forms of marine life" was added to Appendix I of the Ocean Plan and is defined as including all life stages of all marine species.
21.9	The State Board Needs to Provide Clear Guidance on how a Regional Board Shall Combine all of the 13142.5(b) Elements. The amendment should clarify the intent of combining the site location, facility design, and technology elements: "[t]he combination of elements shall collectively be the best combination to minimize the intake and mortality of all forms of marine life." Adopting a "tech neutral" and "site specific" approach to best technology, as suggested by project proponents, would undermine the clear intent to minimize intake and mortality of all forms of marine life through a combination of the elements. As we have seen in the past, this approach allows a "site" selection that has little to no advantages for minimizing intake and mortality, and results in "site specific" technologies that are not the "best." The State Board should be careful not to adopt a policy that does not follow the intent of the Water Code language and does not ensure the best minimization of the intake and mortality of marine life - whether it is through each individual element or the combination of elements. In Surfrider Foundation v. California Regional Water Quality Control Board, San Diego Region ("Carlsbad" decision), the court allowed broad discretion to the Regional Board in its adoption of the Carlsbad permit -finding that a narrow selection of alternative sites with little or no connection to minimizing intake and mortality was acceptable. The court allowed the same discretion in finding that the design of the facility to produce 50 MGD was allowable - again with little or no connection to the ultimate goal of minimizing the intake and mortality of all forms of marine life. Then, given the selection of the site, the discussion of best technology feasible at that site was dramatically constrained if not eliminated. Because the design of the facility did not include alternatives that would make the site compatible with the best technology, the entire purpose of combining site, design and technology to minimize the intake	Disagree. Chapters III.L.2. a, b, c and d of the proposed Desalination Amendment provide a logical framework for evaluating all pertinent site-specific factors and conditions. This process is done in consultation with other state agencies to adequately protect aquatic life related beneficial uses in order to identify the best available site, design, and technology to best minimize intake and mortality of all forms of marine life. To provide further direction on this analysis would limit the flexibility of the regional water boards to consider all factors in relation to all available information. *Surfrider Foundation v. California Regional Water Quality Control Board* (2012) 211 Cal.App.4th 557, represents a specific application of the factors set forth in Water Code section 13142.5(b) for a specific proposed facility but nonetheless sets forth an approach to the analysis and interpretation of the statute that has been upheld by a California appellate court. The proposed Desalination Amendment, if adopted, would provide a consistent approach that regional water boards would use to protect aquatic life from the impacts associated with desalination facilities. Also, please see response to comment 21.5

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	and mortality of all forms of marine life unraveled and the clearly preferable combination was precluded. How the combination was reviewed resulted in far less than the "best" that would be possible with a different process of combining the elements. The process for combining the separate elements clearly did not collectively minimize the intake and mortality of marine life. While the court allowed broad discretion to the Regional Board in combining the elements, the process effectively precluded a combination of elements that were compatible and collectively minimized the intake and mortality of marine life. As discussed below, the Carlsbad decision serves as a practical example of how ambiguity in the Ocean Plan can result in undermining its intent. It is not sufficient to simply state that the Water Code envisions a combination of the elements, it is imperative to describe the process for considering the combination in a way that ensures a collective minimization of the intake and mortality of all forms of marine life.	
21.10	Further, comments by industry representatives including newly fabricated terminology like "site specific" best technology, and taking a "tech neutral" approach are clear evidence of recommended modifications to the Amendment that will result in less than "the best" elements or combination of elements, and consequently less than "minimizing" (reducing to the smallest possible amount or degree) the intake and mortality of marine life by combining the separate but interconnected elements.	Disagree. The proposed Desalination Amendment does not rely on the terms "site specific" best technology or "tech neutral." The proposed Desalination Amendment is consistent with Water Code section 13142.5(b) requiring an analysis of best available site, design, technology, and mitigation measures feasible. Please see response to comment 21.5.
21.11	The Amendment should be modified to clarify that combining the elements does not undermine the intent of best reduction of intake and mortality possible. Without clarifying language and instructions for combining the elements, the Amendment will not result in full enforcement of the intent. As written, the Amendment does little to assert the authority and duty of the State Board to ensure the regional boards enforce the law in a way that is consistent. In practice, the Amendment would still allow similar discretion to the regional boards as they have today, and effectively codify the process that allowed a co--located facility in Carlsbad as the future model for stand-alone facilities statewide.	Agree that the regional water board should consider all four factors collectively and determine the best combination of feasible alternatives to minimize intake and mortality of all forms of marine life. However, the proposed language addition is redundant. Please also see response to comment 21.5.

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	Given the Amendment's clear directive to combine all13142.5(b) elements, we request the State Board include a "combination section" to provide regional board guidance on the proper way of combining all 13142.5(b) elements. To ensure the Amendment properly combines the 13142.5(b) elements, we request the following revisions to Chapter III.L.2.a.(2): "The regional water board shall conduct a Water Code section 13142.5(b) analysis of all new and expanded desalination facilities.* A Water Code section 13142.5(b) analysis may include future expansions at the facility. The regional water board shall first analyze separately as independent considerations a range of feasible alternatives for the best site, the best design, the best technology, and the best mitigation measures to minimize intake and mortality of marine life. Then, the regional water board shall consider all four factors collectively, and the combination of elements shall collectively be the best combination to minimize the intake and mortality of all forms of marine life. --include the best combination of alternatives that in combination minimize intake and mortality of marine life.-- The best combination of alternatives may not always include the best alternative under each individual factor because some alternatives may be mutually exclusive, redundant, or infeasible in combination.	
21.12	The "Carlsbad decision" does not Restrict the State Board's Authority to Interpret 13142.5(b). The "Carlsbad decision" is factually distinguishable from the Amendment, and does not limit the discretion of the State Board to ensure enforcement of the law. First, it is abundantly clear that the court was analyzing the permit for "temporary" operation of the facility while the co-located power plant was discharging heated wastewater for use as "source water" for the desalination facility. Consequently, the factual basis for the decision is not the same as the facts applicable for a stand-alone facility; nor to the adoption of statewide rules for new and expanded facilities.	he proposed Desalination Amendment and the Staff Report with SED were revised to include references to "available" and "feasible" for the statutory factors, in order to make the intent clear. A feasibility definition has been also been added, using CEQA's definition, as consistent with the *Surfrider* decision. The proposed amendment sets forth an analytical framework that is consistent with the *Surfrider* decision but in no way dependent on the specific facts in that case, nor does the proposed interpretation and framework represent a limitation on enforcing the law or giving full meaning to its requirements. Note that "best available" as a standard is not applied in the same context as defined in the Clean Water Act. See response to comment 21.29.

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	The benefit of using the discharge wastewater from the power plant in Carlsbad has all but evaporated- - we predict that source water will cease nearly simultaneously with completion of construction of the facility. And the technology proposed for co-location and co-operation is irrelevant for a stand-alone facility. For example, surely the State Board will not consider "scrubbing bubbles" as a technology for minimizing intake and mortality for a new stand-alone facility. And similarly, the best site, design, technology and mitigation required for the co-located project is not the best for a stand-alone facility.	
21.13	While we agree that the court's interpretation of the law provides important guidance for this Amendment, it does not limit the State Board's discretion to interpret the law and establish regulations for enforcement of the law. "Agency deference" afforded to the Regional Board's issuance of the temporary permit does not limit the State Board's discretion to establish statewide standards for stand-alone facilities.	Agree that the "Carlsbad decision" (*Surfrider Foundation v. California Regional Water Quality Control Board*, San Diego Region, Super. Ct. (No. 37-2010-90436- CU-WM-OTL, 2010)) does not restrict the State Water Board's authority to interpret Water Code section 13142.5(b). Also agree that the best available site, design, technology, and mitigation feasible required for the facilities for facilities with temporary operating conditions (e.g. co-located with a power plant or commingling brine with wastewater) may not be the best for the long-term stand-alone facility. The proposed Desalination Amendment language allows the regional water boards to issue conditional Water Code section 13142.5(b) determinations for desalination facilities with temporary operating circumstances so that when operating conditions change (e.g. water recycling increases and wastewater becomes unavailable for brine dilution) at a desalination facility, the regional water board can issue a new Water Code section 1314.25(b) determination based on the conditions for the long-term stand-alone facility.
21.14	Further, courts have found that when an agency "reverses direction" in their regulatory standards, they must include a reasoned analysis for the change. The Amendment already does that in several ways, and those changes are supported by a reasoned analysis. For example, the Amendment clarifies that "best available mitigation", or "after the fact restoration", is not weighted the same as "best available site, design and technology" when combining the elements of section 13142.5(b). After-the-fact restoration is only allowed for the remainder of what marine life is lost to the intake after the best available site, design and technology	Comment noted. The State Water Board considered the *Surfrider Foundation v. California Regional Water Quality Control Board*, San Diego Region, Super. Ct. (No. 37-2010-90436- CU-WM-OTL, 2010) decision when drafting the proposed Desalination Amendment, but did not rely on its specific facts in establishing the analytical framework for how the regional water board will make a Water Code section 13142.5(b) determination for new or expanded desalination facilities. The decision represents a permissible interpretation of Water Code section 13142.5(b) that accordingly informs the approach set forth in the

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	has been implemented - it is not a co-equal element in the combination of elements. While we disagree that "mitigation" includes "after the fact restoration", we agree that the rule should exhaust every alternative for minimizing the intake and mortality in the first place before attempting to "replace" the species lost. Therefore, the Amendment has already distinguished Carlsbad, and done so within the State Board's discretion, by articulating a reasoned analysis for the change. And we support the reasoned analysis - it is effectively impossible to restore or construct habitat that ensures replacement of all forms of marine life lost to the intake.	proposed Desalination Amendment. As stated in the chapters III.L2. a, b, c and d of the proposed Desalination Amendment, the analysis of the best available site, design, technology, and mitigation measures feasible are performed separately and then in combination. See response to comment 21.5.
21.15	Similarly, the Amendment changes direction in the interpretation of the term "feasible" in the statute. While we disagree with the Amendment's treatment of determining what is and is not "feasible", we agree that changing direction by not relying on the CEQA definition is within the State Board's retained discretion, given a reasoned analysis for the change.	Disagree. A definition of feasible was added to the proposed Desalination Amendment to clarify the meaning of "feasible that states; for the purposes of chapter III.L, feasible shall mean capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors. (Public Resources Code § 21061.1; § 30108)." See responses to comments 6.12, 21.41, 21.50, 21.51, and 21.52 for more discussion on feasibility.
21.16	In conclusion, the State Board's discretion in adopting the Amendment is not strictly constrained by Carlsbad. And it is now apparent that the decision, if it were to constrain the development of this Amendment, would not result in full enforcement of both the letter and intent of the law.	Agree. The proposed Desalination Amendment was not constrained by the "Carlsbad decision" (Surfrider Foundation v. California Regional Water Quality Control Board, San Diego Region, Super. Ct. (No. 37-2010-90436- CU-WM-OTL, 2010)). The State Water Board considered the Surfrider Foundation v. California Regional Water Quality Control Board, San Diego Region, Super. Ct. (No. 37-2010-90436- CU-WM-OTL, 2010) decision when drafting the proposed Desalination Amendment, but did not rely on its specific facts in establishing the analytical framework for how the regional water board will make a Water Code section 13142.5(b) determination for new or expanded desalination facilities. The decision represents a permissible interpretation of Water Code section 13142.5(b) that accordingly informs the approach set forth in the proposed Desalination Amendment.
21.17	What is "Best Available?"	The State Water Board interprets the statute as written and consistent with applicable case law. The proposed Desalination Amendment is

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	Through past regulatory decisions and judicial review, the definition of "best available" has evolved to mean not only what is available today. The term has been interpreted to incorporate a "technology forcing" policy to ensure that future innovations be adopted as they become "available." Therefore, when applying a "best available" standard to "site", "design" and "mitigation" (elements other than "technology") the term might logically be interpreted as enforcing an "innovation forcing" policy. As State Board staff discussed at the August 9, 2014 Board Workshop, this interpretation is in conflict with limits in the Water Code in that section 13142.5(b) only applies to "new or expanded facilities." We agree that there is an apparent, yet likely unintended, contradiction in the Water Code language. The Amendment must include a reconciliation of the contradiction within the discretion of the State Board's authority to interpret the law. And within that discretion, we think it is appropriate to distinguish that the contradiction is centered on interpreting "available" to establish an "innovation forcing" policy in the Amendment. That is, if it is impractical to compel future changes as innovation evolves, it does not preclude imposing the "best" or the "best available" at the time a facility is first permitted - in fact, it compels more scrutiny to ensure that "less than best" is not enshrined in a proposed facility site, design or technology once it is considered "existing."	based on Water Code section 13142.5(b) that requires a proponent to use the best available site, design, technology and mitigation measures feasible that minimize intake and mortality of all forms of marine life. The statute has been interpreted to refer to the set of measures that collectively minimize such intake and mortality. See response to comment 21.29. Regarding new or expanded versus existing facilities, Water Code section 13142.5(b) is clear that it applies only to new or expanded facilities.
21.18	An exception to the requirements above arises when facilities have been constructed and are operational. The principle that "available" includes an "innovation forcing policy" is, from a practical perspective, unenforceable for changing "sites" once a facility is constructed and operating. Arguably, this may affect the selection of a technology that is "available" in the future at an existing facility's site. That is, the standard interpretation of "available" (which embodies a policy to adapt as innovations provide better alternatives) will not be practical for better "sites" once a facility is built and operating. However, that does not preclude requiring "better" technologies at an existing site as innovative alternatives are developed - even if a future "best" is impractical at the existing site. In other words, enforcing the "innovation forcing policy" for technologies developed in the future is not completely eliminated after a site is chosen and a facility is constructed - it merely limits what is "available" at the site.	Disagree. Chapter III.L.2.of the proposed Desalination Amendment applies only to new or expanded desalination facilities and does not apply to existing facilities that have been constructed and are operational unless they are proposing to expand. If a facility expands within the meaning of the proposed Desalination Amendment, the regional water board must still require an analysis of all factors required under Water Code section 13142.5(b). The analysis may be limited to expansions or changes that result in intake and mortality of all forms of marine life, unless the regional water board determines that additional measures to minimize intake and mortality are feasible for the existing portions of the facility. In some cases, a facility planning an expansion may be forced to look at an additional site for the expansion if space is a limiting factor. The analysis of best available site feasible for an expanded facility does not preclude the analysis of how or if the other factors would be analyzed. The proposed Desalination Amendment

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		considers feasibility in the best available determination for each of the factors. In some cases it will be infeasible to move an entire desalination facility to accommodate for an expansion, but the site is still a factor that must be considered in the Water Code section 13142.5(b) determination for an expanded facility
21.19	We agree with the State Board that the literal interpretation of the language creates a conflict between the policy to compel innovation and the limited enforceability on "new and existing facilities." The conflict is, from a practical perspective, primarily a limit on changing the site as innovative new technologies and designs become available. However, the conflict between an innovation forcing policy and the limited authority to regulate new or expanded facilities is largely, if not completely avoidable by ensuring the absolute best in the first place. In fact, it is hard to imagine how a project proponent would be compelled to modify a facility that was designed and sited to be compatible with sub-surface intakes in the first place. Further, it does not preclude requiring the best available technology at the time future project proposals are considered for a permit. It should be clear that if alternatives to a SIG - that are better or equivalent at minimizing intake and mortality of marine life, but more "available"- are developed in the future. the identification of what is "best" may change for new or expanded facilities.	Disagree. There is no reason to believe that best available site would not be a decision factor in future expansions of an existing facility and there is nothing in the proposed Desalination Amendment or Staff Report with SED to support that statement. The proposed Desalination Amendment does not specify the type of subsurface intake that is to be considered, only that subsurface must be evaluated first and demonstrated to be not feasible before consideration is given to surface water intakes. The proposed Desalination Amendment supports new technology that minimizes intake and mortality of all forms of marine life and allows for new and improved technology, so no changes are necessary to address this comment.
21.20	The Concept of Best Available Needs to be Distributed Throughout each of the Elements Under 13142.5(b). As noted above, we agree that the separate elements of section 13142.5(b) need to be considered individually and in combination. Nonetheless, each element - site, design, and technology - needs numerical or qualitative standards to ensure the "best available" mandate is enforced, and the combination needs guidance to ensure that all the elements collectively result in the "best available" scenario to achieve the intent of minimizing the intake and mortality of marine life.	Chapter III.L.2. b, c, d, and e of the proposed Desalination Amendment incorporate the language “best available” into each of the factors (see response to comment 6.1). Within these sections, the proposed Desalination Amendment provides an analytical framework for evaluating all pertinent site-specific factors and conditions in consultation with other state agencies to adequately protect aquatic life related beneficial uses. However, developing quantitative numerical assessment standards for all factors is neither necessary for the protection of aquatic life related beneficial uses nor possible at this time as significantly more data would need to be collected and analyzed in relation to all other combinations to fully develop, test and validate a numerical assessment framework. This effort would take many years

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		and significantly more resources to complete.
21.21	The analysis starts with the "best available technology. "It is undisputed that sub-surface wells eliminate the intake and mortality by a measurable degree. Subsurface infiltration galleries (SIG) effectively minimize intake and mortality of marine life to the same degree. The difference in minimizing marine life mortality between a subsurface well and a SIG is the potential mortality associated with construction and maintenance of a SIG. An open-ocean intake, whether screened or not, is not equal to a sub-surface intake and should not be considered "best available technology."	Disagree. Neither the proposed Desalination Amendment nor Water Code section 13142.5(b) requires that the analysis start with best available technology. With regard to subsurface intakes, while they do otherwise represent the best technology for minimizing intake and mortality of all forms of marine life, they are not available or feasible in all situations. If subsurface intakes are not feasible, an owner or operator may use a screened surface intake. Screened surface intakes have significantly higher operational mortality relative to subsurface intakes, while subsurface infiltration galleries may have mortality associated with the construction and maintenance of the intake. The regional water board will determine the best available technology alternative that will work in combination with the best available site and best available design alternatives and result in the least amount of intake and mortality of all forms of marine life.
21.22	Next, the "best design" is one that is compatible with the best available technology - a sub-surface intake. A SIG can be constructed in modules or different configurations to safely supply much larger volumes of "source water" than a well. The "site" of a facility is "best" if it is compatible with the availability of a sub-surface intake. The currently considers other ancillary issues for what may be the "best site" for a facility - for example consolidating industrial facilities, avoiding special terrestrial habitats and species, co-locating with a sewage treatment plant for dilution water - but achieving the legislative intent of minimizing the intake and mortality of all forms of marine life mandates that the best site available is the site that is compatible with the best technology available.	Disagree with the assumption that subsurface intakes will be feasible in all cases, or that a proposed facility should be restricted to those circumstances where subsurface is feasible. The proposed Desalination Amendment does not restrict desalination facilities to locations where subsurface intakes are feasible because such an approach would limit availability of desalination as an option and potentially put even greater burdens on the range of available alternatives for enhancing existing water supplies. The regional water board will determine the best available and feasible combination of alternatives that in combination will result in the least amount of intake and mortality of all forms of marine life for a proposed facility
21.23	Finally, the "best available mitigation" should also be considered within the context of the intent to minimize the intake and mortality of "all forms of marine life." "All forms of marine life" lost to the intake from a seawater desalination facility using an open intake with screens will likely include a diversity of species and life stages that inhabit every marine habitat - from deep and shallow rocky reef, to deep and shallow sandy areas, to the water column itself. To the extent the entrainment and impingement of	Please see response to comment 21.7. Chapter III.L.2.e of the proposed Desalination Amendment states that, “The owner or operator shall fully [emphasis added] mitigate for all marine life mortality associated with the desalination facility.” The requirement to “fully mitigate” would prevent mitigation projects that will replace general biomass from meeting the mitigation requirements because replacing with general biomass is not “fully” mitigating.

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	organisms includes those that inhabit estuarine or other inland waters, the scope of "replacement habitat" is virtually all habitat. This is why minimizing the intake and mortality of all forms of marine life in the first place must be enforced to the fullest extent - replacement of all these species is extremely difficult to ensure.	
21.24	To ensure each 13142.5(b) element is the "best available", we offer the following revisions to the Amendment: "Chapter III.L.2.b.: The Regional Board shall require the best available site. Site is the general onshore and offshore location of a new or expanded facility. There may be multiple potential facility design configurations within any given site." "Chapter III.L.2.c.: The Regional Board shall require the best available design. Design is the layout, form, and function of a facility, including the configuration and type of infrastructure, including intake and outfall structures." "Chapter III.L.2.d.: The Regional Board shall require the best available technology. Technology is the type of equipment, materials,* and methods that are used to construct and operate the design components of the desalination facility.*" "Chapter lll.L.2.e.: The Regional Board shall require the best available mitigation. Mitigation for the purposes of this section is the replacement of marine life or habitat that is lost due to the construction and operation of a desalination facility* after minimizing marine life mortality through the best available site, best available design, and best available technology measures."	Please see responses to comments 21.5, 21.29, and 6.1.
21.25	The State Board Needs to be Explicit that Subsurface Galleries are the Best Available Technology. Subsurface intakes are not only the "preferred alternative" for minimizing the intake and mortality of marine life - but the best available technology for minimizing the intake and mortality of all forms of marine life. The Amendment implements Section 13142.5(b) by stating that when the	Agree that subsurface intakes are preferred and represent the best option for minimizing intake and mortality of all forms of marine life where feasible and available. Allowing for a limited circumstance under which surface intakes may be used when subsurface is not feasible is consistent with the project objectives and interpretation of the statute as requiring the best combination of measures to minimize intake and mortality. The proposed Desalination Amendment is clear that surface

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	regional board conducts a 13142.5(b) analysis, the board shall first analyze "...the best technology...to minimize intake and mortality of marine life." This is where the terms "best available technology" end. Instead, Chapter III.L.2.d., states that the regional board "shall apply the following considerations in determining whether a proposed technology best minimizes intake and mortality of marine life." The SED also falls short of establishing subsurface intakes as the best available technology. Instead, SED Section 8.3.5., the State Board recommends Option 3, which would "establish subsurface intakes as the preferred technology for seawater intakes." The State Board needs to be explicit that subsurface intakes are the best available technology for minimizing the intake and mortality of marine life. As the Board admits "[s]ubsurface intakes draw water from below the ground or seafloor using the sediment as a natural filter, resulting in null impingement and entrainment at the intake." The Board goes on to state that a subsurface intake's elimination of impingement and entrainment "gives subsurface intakes a significant environmental advantage over surface water intakes..." It is evident that the State Board believes subsurface intakes to be the superior technology for minimizing intake and mortality of marine life, yet fails to designate subsurface intakes as the best available technology in the Amendment.	intakes are allowed only when subsurface intakes are determined to be not feasible. Please see response to comment 15.2.
21.26	The science community agrees with the State Board that subsurface intakes are a superior technology for minimizing the intake and mortality of marine life. Studies come to the same conclusion that subsurface intakes eliminate impingement and entrainment. Similarly, subsurface intakes provide a natural barrier to suspended sediments, algal toxins, pathogens, dissolved or suspended organic compounds, harmful algal blooms, kelp, sea jellies, debris, or oil or chemical spills, and adult and juvenile marine organisms. The international community finds subsurface intakes to be the superior technology - beyond the benefit of nearly eliminating the intake and mortality of all forms of marine life. A 2013 survey led by international experts summarized important findings arguing strongly in favor of subsurface intakes:	See response to comment 21.25 above.

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	"The use of subsurface intake systems for seawater reverse osmosis (SWRO) desalination plants significantly improves raw water quality, reduces chemical usage and environmental impacts, decreases the carbon footprint, and reduces cost of treated water to consumers. Recent investigations of the improvement in water quality made by subsurface intakes show lowering of the silt density index by 75 to 90%, removal of nearly all algae, removal of over 90% of bacteria, reduction in the concentrations of (total and dissolved organic carbon), and virtual elimination of biopolymers and polysaccharides that cause organic biofouling of membranes. Economic analyses show that overall SWRO operating costs can be reduced by 5 to 30% by using subsurface intake systems. Although capital costs can be slightly to significantly higher compared to open-ocean intake system costs, a preliminary life-cycle cost analysis shows significant cost saving over operating periods of 10 to 30 years." There is no question that subsurface intakes are the best available technology. As such, the State Board should be explicit that subsurface intakes - and specifically, subsurface infiltration galleries (as discussed below)- are the best available technology.	
21.27	There is a Difference Between Subsurface Wells and Infiltration Galleries. Not all subsurface intakes are created equally. Subsurface wells and subsurface infiltration galleries are often grouped together under the umbrella of subsurface intakes. And while subsurface intakes collectively have the same operational benefits of eliminating impingement and entrainment, different types of subsurface intakes may have different construction and maintenance impacts resulting in the potential for marine life mortality or temporary displacement. Subsurface wells (vertical beach wells, slant wells, and horizontal directionally drilled (HDD) wells) should be considered the ultimate technology for minimizing marine life mortality because there is no marine life mortality -both operational and during construction. Vertical beach wells consist of a series of shallow wells near the shoreline that use	Disagree that construction of subsurface wells or galleries will cause no marine life mortality. While construction of subsurface wells can avoid significant harm to marine life through implementation of best management practices or drilling onshore, there may still be some mortality associated with the construction of subsurface wells. Subsurface galleries require excavation of much larger areas and would have greater short term impacts. An owner or operator must demonstrate to the regional water board that there is no marine life mortality associated with the construction of the subsurface wells or galleries. If there is marine life mortality associated with the construction of the subsurface wells, it must be quantified and included in the Marine Life Mortality Report. Agree that both the Fukuoka Desalination Facility in Japan and the City of Long Beach's Desalination facility are examples where subsurface intakes are technically feasible and required minimal maintenance over

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	beach sand or other geologic deposits to filter water. Vertical wells are also a proven feasible technology for large-scale desalination facilities internationally. The Sur plant, in the country of Oman, is one of the largest desalination plants in the world with a pumping capacity of up to 21.2 MGD. The Sur plant is an example of a facility that uses subsurface intakes to successfully provide large volumes of water for desalination. HDD wells are a combination of vertical wells before moving horizontal underneath the seafloor. HDD well technology is used extensively by the oil exploration industry and has been used in desalination plants. The 34 MGD San Pedro del Pinatar (Cartagena) plant in Spain, has been operational for several years, and is the largest desalination plant using HDD technology. Slant wells are drilled at an angle such that the wellhead and related infrastructure may be onshore, while the well extends below ocean sediments and draws seawater through the seabed. With this technology, the wellhead can be located some distance from the beach to minimize "loss of shoreline habitat, recreation access, and aesthetic value". While this is a new and growing technology, the potential for slant wells is increasing and evidence of the advancement of slant wells and the minimization of the intake and mortality of all forms of marine life is already proven by the "Dana Point Pilot Project" under operation by the Municipal Water District of Orange County. Subsurface wells have no construction impacts to marine life. All well construction begins at the beach, and then either goes directly down, goes down and then horizontally under the seafloor, or goes offshore at an angle. But regardless of what type of subsurface well is used the benefits of subsurface wells are the same - no marine life mortality during both construction and operation - making subsurface wells the ultimate technology for minimizing marine life mortality. Subsurface infiltration galleries are different - they have construction and maintenance impacts possibly leading to marine life mortality. Infiltration galleries are typically constructed by removing soil or rock, placing a screen or network of screens within the excavated area, and then	the operational lifetime of the facilities. The City of Long Beach operated their desalination facility using an infiltration gallery intake from 2006 to 2010. However, the City of Long Beach shut the pilot project down due to high energy costs and has decided to pursue recycled water or groundwater storage before considering desalination in the future. (Weiser 2014) The comment that the State Water Board should consider galleries and wells as two separate technologies with different performance standards is not an issue that would significantly change the overall intent, implementation, or level of protection to aquatic life. The support for all types of subsurface intakes in the proposed Desalination Amendment is clear; screened surface water intakes and alternative screening technologies may only be considered when subsurface intakes are deemed infeasible. Therefore the proposed change was not made.

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	backfilling the area with a porous media to form an artificial filter around the screens. Infiltration galleries are usually located within the intertidal zone of the beach or in the seabed, thus leading to potential construction impacts on marine life. While galleries have the same operational impacts of subsurface wells - zero marine life mortality - galleries do have some construction and maintenance impacts making that technology the secondary alternative technology for minimizing marine life mortality. Subsurface infiltration galleries offer flexibility to desalination proponents. Since galleries are designed to replace the natural substrate, they are considered to be "highly feasible." The only drawback to galleries is they cannot be located in areas of "significant concentrations of mud and sediment, commonly associated with locations near the mouth of a river or stream" without planning for maintenance to ensure the galleries do not clog up and lose performance. Galleries have proven feasible at the Fukuoka desalination plant in Japan. The gallery has an intake flow of 27 MGD and has been operational since 2006. Since the facility has become operational, the gallery system has not required cleaning, and the filter membranes have required only minimal maintenance. The City of Long Beach, California has also been operating a pilot seabed infiltration gallery for several years. And several other systems around the world are in design, have been proposed for development, or are in operation. Interestingly, the Long Beach pilot gallery is located near the mouths of the Los Angeles River and San Gabriel River, and behind a long breakwater eliminating wave action. Despite the fact this location violates all the industry recommendations for where to construct a gallery to ensure performance and avoid maintenance, the pilot gallery appears to be operating without problem. The State Board should consider galleries and wells as two separate technologies with different performance standards.	
21.28	The Feasibility of Subsurface Intakes Should not Preclude the State Board from Determining that Subsurface Intakes are the Best Available Technology for Setting a Performance Standard. Absolute feasibility should not preclude the State Board from making a	Disagree. Selecting the best available technology within the meaning of Water Code section 13142.5(b) is distinguishable from determining best technology available within the meaning of Clean Water Act section 316(b). See response to comment 21.29 below.

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	determination that subsurface intakes are the best available technology. When determining that wet-cycle cooling towers were the best technology available for minimizing marine life mortality under the OTC Policy, the State Board did not find that wet-cooling technology were feasible everywhere. During the development of the OTC Policy, the State Board hired Tetra Tech Consultants to evaluate the technical and logistical feasibility of retrofitting 15 of the State's coastal OTC facilities with wet cooling systems. The report developed conceptual retrofit designs based on each facility's design parameters and evaluated feasibility in terms of logistics (e.g., available space, interference with other critical systems or nearby infrastructure), operations (e.g., energy penalty), local use restrictions (e.g., noise or building codes) and aesthetic or environmental restrictions (e.g., conflicts with conservation plans, impacts to threatened and endangered species). The Tetra Tech report found that wet cooling was technically and logistically feasible at 12 of the 15 facilities. Although wet-cooling towers were not believed to be feasible for all facilities, the State Board adopted that technology as the best technology available - setting a standard for OTC facilities to meet through either the Track 1 or Track 2 approach. Setting the best available technology for desalination facilities is analogous to setting BTA under the OTC Policy. Subsurface wells may offer limited feasibility due to geological conditions; however, infiltration galleries are designed to work in most geological conditions. Beach galleries specifically have design potential for large scale facilities, and have been demonstrated to be able handle large volumes of water. Therefore, beach galleries are analogous to wet-cycle cooling towers, they may not work in 100 percent of the locations, but they are feasible in the majority of sites along the California coast. Like the OTC Policy, the State Board should determine subsurface intakes to be the best available technology despite the possibility of infeasibility at some locations.	
21.29	Subsurface Infiltration Galleries Should be the Best Available Technology. While subsurface wells are the ultimate technology for minimizing marine	Disagree. Under Water Code section 13142.5(b), the determination of the “best available site, design, technology, and mitigation measures feasible . . . to minimize the intake and mortality of all forms of marine life” is not governed by the same decision-making process set forth in

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	life mortality, subsurface galleries should be considered the best available technology for determining the performance standard. Notably, the OTC Policy did "not require a facility to adopt closed-cycle cooling (dry cooling towers) in order to comply, but instead contains a two track approach that acknowledges the ability of different technology options to achieve reductions that are substantially similar to closed-cycle wet cooling (wet cooling towers)." The State Board did not set a OTC Policy performance standard of dry cooling towers because that technology was shown not to be feasible at many "existing" power plants and hence not readily "available" for existing facilities. Dry cooling is analogous to subsurface wells because both result in a performance standard of zero marine life mortality but may not be feasible everywhere.	the OTC Policy. Importantly, Clean Water Act section 316(b) is distinct and inapplicable here "because of crucial differences in the statutory language." *Surfrider Foundation v. California Regional Water Quality Control Board* (2012) 211 Cal.App4th 557, 579. Specifically, section 316(b) requires that the "location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact," and thus by its own terms does not apply to a seawater intakes not used to withdraw cooling water. In addition, section 316(b) requires that all four factors (location, design, construction and capacity) "reflect the best technology available. . . ." In contrast, Water Code section 13142.5(b) requires "the best site, design, technology and mitigation measures feasible. . . ." In the California statute, technology is just one of four factors to be considered in minimizing intake and mortality of marine life. The Court in *Surfrider* noted that Water Code section 13142.5(b) "goes further [than section 316(b)] by focusing on measures unrelated to intake systems that more generally serve to minimize the mortality of marine life." Id. at 580. The court also found that the plain language of Water Code section 13142.5(b) sets forth a requirement that "the collective set of measures [not only technology, but also site, design and mitigation]. . . when taken in combination" serve the purpose of minimizing intake and mortality of marine life. Id. at 576. The State Water Board may appropriately draw different conclusions about determining feasibility in the separate context of Water Code section 13142.5(b).
21.30	Alternatively, wet cooling towers is analogous to SIGs because both would result in minimal marine life mortality, but both establish a performance standard to be met by different technologies that achieve reductions that are substantially similar, or "functionally equivalent" to the ultimate technology. Moreover, galleries are similar to wet cooling towers because both technologies are feasible in most locations.	Please see response to comment 21.29. The feasibility of subsurface infiltration galleries will be determined on a case-by-case basis. Subsurface infiltration galleries may not be feasible at all locations.
21.31	The same conclusions made in the OTC Policy should be drawn here for the Desalination Policy. First, the State Board should be explicit that SIGs are the best available technology for minimizing intake and mortality of all forms of marine life, and for their nearly universal "availability" compared	Disagree. The designation of subsurface infiltration galleries as best available technology is distinguishable from the BAT designation in the OTC Policy. Drawing similarities to the OTC policy is not appropriate as the proposed Desalination Amendment and the OTC policy are

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	to sub-surface wells. Further, the "performance standard" for a SIG is similar to a "wet cooling tower" in that the SIG can be assumed to have some mortality associated with the construction and maintenance - a minimally less protective performance standard than the absolute best (dry cooling towers in the case of power plants and subsurface wells in the case of seawater desalination). To ensure that the best available technology is being implemented to reduce the intake and mortality of marine life, we offer the following revisions to the draft Amendment Section L.2.d: "The Regional Board shall require the best available technology. Technology is the type of equipment, materials,* and methods that are used to construct and operate the design components of the desalination facility.* The regional water board shall apply the following considerations in determining whether a proposed technology best minimizes intake and mortality of marine life: (1) Considerations for Intake Technology: (a) The best available intake technology for minimizing the intake and mortality of all forms of marine life is subsurface infiltration galleries. Subject to Section L.2.a.(2), the regional water board shall require subsurface* intakes, either subsurface wells or galleries, unless it determines that subsurface* intakes are "not feasible" based upon an analysis of the criteria listed below, in consultation with State Water Board staff."	based on different statutory authorities and design requirements. Please see responses to comments 21.29 and 21.30. Furthermore, subsurface infiltration galleries are not necessarily superior to subsurface wells for reasons described in the previous responses to comments 21.29 and 21.30. Neither subsurface infiltration galleries nor subsurface wells impinge or entrain marine life. However, subsurface wells can be directionally drilled to optimize intake efficiency and require significantly less surface disturbance during construction. The directionally drilled wells can also be drilled so as not to disturb any marine life and would generate less waste material requiring transport and disposal. Therefore, it is not logical to designate subsurface infiltration galleries as best available technology. Consequently, the proposed revisions were not made.
21.32	Performing a Cost-analysis Under a Feasibility Determination is Illegal. When determining the feasibility of the best available technology, cost should not be a factor. In Entergy Corp. v. *Riverkeeper*, Inc. (*Riverkeeper* II), the Supreme Court found that § 316(b) authorizes the U.S. EPA to compare costs that are reasonably borne by the industry in determining the best technology available for minimizing environmental impact at cooling water structures. Importantly, however, U.S. EPA is not required to consider costs in conducting this analysis. *Riverkeeper* II court held	Disagree. Consideration of cost as part of a feasibility determination under Water Code section 13142.5(b) is permissible. (*Surfrider Foundation v. California Regional Water Quality Control Board* (2012) 211 Cal.App4th 557, 582-583). The Court in *Surfrider* expressly upheld the San Diego Water Board's use of the CEQA definition of feasibility, which allows consideration of economic factors, among others. Reliance on federal law interpreting Clean Water Act §316(b) is both misplaced and misapplied.

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	that the use of the term "Best Technology Available" prevents the use of inferior technologies, or what the court referred to as "second best." The *Riverkeeper* II decision held that "the EPA's determination of BTA, cost-benefit analysis is not consistent with the requirement of § 316(b) that cooling water intake structures "reflect the best technology available for minimizing adverse environmental impact." Most importantly, the court determined that "the statutory language requires that the EPA's selection of BTA be driven by technology, not cost. "The Agency is therefore precluded from undertaking such cost-benefit analysis because the BTA standard represents Congress's conclusion that the costs imposed on industry in adopting the best cooling water intake structure technology available (i.e., the best-performing technology that can be reasonably borne by the industry) are worth the benefits in reducing adverse environmental impacts. Therefore, the State Board cannot use a cost-benefit analysis to determine the BTA under 316(b). That is already adopted in the OTC Policy, and as discussed below, we believe the same conclusion should be upheld for desalination facilities under 13142.5(b). In brief, there is no legislative intent to include a cost- benefit analysis in the Clean Water Act section 316(b), nor is there any such intent evident in the Porter- Cologne Act § 13142.5(b). They are similar and must be enforced similarly. The State Board cannot authorize a site-specific determination of whether BTA is feasible using a cost- benefit analysis. In the Amendment, the State Board allows a cost-benefit analysis to determine whether subsurface intakes are infeasible. However, the *Riverkeeper* decision was clear that "[j]ust as the Agency cannot determine BTA on the basis of cost-benefit analysis; it cannot authorize site-specific determinations of BTA based on cost-benefit analysis." *Riverkeeper* II is explicit-an individual project's analysis of whether BTA is feasible cannot be based on a cost-benefit analysis. Therefore, we request the State Board remove any cost-benefit analysis in the best available technology "feasibility criteria."	Entergy v. *Riverkeeper*, Inc. (2009) 556 U.S. 208 interpreted Clean Water Act §316(b), which applies to "cooling water intake structures". The regulations at issue in *Entergy* and *Riverkeeper* applied to intakes using at least 25% of water withdrawn exclusively for cooling purposes. Thus, neither §316(b) nor the federal regulations would apply to seawater intakes used for purposes of desalination. The *Surfrider* court expressly found that "case law analyzing section 316(b) of the Clean Water Act is inapplicable here because of crucial differences in the statutory language." Id. at 579. Even if the federal 316(b) case law were considered as analogous, the commenter misapplies it. While Entergy did authorize the federal Environmental Protection Agency (EPA) to compare costs reasonably borne by the industry in determining best technology available, the Supreme Court did not limit use of cost to that specific inquiry. EPA, in determining performance standards to implement best technology, "permissibly relied on cost-benefit analyses . . . in the Phase II regulations." 556 U.S. at 226.
21.33	California's Common Law Interpretation of Statutes Requires Cost to not	Disagree. The State Water Board in adopting the OTC Policy was

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	be a Factor in Determining Feasibility of the Best Available Technology. California case law on an agency's statutory interpretation also suggests that the State Board should not allow cost to be a factor when determining feasibility for the desalination policy. When determining whether the State Board properly interpreted § 13142.5(b) a court will "take into account matters such as context, the object in view, the evils to be remedied, the history of the times and of legislation upon the same subject, public policy, and contemporaneous construction." The State Board developed the OTC Policy with the intent to eliminate the unnecessary mortality of marine life from seawater intake; the same "evils to be remedied" are also present in the need for a desalination policy. Without a strong desalination policy that remedies the evils of marine life mortality, the OTC Policy is undermined. "Consistent administrative construction of a statute over many years, particularly when it originated with those charged with putting the statutory machinery into effect, is entitled to great weight...." The State Board's adoption of the OTC Policy set a precedent to not consider cost for the feasibility of minimizing the mortality of marine life. OTC facilities are currently expending great financial resources to implement and comply with the OTC Policy. This shows the OTC Policy was not the harbinger of economic collapse predicted by power plant operators. But maybe more importantly, if desalination facilities are allowed to continue withdrawing seawater in a way that replaces, if not exceeds, the intake and mortality of retired once-through-cooling - the entire investment will be offset and wasted. Finally, a court gives deference to the precedent of not allowing cost to be a factor in determining feasibility. "Lawmakers are presumed to be aware of long-standing administrative practice and, thus, the reenactment of a provision, or the failure to substantially modify a provision, is a strong indication the administrative practice was consistent with underlying legislative intent." The California Legislature has not enacted any legislation that would require the State Board to use cost as a factor for determining feasibility under the OTC Policy, thus providing a strong legislative indication that cost should not be a factor, and the State Board	interpreting a different statute with "crucial differences." Surfrider, at 579. The State Water Board now applies Water Code section 13142.5(b) consistent with the conclusions and interpretations of the Court in *Surfrider*. Moreover, beyond statutory differences and despite surface similarities, the OTC Policy governed a defined set of existing facilities, with available data to inform decision-making. By contrast, the Desalination Amendment will in many cases apply to new or expanded facilities, for which no data are available. In addition, options to minimize adverse environmental impacts at the existing OTC facilities involve distinct technologies and approaches with a separate range of potential environmental impacts. That the Legislature has not modified Water Code section 13142.5(b) in order to address cost with regard to OTC or desalination seawater intakes provides no support for the commenter's position, especially where the current statutory interpretation has been clearly upheld.

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	should continue interpreting § 13142.5(b) to not require cost to be a factor for feasibility under the desalination policy.	
21.34	The Supreme Court's Interpretation of Federal Statutes Strictly Limiting the Inclusion of a Cost Analysis Should be Considered. The Supreme Court interprets statutes narrowly when determining whether a cost-benefit analysis is necessary. A statutory canon provides that, unless a cost-benefit analysis is clearly authorized by a legislative body, agencies may not use it. Instead, regulatory statutes should be read to require avoidance of environmental and other harm to the extent possible or feasible. Legislative bodies do not hide elephants in mouseholes. In Whitman v. American Trucking Associations, Inc., the Supreme Court held that section 109 of the Clean Air Act ("CAA") precluded consideration of the costs of implementation in setting National Ambient Air Quality Standards ("NAAQS"). Justice Scalia concluded that the consideration of cost to be authorized "in vague terms or ancillary provisions" is inappropriate-Congress "does not, one might say, hide elephants in mouse holes." The burden was on industry to "show a [clear] textual commitment of authority to the EPA to consider costs in setting NAAQS," and industry failed to carry that burden. In the absence of clear authority, the U.S. EPA is not only not compelled to consider costs; it has no authority to do so. American Textile held that when a legislative body intends for an agency to use cost-benefit analysis it makes that clear in the statute.	Disagree. Case law interpreting Clean Water Act section 316(b) is inapplicable to interpretation of Water Code section 13142.5(b). *Surfrider* at 579. Moreover, to the extent that Clean Water Act section 316(b) jurisprudence is considered, the Supreme Court in *Entergy* rejected this reasoning. *Entergy* at 223. The State Water Board may appropriately include cost as a relevant factor in feasibility determinations.
21.35	The State Board's About-face Change in Existing Policy to not Consider Cost When Determining Feasibility of Best Available Technology is Illegal. Given *Riverkeeper* II's holding that a cost-benefit analysis is illegal, the State Board decided to not allow cost to be a factor in the OTC Policy's feasibility analysis. The State Board justified its position because it is "not appropriate to equate the substantial mortality of marine life associated with OTC to monetary costs of compliance." The only monetary value	Contrary to the commenter's implication, the State Water Board's decision not to include cost as part of a feasibility determination for Track I of the OTC Policy does not constitute an agency determination with larger implications for how to approach decision-making where a statute requires best technology in order to accomplish a specified purpose. Rather, the decision was specific to the statutory authority and the specific issue then before the Board. As noted in response to comment 21.29, above, differences in the language contained in Clean Water Act section 316(b) preclude treating it as equivalent to the

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	associated with impacts to marine life is based on commercial values of fish, which is completely inadequate to characterize the ecological effects of OTC." As discussed above, similarities between the OTC Policy and the proposed Amendment justify applying this same reasoning to not allow cost to be a factor when determining feasibility. If the Amendment allows cost to be considered in determining the feasibility of subsurface intakes, then it will be considered an illegal about-face change in existing policy. The State Board is given deference when interpreting the Water Code, but the Board is bound the rule that an agency's statutory interpretation cannot be "arbitrary, capricious, or entirely lacking in evidentiary support, or contrary to required legal procedures." Courts apply an even higher standard to the required justification for changes such as the Amendment in question, where an agency revokes its previous rule or makes an about-face change in an existing policy. The level of deference afforded an administrative agency's rulemaking decision is defined in Chevron v. Natural Resources Defense Council, 467 U.S. 837 (1984) ("Chevron"). Chevron requires that when the State Board is implementing the Clean Water Act pursuant to its delegated authority, it must first ensure that its implementation decisions are not contrary to the clear language of the law. To the extent there is any ambiguity in the statute, the agency must interpret the law in a way that is not arbitrary and capricious or otherwise abuses the discretion afforded agencies by the Legislature: "[I]f the statute is silent or ambiguous with respect to the specific issue, the question for the court is whether the agency's answer is based on a permissible construction of the statute. [I]f, however, the court determines Congress has not directly addressed the precise question at issue, the court does not simply impose its own construction on the statute, as would be necessary in the absence of an administrative interpretation. Rather, if the statute is silent or ambiguous with respect to the specific issue, the question for the court is whether the agency's answer is based on a permissible construction of the statute. Id. If Congress has explicitly left a gap for the agency to fill, there is an express delegation of authority to the agency to elucidate a specific	technology reference in Water Code section 13142.5(b).

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	provision of the statute by regulation. Such legislative regulations are given controlling weight unless they are arbitrary, capricious, or manifestly contrary to the statute." The State Board has already decided that cost should not be a factor in determining the feasibility of the best available technology. The State Board decided in its OTC Policy that it "does not believe cost- benefit is appropriate at the programmatic level." Motor Vehicles Manufacturers Association v. State Farm explains that the State Board cannot reverse its decision that cost is not appropriate to determine feasibility. In State Farm, the Supreme Court held that: "revocation constitutes a reversal of the agency's former views as to the proper course. A settled course of behavior embodies the agency's informed judgment that, by pursuing that course, it will carry out the policies committed to it by Congress. There is, then, at least a presumption that those policies will be carried out best if the settled rule is adhered to." Accordingly, an agency changing its course by rescinding a rule is obligated to supply a reasoned analysis for the change beyond that which may be required when an agency does not act in the first instance." The State Board has decided that cost should not be a factor in determining feasibility of the best technology available. Reversing that course of action without a reasoned analysis will violate the "arbitrary and capricious" standard. The State Board should remove "cost", including "lifetime cost", from the feasibility analysis for determining best available technology. The same reasoning applied in the OTC Policy is applicable here - that being the cost of compliance is easy to calculate, while the benefits of compliance are un-calculable. California's statutory interpretation of Water Code Section 13142.5(b) demands that cost be removed from the feasibility determination. The Supreme Court's statutory interpretation of similar federal statutes further explains why cost should not be a factor. And if the State Board reverses its decision to consider cost as a factor, it would be considered an arbitrary and capricious interpretation of the law.	

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	In order to uphold the OTC Policy and comply with the law, we request the State Board remove cost from the feasibility analysis for the best available intake technology.	
21.36	The OTC Policy Should Guide the Development of the Desalination Policy. Impacts from OTC and desalination facilities are both immense and comparable, and both the OTC Policy and the Desal Policy should set similar standards to prevent undermining one another. For over thirty years, power plants in California have used open seawater intakes for OTC. Several state agencies, including the California Energy Commission, State Lands Commission, Ocean Protection Council and State Board, have recognized that intake systems for once-through cooling have caused significant damage to California's marine ecosystems." The ecological losses from open seawater intakes used for once-through cooling are estimated in the millions of dollars, and there are additional market losses of commercially and recreationally important species. The concentration of open ocean intakes in a given area can also factor into the magnitude of environmental destruction. The cumulative impact of multiple open seawater intakes in bays could increase environmental damage when they are located in highly biologically productive regions that serve as nurseries for marine life. It is particularly important that cumulative impact evaluations address all seawater intakes (OTC and desalination) in the zone where impacts may be actualized and incorporate research on the performance of Track 2 technologies for OTC alternatives. Finally, it is not uncommon for existing intakes to impact prey species that are not targeted by fisheries nor easily "monetized", but nonetheless serve a critical ecological function in the rebuilding and sustainable populations of our fisheries.	Disagree. The comparison between impacts associated with desalination intakes versus cooling water intakes is limited. When evaluating flow as a relative factor, cooling water flows are considerably greater than projected desalination intakes flows as described in response to comment 21.39. In any case, the OTC Policy is factually distinguishable because it is governed by separate, inapplicable statutory and case law authorities (see responses to comments 21.29 and 21.33 above). While the OTC Policy treated the determination of "best technology available" pursuant to Clean Water Act section 316(b) with a two-track approach, the proposed Desalination Amendment instead looks to combine the best available site, design, technology, and mitigations measures feasible that together minimize intake and mortality of all forms of marine life.
21.37	Currently, the proposed Track 2 of the desalination policy would allow open ocean intakes - the very same type of intakes addressed by the OTC policy (and in the cases where the desalination plants are co-located with the OTC power plants, it could be literally the very same pipe), and section L.2.d.1.c seems to imply that screens are an equivalent technology for minimizing the intake and mortality of marine life - including a provision that requires and equivalency test for screens	The proposed Desalination Amendment requires a project proponent to first demonstrate that subsurface intakes are not feasible. The term "not feasible" in the proposed Desalination Amendment does have the same meaning as "not feasible" as defined in the OTC Policy, but rather not "feasible" as defined using the CEQA definition of "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and

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	rather than an equivalency test for sub-surface intakes.	technological factors." If subsurface intakes are determined to be not feasible, the regional water board may approve use of a screened surface water intake subject to the conditions included in chapter III, L.2.d.(1) that are intended to minimize intake and mortality of marine life. Only under the conditions described above can a surface water intake be constructed and that surface water intake must meet specific design standards and minimize mortality as described in the same section. The proposed Desalination Amendment is not intended to limit desalination facilities to only those areas where subsurface intakes can be constructed and operated as there may be areas where that technology is not feasible based on site-specific conditions including geological constraints. In those cases, screened surface water intakes or alternative screening technologies must be an option. All communities that are suffering from limited water supplies should be able to consider desalination as a potential alternative means of meeting water supply demands. See responses to comments 21.15 and 21.41 for more information on the definition of feasibility used in the proposed Desalination Amendment.
21.38	The entrainment and impingement impacts of withdrawing large volumes of water is the same whether the seawater is ultimately used to cool a power plant or as source water for a desalination plant. The State Board already considered the efficacy of screened intakes in the OTC Policy and found that they were sub-par - and they are still sub-par regardless of the mesh size.	Seawater used for once through cooling serves a very different purpose than seawater used at desalination facilities. Seawater used as cooling water can be recovered, cooled, and used again; hence, a closed loop system that is both practical and protective. However, desalination facilities require a continuous source of feedwater that a closed-loop-system cannot maintain. As a result, some form of continuous source water supply is required. The proposed Desalination Amendment accommodates the fact that subsurface intakes are not feasible at all locations and that communities should be able to consider desalination using screened surface water intakes to help meet water supply demands if subsurface intakes cannot be utilized. See response to comment 21.37.
21.39	Further, the average volume of water withdrawn per day at once-through-cooled power plants is comparable to the anticipated volume of the proposed large-scale desalination plants in California.	Disagree. Prior to the adoption of the OTC policy, power plants in California used up to 15 billion gallons of seawater per day, which is a significant volume of water (State Water Board 2010) (OTC staff report).

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	Therefore, given entrainment and impingement impacts are potentially comparable - and possibly even greater- than OTC and would be regulated under the same Water Code provision, the legal interpretations of section CWA § 316(b) should be used to instruct how the State Board regulates desalination.	This volume is considerably more water than the combined 250-370 million gallons per day proposed for use by desalination facilities in California as described in section 2.4 of the Staff Report with SED. However, the ratio of seawater use for OTC water relative to seawater used for desalinated water will change significantly as more powerplants switch to closed cycle cooling. Although it is highly unlikely that desalination intake flows will ever achieve the rates currently attributed to OTC power plants. As stated previously, OTC facilities are regulated under Clean Water Act section 316(b), while desalination requirements are based on the Water Code section 13142.5(b) (See response to comment 21.34).
21.40	The Once-Through Cooling Policy and Clean Water Act § 316(b) Should be Used to Guide the State Board's Definition of "Infeasible." Given the Water Code does not define "feasible", the State Board should use the OTC Policy and CWA Section 316(b) as guidance. Water Code § 13142.5(b) mandates desalination facilities use "the best available site, design, technology, and mitigation measures feasible...to minimize the intake and mortality of all forms of marine life." The Water Code does not define "feasible," and case law does not provide appropriate guidance. Likewise, the Clean Water Act does not provide a definition of "feasible" in relevant contexts, but the U.S. EPA has provided guidance as discussed below. Given the lack of a statutory definition of "feasible," the State Board has the administrative discretion to define "feasible" by referring to an appropriate analog. The statutory provision most directly analogous and appropriate for reference is Clean Water Act (CWA) § 316(b), because it addresses the same harmful open seawater intakes that certain project proponents propose to use for their coastal desalination facilities, and if a "new or expanded" power plant were proposed, the Porter-Cologne Act would be enforceable and therefore not only analogous, but rather exactly the same. The Once-Through Cooling Policy (OTC Policy) and associated 316(b) Guidance should be used to craft an appropriate definition of "not feasible" in the desalination policy. California courts have stated that where a state and federal statutory	Disagree. Clean Water Act section 316(b) and associated case law are inapplicable to seawater intakes for desalination purposes. See responses to comments 21.29, 21.34 and 21.35 above. Determining feasibility of subsurface intakes is a site-specific inquiry requiring consideration of a number of factors. Water Code section 13142.5(b) requires that the combination the four factors (site, design, technology, and mitigation) be the best available that are also feasible in order to minimize intake and mortality of all forms of marine life. Thus, a broader definition of feasible is appropriate, with additional criteria to inform the analysis for potential use of subsurface intakes.

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	scheme have the same "objectives and relevant wording", as they do here, California courts look to federal precedent for guidance. The OTC Policy is based on federal CWA § 316(b), which has similar requirements as State Water Code § 13142.5(b), which applies to seawater withdrawals for "cooling water" and desalination facilities' "source water". For the OTC Policy the State Board developed a two-track approach, with Track 1 setting the best technology available standard, while Track 2 provided an alternative - but substantially the same- - compliance track that could be pursued when an existing facility demonstrates to the State Water Board's satisfaction that Track 1 is "not feasible." The Desalination Amendment proposes a similar structure for the best available intake technology section. Section L.2.d.1.a. [of the proposed Desalination Amendment] states that the "regional water board shall require subsurface intakes unless it determines that subsurface intakes are infeasible..." Like the OTC Policy, this sets-up a two-track approach for coming into compliance with the best available technology portion of Water Code Section 13142.5(b). Given the similar statutory language of CWA § 316(b) and Water Code § 13142.5(b), the similar two-track approach in both policies, and critical nature of the term "not feasible," the State Board should use the OTC Policy and CWA § 316(b) as guidance for the desalination policy's definition of "not feasible." In order to adequately protect our marine ecosystems from entrainment and impingement impacts and to ensure that any gains made through the OTC Policy and the MLPA are not undermined, the State Water Board should use the 316(b judicial guidance as guidance for the desalination policy - as the State has already done in the OTC Policy.	
21.41	CEQA 's Definition of "Feasible" is not an Appropriate Definition for a State Board Policy Aimed to Minimize the Mortality of Marine Life. CEQA is an information-forcing law that keeps the public informed and agencies accountable. Porter- Cologne's purpose is to regulate the "water resources of the state" and ensure "the quality of all the waters of the state shall be protected for use and enjoyment by the people of the state." Porter-Cologne expects sources of pollution, like desalination facilities, to "be regulated to attain the highest water quality which is reasonable." CEQA and Porter-Cologne are not analogous statutes; their definitions are not analogous. Therefore, the State Board should not	The CEQA definition of “feasible” is more appropriate to the term’s broader use in Water Code section 13142.5(b) and in the Desalination Amendment. The term “not feasible” in the proposed Desalination Amendment does not refer to “not feasible” as defined in the OTC Policy, but rather not “feasible” as defined using the CEQA definition which states feasible shall mean “capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors.” The use of the CEQA definition in the permit determining best available site, design, technology and mitigation measures feasible to minimize

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	interpret "feasible" by using CEQA's definition. Rather, statutory interpretation, case law, and responsible public policy suggests the State Board use the Clean Water Act, EPA and judicial guidance on 316(b), and the State Board's analogous OTC Policy to define "feasible" for the desalination policy. It is critical to articulate the reasons for defining "not feasible" consistent with the OTC Policy definition and not the CEQA definition as any deviation from the CEQA definition will be a change in course from what the State previously argued in Surfrider Foundation v. California Regional Water Quality Control Board.	intake and mortality of all forms of marine life for the Carlsbad Desalination Project was upheld by the court in *Surfrider*, at 582-83, FN 24. It is unclear why the use of the CEQA definition of feasible in the proposed Desalination Amendment would represent a change in course because the Water Boards took no contrary position in *Surfrider*. Further, the OTC Policy definition of "not feasible" was tailored to the relatively narrow question of whether an existing power plant is allowed to pursue an alternative method of compliance at a facility already built and operating. With its references to space constraints and permitting restrictions resulting from public safety, the definition of "not feasible" in the OTC Policy clearly envisions considerations about suitability of the preferred method of installing cooling towers. Development of new or expanded desalination facilities will involve feasibility determinations that should allow a broader analysis that includes cost. Please see response to comment 6.12.
21.42	In-plant Dilution Should not be a Factor in Determining the Feasibility of Subsurface Intakes. "Augmented flow" for "in-plant dilution" is the intake of additional seawater for the purpose of in-plant dilution during the discharge of a desalination facility's brine waste. The Policy mistakenly includes in- plant dilution under the definition of augmentation flow, but they are two separate terms. "In-plant dilution" is the commingling of another source of water, typically treated wastewater, to dilute brine as it is discharged into the ocean. The distinction between "flow augmentation" ("additional intake volume") and other sources of water for in-plant dilution is, "flow augmentation" dilution water was pulled out of the ocean for the purpose of diluting brine, while other waters for in-plant dilution were already put to another use before being used for dilution, and these wastewaters do not add to the intake and mortality of all forms of marine life. This difference is critical because "augmented intake" (or "additional intake volume") severely increases the intake and mortality of marine life, causing a net negative benefit to marine life, while wastewater used for "in-plant dilution" results in no marine life mortality and results in a net benefit given its ability to dilute brine to natural levels.	The proposed Desalination Amendment does not consider augmented intake volume required for in-plant dilution as a basis for determining feasibility of subsurface intakes. Commingling brine effluent from the desalination facility with wastewater is the preferred technology for minimizing impacts to marine life and discharging through multiport diffusers is the next preferred brine disposal option. The proposed Desalination Amendment allows the use of flow augmentation if an owner or operator can demonstrate to the regional water board through studies that flow augmentation provides equal or greater protection than that provided by commingling or diffusers. These criteria allow the use of flow augmentation where technologies are protective of marine life as described in Section 8.6.2.3 of the Staff Report with SED. If flow augmentation is not as protective as multiport diffusers, the facility must commingle brine with a sufficient volume of wastewater for adequate dilution, construct a diffuser array, or utilize some other approach for brine dilution. Please also see response to comment 21.45.

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21.43	It is already known that seawater intakes can be devastating to marine life, with the exception of sub--surface intakes. Taking additional seawater through surface intakes to dilute brine can result in a three--fold increase in the amount of marine life mortality. Take the Carlsbad facility as an example since they are currently permitted to conduct augmented flow for in-plant dilution. Carlsbad is a 50 MGD facility requiring about 105 MGDs of source water, but its NPDES permit allows for a 304 MGD seawater withdrawal due to in-plant dilution. The San Diego Regional Board set a dilution ratio for Carlsbad at 15.5: I, resulting in 199 MGDs of additional seawater intake flow just to dilute the brine. Once Carlsbad becomes a stand-alone facility, if similar additional intake volumes were necessary to meet the dilution ratio in the draft, it would result in triple the amount of marine life mortality. And screens may provide some reduction in entrainment, but likely very little - and certainly not a reduced intake and mortality of "all forms of marine life."	See response to comment 21.42.
21.44	Allowing additional intake volumes simply for in-plant dilution is illegal. Interpreting § 13142.5(b) to allow flow augmentation for brine dilution is not wise policy and would lead to "mischief and absurdity." A court determining whether flow augmentation is permitted under § 13142.5(b) would first "ascertain the intent of the Legislature so as to effectuate the purpose of the law." The Legislature's intent is clear - it wants the best available technology to minimize the intake and mortality of all forms of marine life. In- plant dilution does not minimize the mortality of marine life if it requires increasing the intake volume; it exacerbates impingement and entrainment to dilute brine. A court also needs to interpret § 13142.5(b) to give "a reasonable and common sense interpretation consistent with the apparent purpose and intention of the lawmakers, practical rather than technical in nature, which upon application will result in wise policy rather than mischief or absurdity. Statutes should be interpreted to produce reasonable results and words should be interpreted to "promote rather than defeat" the law's purpose and policy. Allowing a project proponent to increase its intake of seawater - impinging and entraining marine life in the process - to dilute brine is not a common sense approach to minimizing mortality; and allowing this dilution alternative to be a factor for determining feasibility would lead to mischief and create an absurd policy position.	Disagree. Commenter provides no clear basis for the claim that in-plant dilution is illegal. Moreover, the proposed Desalination Amendment clearly allows flow augmentation only where it is demonstrated to provide equal or greater protection than that provided by commingling or diffusers. Interpretation of Water Code section 13142.5(b) follows the analysis set forth in *Surfrider*, where it was found that the combination of best available site, design, technology and mitigation measures feasible should be used to minimize intake and mortality of all forms of marine life. *Surfrider*, at 576. See response to comment 21.42.

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21.45	The State Board has already acknowledged that increased flow volumes for dilution of the discharge is illegal. The State Board's 2010 Triennial Review stated that "with regard to intake impacts, the Ocean Plan does not authorize flow augmentation for dilution purposes." The State Board goes on to explain that the Triennial Review "identified plans for a limitation on in-plant dilution of brine prior to discharge." As the State Board admits "diluting brine prior to discharge by taking in additional source water from a surface intake may reduce discharge mortality; however, there would be increased intake mortality that might offset any benefit of diluting the brine prior to discharge." It is clear from the expert reports that the potential increased mortality through screened intakes will be far greater than any potential entrainment mortality from diluting brine with properly designed diffusers. And compared to comingling with wastewater for in-plant dilution, the additional intake and mortality would not be offsetting any intake and mortality. Therefore, augmented intake (additional intake flow volume) for the purpose of in-plant dilution should be explicitly prohibited in the Desalination Policy to prevent backsliding from the Ocean Plan's current prohibition.	In order to clarify terminology, note that at the time of State Board's 2010 Ocean Plan Triennial Review, staff did not distinguish in-plant dilution from flow augmentation, which has resulted in some confusion. Since that time an effort has been made to clearly characterize and define the terms “in-plant dilution” and “flow augmentation.” In-plant dilution is any form of diluting brine within a plant before discharging the commingled brine into the ocean. In-plant dilution includes commingling brine with wastewater from power plant (cooling water effluent) or treated effluent from a sewage treatment plant. Flow augmentation is also a type of in-plant dilution. For the purposes of this Plan, flow augmentation is specifically set apart from in-plant dilution and defined as a circumstance when a facility withdraws additional seawater for the specific purpose of diluting brine prior to ocean discharge. Although others use in-plant dilution and flow augmentation interchangeably, for the purposes of this proposed Desalination Amendment, the terms and discharge technologies are distinguished to prevent confusion. The statement, "identified plans for a limitation on in-plant dilution of brine prior to discharge” does not refer to the preferred alternative of commingling brine with wastewater, but to flow augmentation. In 2010, staff was considering recommending a prohibition on flow augmentation because of the significant marine life mortality associated with the additional intake of seawater. The current scientific literature assumes that 100 percent of entrained marine life does not survive the desalination process. (Pankratz 2004; Foster et al. 2013; U.S. EPA 2011) However, Poseidon Resources is proposing to use a modified flow augmentation system at their Carlsbad Desalination Project that would use a screened Archimedes screw pump intake to take in additional water for brine dilution. The theory is that organisms in the water are “gently” conveyed through the intake to the brine mixing area and then discharged into the surf zone alive, or mostly alive. Jenkins et al. (2014) argue that the flow augmentation is the environmentally superior brine disposal method. The Expert Review Panel members were asked to consider marine life

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		mortality associated with the modified flow augmentation system and their conclusions were reported in Foster et al. 2013. In the Diffuser Versus In-plant Dilution section, Foster et al. (2013) mentions that similar to diffusers, flow augmentation would require the intake of 20 parts seawater for every one part brine to meet the receiving water limitation for salinity and the entirety of the dilution water would be subject to entrainment impacts. The report goes on to say, *"SCCWRP (2012) mentioned the mortality of organisms in the dilution water caused by intake pumps, and that this might be reduced with pumps that reduce turbulence. It was noted, however, that the practicality of such pumps for use in a desalination plant has not been demonstrated. In addition to practicality, we are unaware of existing pumps that can move the amounts of water required and also reduce turbulence at the scales needed to protect very small organisms."* Poseidon Resources has submitted two studies on the use of these low turbulence pumps (see Attachments 8 and 9 of their comment letter and responses to comments 15.19, 15.74, and 15.75). However, neither of the studies looks at the through-pump mortality for very small organisms (less than 20 mm) and the 1.0 mm intake screens would prevent entrainment of anything larger than 20 mm. Ultimately, Foster et al. (2013) concluded: "Until relevant information, designs and technology are available that show otherwise, it is reasonable to assume that impacts to organisms in the water entrained for dilution by diffusers are likely less, and perhaps much less, than impacts to dilution water used for in-plant dilution [flow augmentation]." This report did not entirely reject the possibility that there may be a flow augmentation system that could be designed to be at least as protective as multiport diffusers, but it did conclude that at the time, there was not enough information about such systems. Since Foster et al. (2013) was released, Poseidon Resources submitted a Jenkins et al. (2014) to the State Water Board, which was a revised version of Jenkins and Wasyl (2013). Jenkins et al. (2014) attempted to provide further comparisons between multiport diffusers and flow augmentation. Comments on that

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		document are provided in response to comment 15.20. We still agree with Foster et al (2013) that at this time there is not sufficient information to evaluate marine life mortality at flow augmentation systems, but that data might become available in the future. The proposed Desalination Amendment was designed to allow for future technological innovations. It hierarchically ranks brine disposal technologies with commingling brine with wastewater as being the preferred technology, followed by multiport diffusers. An owner or operator can propose to use an alternative brine disposal method (e.g. flow augmentation) if they can demonstrate to the satisfaction of the regional water board in consultation with the State Water Board that the alternative technology is at least as protective as discharging through diffusers. At the time of the 2010 Ocean Plan Triennial Review, staff did not have any information on any alternative flow augmentation system that might be as protective of marine life as multiport diffusers. Even though there is currently insufficient information to demonstrate availability of a flow augmentation system that is as protective as multiport diffusers, there may be a brine dilution system in the future that is. It will be up to the owner or operator to demonstrate equivalent protection and the responsibility of the regional water board in consultation with the State Water Board to evaluate and approve the analysis.
21.46	Subsurface intakes for additional flow volume may be considered in determining practices for rapid dilution, so long as the additional volume from the subsurface intake is not a factor in determining whether subsurface intakes are "not feasible." For example, if a plant is designed to produce a volume of product water that is feasible using subsurface intakes, but not feasible if the additional "dilution water" is added to the plant design - the facility should be mandated to utilize best available technology for the "source water" and alternative discharge technologies and practices to ensure rapid dilution of the brine discharge. To consider sub-seafloor intakes "not feasible" due to the volume of water necessary to properly dilute the brine discharge, above what is necessary for "product water", would amount to a violation of the Water Code's mandate to "site and design" the intake to minimize the intake and	To address this concern, we revised the sentence in chapter III.L.2.b.(2)(formerly 1) to read, “A design capacity in excess of the need for desalinated water as identified in chapter III.L.2.b.(2) shall not be used by itself to declare subsurface intakes as not feasible.” The revised sentence was re-located to chapter III.L.2.d.(1)(a) as a consideration for intake technology.

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	mortality of all forms of marine life.	
21.47	"Augmented intake volume" for "in-plant dilution" from open or screened surface intakes should be prohibited. This additional volume of intake water volume exacerbates the marine life mortality - in contradiction of §13142.5(b)'s clear read to minimize the intake and mortality of all forms of marine life. Further, as shown in the report provided to the State Board by the expert panel on brine discharges, there are alternative technologies and practices that provide rapid dilution of brine discharges without the need for "augmented intakes" and the additional marine life mortality from this proposed practice. Therefore, increased intake volume for "in-plant dilution" should be expressly prohibited. and expressly prohibited as a consideration in determining whether subsurface intakes are feasible.	Please see response to comment 21.45.
21.48	Co-location with a Wastewater Treatment Facility Should not be used to Demonstrate Infeasibility. As with nearly all of the criteria in L.2.d.1.a.1, whether a facility is sited next to a wastewater treatment facility should have no bearing on whether subsurface intakes are a feasible means of minimizing the intake and mortality of marine life. However, the State Board states in Section L.2.d.1.a.i that a factor to be considered in the analysis of whether meeting the preferred alternative of sub-surface intakes is feasible is "co-location with sources of dilution water." How does co-location with sources of dilution water the best available technology [sic] any more or less feasible? The State Board explains that: "Siting a desalination facility in close proximity to a wastewater dilution source can prevent a facility from discharging toxic concentrations of brine into ocean waters and reduce the cost of constructing conveyance pipes to transport the brine to the wastewater facility or vice versa." We agree with this statement, but it has nothing to do with whether the best available technology to "minimize the intake and mortality of all forms of marine life" is feasible.	Agree. “Co-location with sources of dilution water was removed from the list of feasibility criteria in the proposed Desalination Amendment and the Staff Report with SED.

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21.49	First and foremost, it is critical that the best available technology be implemented to reduce marine life mortality. The ability to co--mingle treated wastewater with brine discharge should not take precedent over requiring the best available technology to minimize intake and mortality. Regardless, a facility's proximity to a wastewater treatment facility has no bearing on whether the best available technology is feasible to achieve the purpose of section 13142.5(b). Therefore, we request the State Board remove from consideration "co-location with sources of dilution water" as a factor to be considered in whether subsurface intakes are feasible.	Please see response to comment 21.48. Commingling brine with wastewater would provide some benefit from reduced salinity at the point of the discharge, but does not impact intake flow and associated mortality.
21.50	As explained further in [comments 21.53 - 21.62], any other criteria unrelated to the directive to "minimize the intake and mortality of all forms of marine life" is equally irrelevant for determining whether an alternative can feasibly attain that goal. And as discussed below, cost should not be a factor in determining "not feasible." It is critical for clarity and consistent enforcement that the Amendment includes a definition of "not feasible."	Disagree that a definition of “not feasible” as defined in the OTC Policy should be included in the proposed Desalination Amendment. A definition of feasible was added to the proposed Desalination Amendment as described in responses to comments 6.12, 21.15, 21.41, and 21.51.
21.51	The Desalination Policy Needs a Feasibility Definition, not a List of Criteria Project Proponents can use to Explain why they Cannot Achieve the Best Available Technology Standard. The proposed Desalination Policy does not contain a definition of "infeasible", but rather a laundry list of criteria to be evaluated by regional boards. Section L.2.1.a. states that subsurface intakes are required unless the regional board "determines that subsurface intakes are infeasible based upon an analysis of the criteria listed below..." Subsection (i) then goes on to list numerous factors a project proponent can use to exempt themselves from their legal responsibilities to install the best available technology, including: (1) Hydrologic and oceanographic conditions; (2) Presence of sensitive habitats and species; (3) Energy use; (4) Impact on aquifers, local water supply, and existing users; (5) Desalinated water conveyance, existing infrastructure, co-locations with sources of dilution water; (6) Design constraints;	Disagree with the contention that the proposed Desalination Amendment identifies a laundry list of issues to address. The proposed Desalination Amendment describes a process for evaluating the various factors identified in Water Code Section 13142.5(b) and describes how, when, and by whom those factors will be evaluated. See responses to comments 21.40 and 21.41 above. The CEQA definition of feasibility (“capable of being accomplished in a successful manner, within a reasonable period of time, taking into account economic, environmental, social and technological factors”) is appropriate for use throughout the proposed Desalination Amendment, in order to interpret each of the four factors in Water Code section 13142.5(b). This approach was upheld in the *Surfrider* decision. Use of additional, specific criteria for consideration in determining feasibility of subsurface intakes is an appropriate method of directing the regional water boards in conducting a site-specific analysis to determine the best available technology feasible in combination with the other statutory factors.

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	(7) Project life cycle cost; and (8) Other site specific and facility factors. These eight factors are not only vague and open-ended, allowing project proponents to excuse themselves from the best available technology standard, but they do not provide an actual definition of feasible under Water Code Section 13142.5(b). Black's Law Dictionary defines feasible as "capable of being accomplished." Other than criteria number one - hydrologic and oceanographic conditions - how do any of the other criteria determine whether subsurface intakes are feasible? All of the other criteria may or may not be appropriate to determine the best available design, or the best available site - but criteria two through seven do nothing to determine whether the best available "technology" is feasible for minimizing the intake and mortality of marine life. Each of these elements should be removed from Section L.2.d.1.a.i., and replaced with a proper definition of "not feasible" consistent with the definition in the OTC Policy. The law requires the State Board to ensure use of the best available technology feasible for minimizing the intake and mortality of all forms of marine life. The law does not condition a determination of the best available technology on whether or not it meets the project proponents' business goals. Instead of providing a list of criteria for project proponents to use to excuse themselves from complying with the law, the State Board should look at the OTC Policy's definition of "not feasible."	
21.52	First, the State Board defined the term "available" in regards to "best technology available." The State Board determined that "the technology must be "available" in the sense that it is technically and logistically feasible at most facilities subject to the proposed Policy..." From that definition of "available" the State Board created a definition of "not feasible": "Cannot be accomplished because of space constraints or the inability to obtain necessary permits due to public safety considerations, unacceptable environmental impacts, local ordinances, regulations, etc. Cost is not a factor to be considered when determining feasibility under	Disagree. The proposed Desalination Amendment includes a definition of feasible (as described in responses to comments 6.12, 21.15, 21.41, 21.51) that considers cost. Further, the proposed Desalination Amendment already describes alternatives in the case where subsurface intakes are determined to be not “feasible” where “feasible” is defined using the CEQA definition and not the OTC Policy definition of “not feasible.”

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	Track 1." For the reasons discussed above, the State Board should use the OTC Policy's definition of "not feasible" as a starting place for a similar definition in the Desalination Policy. In order to provide an accurate definition of "infeasible", we suggest the following revisions to Chapter III.L.2.d.(l).a.i.: "The regional water board shall use the following definition of "not feasible" --consider the following criteria-- in determining feasibility of subsurface* intakes: Cannot be constructed or operated given geotechnical data, hydrogeology, benthic topography, or oceanographic conditions. Cannot be accomplished because of the inability to obtain necessary permits due to unacceptable environmental impacts, local ordinances, State or local regulations, etc. Cost is not a factor to be considered when determining feasibility. Flow Augmentation for brine dilution is not a factor to be considered when determining feasibility. --presence of sensitive habitats*, presence of sensitive species, energy use; impact on freshwater aquifers, local water supply, and existing water users; desalinated* water conveyance, existing infrastructure, co-location with sources of dilution water, design constraints (engineering constructability), and project life cycle cost. Project life cycle cost shall be determined by evaluating the total cost of planning, design, land acquisition, construction, operations, maintenance, mitigation, equipment replacement and disposal over the lifetime of the facility, in addition to the cost of decommissioning the facility. In addition, the regional water board may evaluate other site and facility specific factors.--" Furthermore, we suggest the following addition to Chapter III.L.2.d.(l)(a): "iii. If subsurface wells or galleries are determined to be "not feasible," then the regional board shall allow an alternative technology, or suite of technologies and other measures other than after-the-fact restoration, which achieves a minimization of the intake and mortality of all forms of marine life that is equivalent to the performance of subsurface infiltration galleries."	

Please note all tables and figures referenced are present at the end of this document

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21.53	General Considerations The draft should identify Seafloor Infiltration Galleries (SIG) as the best technology available, and use that determination to establish a reasonable "performance standard."	The proposed Desalination Amendment allows low velocity screened intakes meeting specific requirements to be used where subsurface intakes are not feasible. As described in previous comments, the purpose of these requirements is to allow communities with limited or dwindling water supplies located in areas where subsurface intakes are not feasible to still be able to consider and develop desalination technology as a potential alternative water supply. Please see responses to comments 21.29, 21.31, and 21.51.
21.54	Further, section L.2.d. should remove any language that implies screens are the standard for an "equivalency test." An equivalency test, as used in the OTC Policy and the *Riverkeeper* case law, is to ensure that any alternative to the "best technology" meets a reasonable range of performance based on the performance of the "best technology." The State Water Board considered the efficacy of screened intakes for minimizing the intake and mortality of marine life during the OTC Policy creation and found them inferior. In fact, the OTC Policy only allowed the use of screens if, in combination with other measures, they could meet the performance standards established by the "best available technology." Since the adoption of the OTC Policy, there have not been any new technological advances or scientific studies to suggest that intake screens are best available technology. If anything, recent studies have only confirmed that the efficacy of screened surface intakes is still questionable and likely less than what was assumed when the OTC Policy was adopted. This amendment to the Ocean Plan for desalination needs to be consistent in the consideration of screen efficacy as the adopted approach in the OTC Policy.	Disagree. The proposed Desalination Amendment describes the criteria that screened intakes must meet while allowing for the design or development alternative technologies providing these methods provide equivalent protection. The surface water intakes are only considered in the case where subsurface intakes are not feasible. When that demonstration has been made, a project proponent should be allowed the flexibility to consider other intake design options that meet the same performance criteria as described for screened surface water intakes. As stated in previous responses the OTC policy addresses a need that can be achieved with closed-cycle systems, while desalination requires a continuous supply of water. See also, response to comment 21.29, illustrating why a determination of “best technology available” under Clean Water Act section 316(b) is distinguishable from a determination of “best available . . . technology. . . feasible . . to minimize intake and mortality of all forms of marine life.” Water Code section 13142.5(b).
21.55	Fine Mesh Screens Are Not Best Technology Available. Perhaps the most obvious example is the potential for the Desal Policy to allow surface intakes with fine--mesh screens. Despite the fact that the Substitute Environmental Document ("SED") concludes "[s]ubsurface intakes are more protective of marine life than surface water intakes" the draft Desal Policy fails to designate subsurface intakes as BTA and instead leaves open the possibility of a new desalination plant receiving	Disagree. The proposed Desalination Amendment was released with a range of screen slot sizes (0.5, 0.75, and 1.0 mm) with a clear note that said “[NOTE: The State Water Board intends to select a single slot size, but is soliciting comments on whether 0.5 mm, 0.75 mm, 1.0 mm, or some other slot size is most appropriate to minimize intake and mortality of marine life]” During the public comment period, we received numerous comments that the screen slot size should be no smaller than

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	permits to use surface intakes with screens of a yet-to-be determined slot size.	1.0 mm. Chapter III.L.2.d.(1)(c)ii of the proposed Desalination Amendment was revised to: "In order to reduce entrainment, all surface water intakes must be screened with a 1.0 mm (0.04 in) or smaller slot size screen when the desalination facility* is withdrawing seawater.*" This directive does not leave room for interpretation on the part of the regional water boards, but instead provides clear guidance regarding intake screens. Subsurface intakes represent the best technology for minimizing intake and mortality of all forms of marine life, but they are not available or feasible in all situations. If subsurface intakes are not feasible, an owner or operator may use a screened surface intake. The State Water Board acknowledges that screened surface intakes have significantly higher operational mortality relative to subsurface intakes and that subsurface infiltration galleries may have mortality associated with the construction and maintenance of the intake. The regional water board will first determine if subsurface intakes are feasible and then determine the best available technology alternative that will work in combination with the best available site and best available design alternatives, resulting in the least amount of intake and mortality of all forms of marine life. However, the proposed Desalination Amendment is not based on the conclusions and requirements set forth in the OTC policy and as a result comparisons or parallels to decisions contained therein are misplaced.
21.56	Fine mesh screens have not been proven to be a reliably effective method of reducing entrainment and impingement and should not be considered best technology available for minimizing intake and mortality of all forms of marine life. While wedgewire screens may potentially reduce impingement mortality and entrainment loss of juvenile and adult fish to a certain degree, it's important to recognize that "intake--related mortality will be site and species-specific."	See response to comment 21.57.
21.57	Further, as the SED noted in a report cited by the US EPA, the efficacy of minimizing impingement mortality is conditional: "0.05 mm screens have been used on traveling screen and single entry, double exit screens.	As described in section 8.3.1.1 of the Staff Report with SED, the combination of fine-mesh or wedge wire screen and low velocity intake structure will reduce entrainment and may eliminate impingement of

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	These systems are successful if the facilities apply a safe return of impinged organisms." There is nothing in the draft Amendment speaking to, much less requiring the safe return of impinged organisms and the data collected in recent screen studies is evidence that impingement is occurring and may be a function of both mesh size and/or intake velocity. The State Board should include an analysis in the SED describing the relationship between mesh size and intake velocity to the efficacy of minimizing the intake and mortality of all forms of marine life - whether through entrainment and/or impingement mortality.	aquatic organisms in comparison to uncontrolled intakes. Organisms entrained through the screens are assumed to not survive and the loss will be included in the Marine Life Mortality Report. As described in section 8.3.1.2.2, most fish will be able to swim away and avoid impingement if the velocity is 0.15 meters per second or less. Additional information was added to section 8.3.1.2.3 to address comment 9.15 that discusses the hydraulic factors that can contribute to the reduction in impingement and entrainment at wedgewire screens. Based on the information in section 8.3.1, impingement is expected to be *de minimis* if any. A facility could elect to design their system to safely return any impinged organism to reduce the amount of operational mortality associated with a facility, but is not required to. As stated above, the wedgewire intakes can be designed with low intake velocity and positioned to prevent impingement of organisms. However, chapter III.L.2.e.(1) of the proposed Desalination Amendment states that an owner or operator must estimate marine life mortality resulting from construction and operation of the facility and chapter III.L.2.e.(2) requires that they fully mitigate for mortality of all forms of marine life. This would include impingement-related mortality. Even though there is no specific information to address the quantification of impingement in the proposed Desalination Amendment, chapter III.L.2.a.(1) states that "The regional water board in consultation with the State Water Board staff may require an owner or operator to provide additional studies or information if needed, including any information necessary to identify and assess other potential sources [emphasis added] of mortality to all forms of marine life." This would also include any impingement-related mortality.
21.58	The efficacy of screening technology remains uncertain and thus should not be considered BTA. As the SED notes "(s)ome studies on screen efficacy are contradictory. The majority of studies that examine the efficacy of wedgewire screens only looked at impacts on ichthyoplankton; yet there are many other organisms that are abundant in the water." California's marine ecosystems are complex and support incredibly diverse species that are "extremely valuable from an ecosystem standpoint as well as being a key contributor to California's economy."	Section 8.3.1.2.3 of the Staff Report with SED clearly describes the benefits and problems associated with both subsurface and surface water intakes. Studies summarized in that section and tabulated in Appendix D of the Staff Report with SED present a body of evidence supporting the relationship between screen slot size and size of fish. Overall, reducing screen slot size reduces risk of entrainment. While the studies did focus on fish, it is important to understand that all impinged and entrained forms of aquatic life must be mitigated under the

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	Allowing new desalination plants to build or continue the use of surface intakes with fine mesh screens is not the best way to achieve the directive of the Water Code to protect all forms of marine life.	proposed Desalination Amendment (see 21.57 above). The use of surface water intakes and relationship to best technology available is addressed in response to comments 21.77.
21.59	In setting BTA for ocean open intakes for OTC Policy, the State Board had the particular challenge of evaluating technology for plants that already existed. And even in that case, fine mesh screens were not determined to be BTA. Here, the State Board has the opportunity to set BTA for desalination plants that have not yet been built. As described in Section E above, subsurface intakes have not been scientifically proven to protect against both entrainment and impingement, and thus subsurface technology should be determined to be BTA.	This comment essentially states that because subsurface intakes are not proven, subsurface intakes should be designated as best technology available as defined in the Clean Water Act. A response to such a contradictory statement is unnecessary; however responses relating to subsurface intakes as best available technology are presented in response to comments 21.52, 21.53, 21.54, 21.55, 21.56, 21.57, 21.58, and 21.77.
21.60	If Fine Mesh Screens are used, Screen Size Should be .5 mm or Smaller (if they are Shown not to Exacerbate Impingement Mortality). The Amendment currently has a placeholder for the recommended screen size and the State Water Board is seeking input on whether the screen size should be designated as .5mm, .75mm, or 1.0mm. Although the State Water Board is seeking comment on screen size, its own conclusions in the SED seem to give the answer. The SED states: "Section 13142.5(b) requires that the Ocean Plan consider all forms of marine life, regardless of size. Subsurface intakes are more protective of marine life than surface water intakes. However, when subsurface intakes are proven to be infeasible, small slot-sized screens will protect larger juvenile and adult organisms (particularly fishes) from entrainment." But that is not the end of the question. There may still be impingement of organisms that result in mortality, and the impingement rate may be dependent on slot size and intake velocity. Therefore, we think that the reduction in entrainment may not equate to a reduction in mortality. While studies have concluded that "effectiveness of both fine-mesh screens and wedgewire screens in reducing entrainment is a function of the screen slot size" and that "(e)ntrainment decreases as the screen slot size decreases and the size of the fish increases" the size of the fish is not the only factor. The effectiveness of a given screen in preventing	As stated in response to comment 21.53, surface water intakes are an alternative when subsurface intakes are determined to be not feasible. As described in the Staff Report with SED, surface water intakes can be designed to minimize or eliminate impingement and minimize entrainment related mortality. But it is expected that there will be some marine life mortality associated with a facility even after the best available site, design, and technology measures are implemented. Section 8.3 of the Staff Report with SED describes studies on the effects of screen size that suggest smaller screen sizes may be more protective of marine life. However selection of screen slot size and intake velocity represent a balance between protecting aquatic life and maintenance and production needs as described in Section 8.3 of the Staff Report with SED. See responses to comments 21.61 and 15.4.

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	entrainment is largely dependent on the species, and specifically on their head capsule dimensions. Different species have different morphology that play an important role in whether a given screen size will protect against entrainment. For example, fish such as anchovies and flatfish that are laterally compressed have higher entrainment rates than fish such as sculpins and rockfishes of the same length because anchovies and flatfish have smaller head capsule dimensions. Thus the State Water Board should be cautious when presented with arguments that larger screen sizes have proven effective in preventing entrainment of a certain species and should remember the Water Code charge to reduce intake and mortality "all forms of marine life."	
21.61	The velocity control is also an important factor to consider when evaluating whether mesh and wedgewire screens are effective at reducing impingement. We are concerned that the draft Amendment sets intake velocity at 0.5 foot per second for screened surface intakes. That is an intake velocity set by EPA to minimize the impingement of marine life that have developed swimming capability. Tests have shown that most fish can swim away from that velocity and avoid impingement on the screen. However, that isn't the case for developing organisms who are exposed to entrainment; "(m)ost larval and juvenile organisms are not developed enough to swim and avoid entrainment and may be susceptible to entrainment through even small slot sized intake screens." Because of this reduced mobility, we are concerned that the proposed 0.5 foot per second intake velocity limit will not protect larval and juvenile marine life from impingement.	The only flow velocity through a screened surface intake that would fully protect all aquatic life from impingement and entrainment is zero; however, that would prevent a facility from withdrawing seawater. With that understanding, U.S. EPA considered multiple factors including fish avoidance and swim velocity as well as mechanical efficiencies necessary in establishing the value of 0.15 meters per second or 0.5 feet per second in chapter III.L.2.d.(1)(c)iv. We understand that not all forms of marine life will be protected using fine-mesh or wedgewire screens in combination with low velocity intakes. But Water Code section 13142.5(b) does allow for mitigation measures. See response to comment 21.57.
21.62	Further, the efficacy of "cylindrical" screen housings is in large part a function of the difference between "approach velocity" and "intake velocity." That is, if the approach velocity is significantly greater than the intake velocity, the organisms may be swept of the screen housing. But it would seem extremely rare to find a circumstance in the ocean where the approach velocity would be faster than the intake velocity. California's diverse marine species and habitats support complex ecosystems with high diversity. "These biologically diverse species are extremely valuable from an ecosystem standpoint as well as being a key	Comment noted. The State Water Board has considered all factors associated with screen size in formulating the proposed Desalination Amendment. As stated in response to comment 21.57, the proposed Desalination Amendment does not include requirements for return of impinged organisms, but does require that impingement-related mortality be mitigated for. Please see response to comment 15.4 for more information about the selection of screen slot size.

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	contributor to California's economy." If the State Board decides to allow screened surface intakes, then a slot screen size of .5 mm or smaller should be required after a showing that they can be designed to safely return impinged organisms.	
21.63	Design Capacity is a Critical Consideration for Minimizing the Intake and Mortality of Marine Life. It is critical that the State Board include design capacity as a factor to be considered under the best available design analysis. The State Board must interpret every factor in § 13142.5(b) and harmonize each factor. Statutory interpretation dictates that "[s]ignificance should be attributed to every word, phrase, sentence and part of an act in pursuance of the legislative purpose, as the various parts of a statutory enactment must be harmonized by considering the particular clause or section in the context of the statutory framework as a whole." Again, Section 13142.5(b) requires the best available design be used to minimize the intake and mortality of marine life - designing a facility with a production design capacity to accommodate subsurface intakes is the best available design. In interpreting § 316(b), the U.S. EPA has determined that the technology, design, location, and capacity, must be assessed in conjunction with the other factors. The State Board agrees with the U.S. EPA's statutory interpretation, and finds the same reading is appropriate under Section 13142.5(b). Chapter III.L.2.a.(2) states that "the regional water board shall consider all four factors collectively, and include the best combination of alternatives that in combination minimize intake and mortality of marine life."	The size of a facility and a facility's intake capacity were added to chapter III.L.2.c of the proposed Desalination Amendment. Intake capacity is one of the most important factors when assessing impacts associated with surface water intakes because the amount of water a facility withdraws through a screened surface intake is directly related to the amount of operational mortality. The proposed Desalination Amendment provides adequate harmony and direction for the regional water boards to assess the four factors individually and together to ensure the facility is protective of all forms of marine life. The State Water Board is not, as the commenter asserts, constrained by the Clean Water Act section 316(b) and associated interpretations and case law in interpreting Water Code Section 13142.5(b) for the proposed Desalination Amendment. Clean Water Act section 316(b) and the conclusions of US EPA or the State Water Board pursuant to the OTC Policy do not serve as the legal foundation for the proposed Desalination Amendment, nor are they directly applicable.
21.64	To understand how each of the four factors should best be combined, the State Board should look to the U.S. EPA for guidance. The U.S. EPA General Counsel has provided guidance to the State Board on using design capacity to minimize the intake and mortality of marine life: "Since the magnitude of entrainment damage is frequently a function of the amount of water withdrawn, the only way that massive entrainment	Agree that the volume of water withdrawn is a major factor when quantifying impacts from surface water intakes and we have included intake capacity in design considerations as described in response to comment 21.63. However, as noted in response to comment 21.29 above, U.S. EPA's interpretation of Clean Water Act section 316(b) does not apply to interpretation of the California statute. The legal foundation associated with the proposed Desalination Amendment

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	damage can be minimized in many circumstances is by restricting the volume of water withdrawn..." The EPA has determined that restricting the volume of water withdrawn by a facility is one appropriate way to meet the BTA standard of CWA § 316(b) The State Board should make the same determination and incorporate design capacity as the best available design.	instead relies on plain language of the California statute and case law interpreting Water Code section 13142.5(b).
21.65	The technical feasibility of subsurface intakes and infiltration galleries has already been demonstrated internationally - including in nations with standards similar to the Clean Water Act's BAT standard. As the State Board has already concluded: "[b]each galleries specifically have design potential for large scale facilities, and have been demonstrated to be able handle large volumes of water." With infiltration galleries demonstrated to be technically feasible, the State Board should require flow restrictions to a facility's design capacity to achieve BAT. In fact, designing a facility to produce a certain amount of freshwater, and consequently withdrawing a certain amount of seawater, may be the only "design" consideration with any relevance to the goal of minimizing the intake and mortality of all forms of marine life. Statutes relating to the same subject matter should be read together in a manner that harmonizes them whenever possible. Therefore, the State Board should include design capacity as the best available design for minimizing the intake and mortality of marine life.	Disagree. Technical feasibility of subsurface intakes (either galleries or wells) may not be demonstrated in all coastal areas in California. Intake capacity has been added as a factor of design considerations as discussed in response to comments 21.63 and 21.64. Note that the Clean Water Act standard commonly referred to as "BAT" usually refers to Clean Water Act section 301(b)(2)(A), a technology-based standard for applying effluent limitations for toxic and non-conventional pollutants in NPDES permitting. The closest analog to Water Code section 13142.5(b) is Clean Water Act section 316(b) that requires cooling water intake structures to employ "best technology available for minimizing adverse environmental impact" (sometimes shortened to BTA). BTA may have been the intended reference, but it is still distinct and not directly applicable. Water Code section 13142.5(b) directs that "the best available site, design, technology and mitigation measures feasible shall be used to minimize the intake and mortality of all forms of marine life." Despite similar terminology, each standard is unique, and cannot be used interchangeably or out of context with other governing authorities. See, response to comment 21.29 above.
21.66	The Best Available Design Accommodates the Best Available Technology. The best design capacity should be defined as the maximum amount of produced water achieved using the best available technology at the best available site - because that will best minimize the intake and mortality of marine life. Statutory interpretation requires the State Board to interpret and harmonize every factor in §13142.5(b).	Size and intake capacity were added to chapter III.L.2.c of the proposed Desalination Amendment. See also response to comment 21.3.
21.67	Zero design capacity is not the best available design. There is an argument to be made that if design capacity was included under the best	Disagree. The emphasis on intake capacity over other factors would affect and influence the analysis of the best combination of factors that

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	available design analysis, then the best available design would be a zero MGD desalination facility. We agree this would be an absurd result, but disagree that the best available design is a zero design capacity. Instead, the best available design is that which is compatible with a feasible output from subsurface intakes - thus establishing a design performance standard of zero marine life mortality but not zero production. As noted before, "minimize" does not necessarily mean reduce to zero - but reducing to zero, or close to it, is certainly "minimizing." This standard can be met by implementing the best available technology, which would not result in a zero MGD capacity facility. As illustrated in facilities elsewhere, subsurface intakes can supply relatively large desalination facilities. And recent discussions over the feasibility of a SIG for the proposed Huntington-Poseidon facility have concluded that a "Fukuoka-style" SIG can be replicated in modules to produce more source water than a single SIG. As discussed above, subsurface wells and subsurface infiltration galleries have both been demonstrated to be feasible technologies for "large scale" desalination facilities. To ensure the best available design does not achieve absurd results, we request the State Board define design capacity as the maximum amount of capacity achieved using the best available intake technology at the best available site for that technology.	treats site, design and technology equally. See responses to comments 21.3, 21.63, 21.64, 21.65 and 21.66 above.
21.68	Regulating the Design Capacity of a Facility does not Impose Limits on Local Water Supplies. Requiring project proponents to consider design capacity as the best available design does not limit local jurisdictions in their selection water supplies. Water supply agencies are granted the authority to develop water projects - but not water projects that violate State or federal law. For example, a water agency could not argue that enforcement of the Endangered Species Act, if it interfered with a water development project in any way, would constitute an intrusion on their sole authority." The only difference here is that the Porter-Cologne Act, as codified in the Water Code section 13142.5(b), specifically mandates the regulation of seawater withdrawals for these facilities. The Ocean Plan amendment is	See response to comment 21.67. Capacity is given consideration in section III.L.2.b(2) of the proposed Desalination Amendment and requires design capacity to be consistent with regional need as determined by a county general plan, integrated regional water management plan, or an urban water management plan or other planning documents if these plans are available. In other words, there must be a specific need for the facility and a basis for the intake capacity and size. See also response to comment 21.3

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	simply enforcing State law, and to the extent it may require modification of a water development project, it is not an intrusion on a water agency's sole authority. As drafted, and even with our requested edits, the water agency still has the opportunity to develop a seawater desalination facility and is only constrained by the mandates of State law - if they are constrained at all.	
21.69	Further, as discussed in the introduction to this comment letter, California has ample alternative water supplies to be implemented before desalination is necessary. Furthermore, a plain reading of Section 13142.5(b) finds the Legislature did not intend water supply concerns to be considered when conducting the "best available" analysis. And finally, a desalination facility's ability to take seawater is not a right, but rather a privilege that the public provides. The public trust doctrine provides that tidelands, the beds of navigable waterways and other natural resources are held in trust for the public by the state. The state holds these rights in trust for the public. Thus, design capacity restrictions relating to public trust rights of seawater cannot conflict with a local government's authority over water supplies, because the project proponent never had the right to use the property for non-public trust uses. While placing design capacity restrictions on the intake of seawater does not conflict with any local authority, we understand the State Board's concern. To alleviate concern, we suggest the State Board be clear that reduced design capacity be limited to public trust seawater influent. The State Board should be explicit that the design capacity for the intake of seawater shall be reduced to accommodate the best available technology, but protect proponents can increase its overall capacity from other source water, such as comingling treated wastewater with the seawater intake. As such, we recommend the following revisions to Chapter III.L.2.c. [of the proposed Desalination Amendment]: "The Regional Board shall require the best available design. Design is the size, layout, form, and function of a facility, including the production capacity, and the configuration and type of infrastructure, including intake	The requested change was made to chapter III.L.2.c of the proposed Desalination Amendment with minor edits. Rather than production capacity, the intake capacity was included because intake bears a direct relationship with intake and mortality of all forms of marine life. See also responses to comments 21.3 and 21.63.

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	and outfall structures. --The regional water board shall require that the owner or operator perform the following in determining whether a proposed facility design best minimizes intake and mortality of marine life.—	
21.70	The Owner or Operator of the Desalination Facility Should not be Responsible for Determining the Best Available Design. The proposed "best available design" analysis is severely lacking any real consideration of the best available design for minimizing the intake and mortality of marine life. Section L.2.c. states that the "regional water board shall require that the owner or operator perform the following in determining whether a proposed facility design best minimizes intake and mortality of marine life." First, the draft Amendment should clarify that the information provided by project permit applicants to the Regional Boards is to be carefully scrutinized. The draft needs clear direction, and elimination of any ambiguity or implication that a project proponent's own analysis of alternative designs is not afforded undue weight. We have seen in the past that allowing the project proponent to narrowly define the purpose of the project and, then design their facility to best accommodate their own self-defined limited purpose, leads to permits that do not meet the requirements under 13142.5(b). We request the State Board require regional boards to determine the best available design for a proposed protect, in consideration of the specific purpose to design a facility that is compatible with the best available technology at the best available site to collectively minimize the intake and mortality of all forms of marine life. Any other project goal or project design to meet that goal, would not meet the mandates of Water Code section 13142.5(b).	Disagree. See response to comment 21.5. The proposed Desalination Amendment considers the best available alternative feasible for all factors described in Water Code section 13142.5(b) and then requires an owner or operator to use the best combination of alternatives that collectively minimize intake and mortality of all forms of marine life. Mitigation is considered after best available site, design, and technology measures feasible are implemented. But site, design, and technology are all weighted equally. Moreover, the proposed Desalination Amendment is clear that the regional water board has responsibility for review and approval of information submitted as part of a section 13142.5(b) analysis based on information submitted by the owner or operator.
21.71	Design Factor (1) is a Site Consideration Already Analyzed Under the "Best Available Site" Determination. Avoiding sensitive habitats and sensitive species is a site consideration - not a design consideration. Section L.2.c.1 [of the proposed Desalination Amendment]. requires the owner or operator at each potential site to	Disagree. The provision should be considered under both factors since they require slightly different evaluations. The language in chapter III.L.2.b requires an analysis that would compare the presence, abundance, diversity, etc. of sensitive habitats and species present at the site alternatives. The analysis would then compare various site options and establish the best available site to avoid impacts to

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	"analyze the potential design configurations of the intake, discharge, and other facility infrastructure to avoid impacts to sensitive habitats and sensitive species." That sounds a lot like consideration (2) of the site analysis: "[a]nalyze the feasibility of placing intake, discharge, and other facility infrastructure in a location that avoid[s] impacts to sensitive habitats and sensitive species." We agree that the best available site analysis should avoid impacts to sensitive habitats and sensitive areas, but repeating the same consideration under the design analysis is inappropriate and does not meet the legal requirements of best available design. There is only one "design" criteria we can think of that would improve the goals of the law beyond what a proper site and technology would achieve - design the production capacity to ensure compatibility with the best site and technology. We request the State Board remove Factor (1) from the best available design analysis since it is already -- and most appropriately - addressed in the best available site analysis.	sensitive habitats and sensitive species, which would also minimize intake and mortality of all forms of marine life. For example, a comparison of two sites may elucidate that one site has 90 percent cover of rocky reef habitat and 10 percent barren sandy bottom habitat, that cannot accommodate for subsurface intakes, and another site with only 20 percent cover of rocky reef habitat and 80 percent barren sandy bottom habitat that can accommodate a subsurface intake. The language in chapter III.L.2.c requires an analysis of potential design configurations that would avoid impacts to sensitive habitats and species at each potential site. For example, a given site may have an area with rocky reef and barren sandy bottom habitats. The provision in the design section would suggest the intake be designed and constructed in the barren sandy bottom habitat away from the rocky reef. Similarly, design considerations such as raising the diffuser nozzles >1.0 m off the seafloor versus 0.5 m off the seafloor, or angling the diffuser at 60 degrees versus 45 degrees can reduce the suspension of benthic sediments and consequently avoid impacts to sensitive habitats and sensitive species would also be considered in chapter III.L.2.c.
21.72	Design Factor (2) is a Technology Consideration Already Analyzed Under the "Best Available Technology" Determination. Section L.2.d [of the proposed Desalination Amendment] preamble clarifies that: "Technology is the type of equipment, materials and methods that are used to construct and operate the 'design' components..." Analyzing intakes in order to minimize the Area Production Foregone is already a consideration under the best available technology consideration. Section L.2.d.1.a already requires sub-surface intakes if feasible, and sub-surface intakes are already accepted as the best technology in minimizing the intake and mortality of marine life (measured by APF). Alternatively, section L.2.d.1.c.ii.states that in "order to reduce entrainment, all surface water intakes must be screened with a [0.5 mm/0.75mm/l.0mm] or smaller slot size screen when the desalination facility is withdrawing seawater." Additionally, subsection (d) states that in "order to minimize impingement, through-screen velocity at	Disagree. There is no reason not to consider the same potential impact in evaluating design or technology.

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	the surface water intake shall not exceed .15 meters per second." All of these provisions combined minimize the Area Production Foregone - and no further analysis is needed to minimize the intake and mortality of marine life. Repeating these two technology considerations under best available design Factor (2) does nothing additional to minimize the intake and mortality of marine life. There is only one "design" criteria we can think of that would improve the goals of the law beyond what a proper site and technology would achieve - design the production capacity to ensure compatibility with the best site and technology. We request the State Board remove Factor (2) from the best available design analysis since it is already- - and most appropriately - addressed in the best available technology analysis.	
21.73	Design Factors (3- 5) [in the proposed Desalination Amendment] are the Same Consideration Repeated and Re-worded. The best available design Factors (3 - 5), are essentially the same considerations repeated. These factors require: "(3) Design the outfall so that the brine mixing zone* does not encompass or otherwise adversely affect existing sensitive habitat.* (4) Design the outfall so that discharges do not result in dense, negatively-buoyant plumes that result in adverse effects due to elevated salinity* or anoxic conditions occurring outside the brine mixing zone.* An owner or operator must demonstrate that the outfall meets this requirement through plume modeling and/or field studies. Modeling and field studies shall be approved by the regional water board in consultation with State Water Board staff. (5) Design outfall structures to minimize the suspension of benthic sediments." As discussed below, we don't believe any of these factors are appropriate	Disagree. Each of the three factors attempts to reduce or minimize the impacts associated with a unique issue. Combining the independent considerations into one would create confusion and may result in the oversight of an important consideration. In addition, brine discharge relates to mortality and is not outside the scope of Water Code section 13142.5(b). See response to comment 21.74.

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	to analyze the best available "design" to minimize intake and marine life mortality - they are not clearly related to the intake and mortality of marine life, but rather to the discharge of brine. Nonetheless, if Factors 3-5 are considered "design" considerations, each of these elements are essentially the same consideration and should be incorporated into only one factor. "Brine mixing zone[s]", "negatively-buoyant plumes", and "suspension of benthic sediments" are all essentially the same consideration - design the outfall to minimize the impacts of the associated brine plume. There is no need to be repetitive and expand this one consideration into three separate factors. But more to the point, these three considerations are already covered by the performance standards for brine diffusers. This subsection merely identifies the benefits of the performance standards in terms of best intake, which is both confusing and unnecessary. It is evident that the State Board struggled to develop appropriate design criteria to determine the best available design to minimize intake and mortality of marine life. We request that the State Board, at a minimum, analyze Factors (3- 5) as only one factor.	
21.74	Design Factors (3- 5) [in the proposed Desalination Amendment] Have Nothing to do with Minimizing the Intake and Mortality of Marine Life. Designing an outfall to prevent toxic brine plumes is a laudable goal, but it has nothing to do with Section 13142.5(b)'s requirement of minimizing the intake and mortality of marine life. The best available design factors (3 - 5) all require the outfall to not have a negative discharge plume. While a discharge plume has adverse impacts on marine life, minimizing those impacts is not the same as "minimizing the intake and mortality of marine life." We request the State Board move Factors (3- 5) to Section L.2.d.2. and incorporate into the considerations for brine discharge technology if the current language in that sub-section needs any additional clarification.	Disagree. Brine discharge, while not directly related to intake of marine life, is nonetheless appropriately considered as part of the Water Code section 13142.5(b) analysis since it may result in mortality of marine life. The Court in the *Surfrider* decision interpreted the statute's use of "intake and mortality" to mean that "the collective set of measures . . . must serve to reduce both intake and mortality. . . . If one such measure contributes only to reducing the intake of marine or to reducing the mortality of marine life, the measure may still be used, in combination with other measures, to fulfill the statutory requirements." (italics in original) *Surfrider*, at 576. Thus, design features of outfall structures that minimize mortality of marine life, including those described in chapter III.L.2.c.(3), (4) and (5), are salient to determinations about a facility otherwise subject to the statute.
21.75	The Best Available Site Should Accommodate the Best Available Technology.	See response to comment 21.77.

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	We think the analysis of the best available site necessarily starts with the "best available technology. "It is undisputed that sub-surface wells eliminate the intake and mortality of all forms of marine life to any measurable degree. While the law doesn't mandate complete elimination of intake and mortality, a technology that would achieve that degree of minimization is clearly the "best." Nonetheless, a Subsurface Infiltration Gallery (SIG) effectively minimizes intake and mortality of marine life to the same degree. The difference in minimizing marine life mortality between a subsurface well and a SIG is the potential mortality associated with construction and maintenance of a SIG. However, as articulated in the *Riverkeeper* cases, a range of performance is allowable and justifiable to define "best" because measuring the efficacy of a technology will show different results at different times - therefore measuring the efficacy of different technologies is allowed if it is within that range of performance bounded by the margin of error. The court established that "range" for a performance standard to be effectively equitable as 10% - and the OTC Policy adopted that range. The operation of either wells or a SIG is assumed to minimize intake and mortality 100%	
21.76	But the mortality from construction and maintenance of a SIG is difficult to calculate because monitoring and measuring the impact is nearly impossible. So, the efficacy is equitable within a margin of measuring and monitoring error. And because a SIG is "available" without the hydro-geological constraints of siting wells, it is arguably the "best available" and should be used to set the performance standard.	See response to comment 21.77.
21.77	Finally, surface intakes, whether screened or not, are not equitable to sub-surface intakes and are not to be considered "best available technology." However, as noted in the OTC Policy's analysis, where sub-surface intakes are proven to be "not feasible", screened intakes may be part of a suite of alternatives that, in combination, may achieve an equitable minimization of the intake and mortality of marine life as that of a SIG. However, the choice of the defined "best available technology" allows permitting the facility without any monitoring requirements and	The factors set forth for considering the best available site and best available design are included in order to inform decision-making within the context of determining the best collective set of measures to minimize intake and mortality of marine life. Case law interpreting Clean Water Act section 316(b) and use of performance standards expressed as ranges (as part of delineating “best technology available”) does not address the statute in question (Water Code section 13142.5(b)), where technology is just one of four factors to be used in minimizing intake and

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	conditions that the intake technology may have to be changed if the alternative technology(s) fails to meet the performance standards.	mortality of marine life. See, response to comment 21.29 above. Requiring a specified performance standard is neither practicable nor appropriate for a framework of combined factors when considering proposed desalination facilities within this analytical framework.
21.78	To be consistent with the Ocean Plan amendment directive that the elements of section (b) be considered individually and in combination, the best technology needs to be considered in combination with the best available site. And if that combination is to collectively achieve the goal of minimizing the intake and mortality of all marine life, these elements need to be compatible - they must work together to achieve the goal. The performance standard for the "best available technology" established in the Ocean Plan should be the determining factor in defining "best available site." The Ocean Plan draft should that the "site" of a facility is "best" if it is compatible with the installation of a sub-surface intake. The "best sites "for the use of wells is limited by the availability of seawater aquifers and arguably not the "best available" under one interpretation of that phrase. However, the "best sites" for the use of a SIG are much more "available." A SIG can be sited in areas where there is enough open sandy-bottom habitat to accommodate the size of a gallery or multiple galleries. And while some places are preferable for reducing potential maintenance and repairs, areas where a SIG can be constructed are readily available statewide, and any SIG (regardless of maintenance and repairs) is equitable for minimizing the intake and mortality of all forms of marine life. Reducing maintenance and repairs are considerations for optimal sites for reasons other than minimizing the intake and mortality of all forms of marine life. What is optimally "feasible" is what is the best for minimizing the intake and mortality of all forms of marine life, and any unavoidable maintenance and repairs does not render a site infeasible. In fact, surface intakes for power plants require regular maintenance and repairs, including an occasional shut-down of the facility altogether. Yet these surface intakes are clearly feasible - although it's also clear they are not the "best."	Disagree. The proposed Desalination Amendment states that all owners and operators shall consider subsurface intakes for all facilities unless otherwise determined to be not feasible (as described in response to comment 21.41) by the regional water board.
21.79	There are arguably other considerations for what may be the "best site"	Disagree. Water Code section 13142.5(b) requires "the best available

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	for a facility - for example consolidating industrial facilities, avoiding special terrestrial habitats and species, co-locating with a sewage treatment plant for dilution water, etc. But for achieving the section 13142.5(b) legislative intent of minimizing the intake and mortality of all forms of marine life, the best site available is a site that is compatible with the best technology available. The State Board should clearly articulate a baseline for minimization of the mortality of all forms of marine life lost to an open intake, and a reasonable performance standard established as a range between 100 and 90 percent reduction of intake and mortality from the baseline. Further, the guidance should clarify that the "best site" is determined by the site's compatibility with technologies that achieve the performance standard.	site, design, technology and mitigation measures feasible. . . " Requiring the best combination of measures that collectively minimize mortality does not mandate either a baseline or a performance standard based upon one of the four statutory factors. See response to comment 21.77
21.80	An important issue missing in the draft feasibility analysis of alternative sites, that has come up repeatedly in past permit applications, is the scope of the area considered reasonable for alternative sites. To date, the geographic scope of the alternative site analysis has been determined by a project proponent's self-defined and narrow "project purpose." And consequently, the proposal has never looked far for alternative sites that may be compatible with a SIG or well. As part of the feasibility analysis, the draft amendment should add a sub-section to clarify the geographic scope of alternative sites available to ensure consistency in Regional Board decisions and to ensure full enforcement of section 13142.5(b).	Disagree. The scope of the area under consideration would most likely be located in the area where the community water system is lacking in alternative water supplies. Promoting the development of a desalination project in other areas would defeat the purpose of the project since the water supply would not be provided where it is needed. While some fully developed areas may have existing infrastructure to transfer or pump water many tens of miles, many small communities along the coast are isolated and without benefit of large regional systems.
21.81	We recommend the geographic scope of alternative sites be bounded by practical constraints to moving the water from the production site to the point of demand. And for further clarification, this practical boundary does not imply that the actual water molecule needs to travel through distribution infrastructure from the point of production to the point of consumption - rather it is simply possible, or even common, to "transfer" water across jurisdictions. From experience, we know this is an important issue when defining the feasibility of different sites to ensure the "best." We recommend that a section devoted to this consideration, with recommended language to codify the rule, and that the State Board consider the language and invite	Disagree with the need to provide greater specificity on the issue of siting and feasibility. See response to comment 21.80 above. Resource decisions about water use and transport are outside the scope of the proposed Desalination Amendment.

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	public comment before adopting it into the Ocean Plan amendment.	
21.82	The Best Available Site Should Minimize Impacts to Marine Protected Areas and Other Special Protected Areas. To ensure the long-term success of California's MPA network, it is critical that desalination facilities be sited appropriately. Desalination plants with infrastructure sited in or near MPAs would likely result in significant impacts from intakes and brine discharge to resources, similar to impacts from power plant intake and discharge sites. Furthermore, desalination plants sited in proximity to MPAs may reduce larval connectivity between protected areas through entrainment and impingement, thereby compromising the effectiveness of the broader network. Given the potential impacts of desalination projects on protected areas, we fully support the unambiguous directive in Chapter III.L.2.b.6. of the draft Amendment that intake and discharge structures for desalination facilities will not be located within MPAs or State Water Quality Protected Areas (SWQPAs). We also support the statement that discharges should be sited at a sufficient distance as to have no impacts on MPAs or SWQPAs; however, the criteria for avoiding impacts from discharges is currently limited to salinity. While salinity and brine dilution levels are a top concern, impacts of chemicals used in the desalination process also need to be evaluated. The State Board should establish additional criteria - such as thresholds for chemicals like coagulants and anti-foulants - that will be used to determine that discharges are having no impact on protected areas.	The proposed Desalination Amendment language and existing Ocean Plan requirements are adequately protective of MPAs from all impacts associated the intakes and discharges from coastal desalination facilities (please see response to comment 6.4). Please see response to comment 26.2 and section 8.8 of the Staff Report with SED for more information why additional thresholds for antiscalants, biocides, and cleaning in place liquids are not addressed in the proposed Desalination Amendment.
21.83	We also appreciate and support the statement that, to the extent feasible, intakes shall be sited to maximize the distance from MPAs and SWQPAs. However, consistent with CEQA requirements and other state laws such as the Coastal Act, potential impacts on important ecological features, such as a kelp bed, canyon head or other productivity hot spot, should be analyzed and addressed even if they occur outside of a protected area. We recommend the State Board revise section L.2.b.6 of the desalination policy to include the statement that "Intakes should be sited to minimize	Disagree. The proposed Desalination Amendment includes criteria to avoid siting infrastructure in sensitive habitats that are defined to include kelp beds, surfgrass beds, eelgrass beds, and other sensitive habitats. In addition, the California Coastal Commission under the authority of the Coastal Act, California Department of Fish and Wildlife, State Lands Commission, and other resource trustees participate in the siting approval process. These other agencies have independent authorities to address site selection in relation to sensitive habitats and

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	impacts to important ecological features in addition to maximizing their distance from MPA and SWQPA boundaries."	protected species. The existing requirements in the proposed Desalination Amendment are protective of these areas.
21.84	Additionally, the Board will need to reconcile the language in the recently approved Ocean Plan amendment that creates a new designation to protect water quality within MPAs (State Water Quality Protection Areas -General Protection, SWQPA-GP) with the language in the desalination amendment. The SWQPA-GP amendment states that "[n]o new surface water seawater intakes shall be established within a State Water Quality Protection Area - General Protection" and goes on to state that this "does not apply to sub-seafloor intakes where studies are prepared showing there is no predictable entrainment or impingement of marine life." This language is inconsistent with section L.2.b.6 of the proposed desalination amendment, which prohibits any intake structures within MPAs and SWQPAs. The approach in the draft desalination amendment is preferable, given that a facility with a subsurface intake would still have discharges with adverse effects that should not occur in a SWQPA or MPA. To ensure benefits from MPAs are realized and SWQPA designations are fulfilling their purpose of protecting water quality within these refuges, we recommend the State Board adjust section E.5.d.2 of the SWQPA amendment to match the related provision in section L.2.b.6 of proposed desalination amendment prohibiting all intake structures within MPAs and SWQPAs.	Agree that there is a need for consistency between the two sections. Chapter III.E.5.d.2 of the Ocean Plan (Implementation Provisions for Marine Managed Areas) was revised to be consistent with chapter III.L.2.b.6. See Appendix A of the Staff Report with SED.
21.85	Exempt Expanded Facilities from the Site Analysis Under 13142.5(B). It is prudent public policy to allow already constructed facilities, and that those deemed "expanded facilities" under the Policy, be exempt from the Section L.2.b. analysis. The State Board is proposing that "Chapter III.L.2 (Water Code § 13142.5(b) Determinations for New and Expanded Facilities: Site, Design, Technology, and Mitigation Measures) applies to new and expanded desalination facilities withdrawing seawater." Furthermore, the State Board defines an "expanded facility" as an "existing facility" which either increases the amount of seawater intake or changes its design.	Disagree with the contention that the California Legislature modeled Water Code section 13142.5(b) after the federal Clean Water Act section 316(b) as there is no evidence to support that contention in the record or legislative history. Disagree to include language that the "best available site for expanded facilities is the site already selected" for the reasons stated in response to comment 21.18.

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	We agree that the State Board has the authority to require expanded but existing facilities to evaluate the best available site post-construction. Water Code Section 13142.5(b) is clear that expanded facilities need to achieve the best available site, design, technology, and mitigation measures feasible. There is no clear intent by the Legislature that expanded but existing facilities be exempt from any of these factors to minimize the intake and mortality of marine life. The California Legislature likely modeled Section 13142.5(b) after the federal Clean Water Act section 316(b). Like Section 13142.5(b), CWA Section 316(b) does not exempt expanded - or even existing- facilities from the required best available site determination. The U.S. EPA considers "site" as one of the most important factors in minimizing adverse impacts from ocean withdrawals, because "many adverse impacts can be avoided simply by not siting the intake in areas of sensitive or important natural resources." But section 13142.5(b), as interpreted in the draft Amendment, combines site, design and technology to collectively minimize the intake and mortality of all forms of marine life and goes beyond just avoiding sensitive habitat areas - as it should. So the Amendment provides an excellent opportunity to require the best available site, because the policy will be adopted before the majority of facilities are built. The U.S. EPA agrees that selecting a site where the best available technology may be used "is likely to be easier for a new facility than an existing facility." Yet even for an existing facility, EPA believes alternatives sites "must be considered...because it may be possible in some cases to reduce impacts by replacing an existing [facility] with a new one at a new location." While we maintain that the State Board has the authority to require expanded facilities to choose the best available site, we do not believe it is appropriate at this time to require expanded facilities to comply with the best available site analysis under Chapter L.2.b. Facilities already constructed, but considered an expanded facility, should invest limited resources on implementing the best available design, technology, and mitigation measures to minimize marine life mortality at the existing site.	

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	The State Board should determine that it is impracticable for expanded facilities be required to move to another location. In order to get around the legal requirement that expanded facilities must use the best available site, we suggest the State Board limit the site analysis for existing and expanded facilities to the property where the facility has already been built. The State Board can limit this analysis by stating a very specific and narrow rule that the "best available site for expanded facilities is the site already selected", and find that requiring a constructed facility to move to another location is "infeasible." The State Board should not require expanded facilities to move locations, but an expanded facility should be required to site its intake, discharge, and other facility infrastructure at the pre-selected site to minimize intake and mortality of marine life and avoid impacts to sensitive habitats and sensitive species.	
21.86	After-the-Fact Restoration is not Mitigation. Allowing mitigation to restore marine life mortality after-the-fact is counter to the Water Code. The Amendment Section III.L.2.e. states that the best available mitigation is "the replacement of marine life or habitat that is lost due to the construction and operation of a desalination facility after minimizing marine life mortality through site, design, and technology measures." We agree that the best available mitigation should be implemented after minimizing marine life mortality through site, design, and technology measures. However, attempting to replace marine life that is lost due the activity of a desalination facility is not an appropriate way to minimize mortality. Indeed, federal courts have concluded that after the fact restoration cannot be used "in-lieu" of the best technology available. The *Riverkeeper* I Decision Finds After the Fact Restoration Illegal. As the State Board is well aware, the Clean Water Act prohibits the use of "restorative" or "corrective" measures (that is, "after the fact" mitigation measures) to meet the section 316(b) best available technology requirement. The Second Circuit has definitively affirmed that the	Disagree. Water Code section 13142.5(b) is different from CWA section 316(b) in that CWA section 316(b) applies only to new and existing cooling water intakes, whereas Water Code section 13142.5(b) applies to new or expanded coastal powerplants or other industrial installations using seawater for cooling, heating or industrial processing. Desalination facilities are not regulated by CWA section 316(b) because they are not cooling water intakes, but are instead regulated under Water Code section 13142.5(b) as industrial installations using seawater for industrial processing Mitigation is treated differently under CWA section 316(b). Where courts have interpreted CWA section 316(b) as not allowing restoration measures as a substitute for best technology available for minimizing adverse environmental impacts, Water Code section 13142.5(b) specifically names mitigation measures as a one of four elements to minimize impacts to marine life resulting from seawater intakes. Federal case law interpreting Clean Water Act (CWA) section 316(b) does not control interpretation of Water Code section 13142.5(b). See, response to comment 21.29 above. *Surfrider*, interpreting the California statute, expressly found that "the

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	technology requirement of section 316(b) cannot be satisfied with "after-the-fact" mitigation. As the court explained in the first *Riverkeeper* case: "Reclaiming abandoned mines to reduce acid mine drainage into the waterbody, removing barriers to fish migration, and creating buffers to reduce destructive runoff from agricultural lands,...however beneficial to the environment, have nothing to do with the location, the design, the construction, or the capacity of cooling water intake structures, because they are unrelated to the structures themselves. Restoration measures correct for the adverse environmental impacts of impingement and entrainment; they do not minimize those impacts in the first place." Beyond the plain language of the statute, the Second Circuit cited supporting legislative history, prior agency interpretation of section 316(b), and EPA's own statements concerning the significant complexity and difficulty of "planning, implementation, and evaluation of restoration measures for populations of aquatic organisms and ecosystems as a whole." For all of these reasons, the court rejected EPA's argument that restoration measures are a permissible consideration in determining best available technology.	compensatory measure of creating additional marine life habitat . . . can be defined as mitigation." 211 Cal.App. 4th at 577. "Increasing the population of marine life in an ecosystem by restoring wetlands habitat serves as 'abatement or diminution of' the proportion of death to a population of the marine life because it increases the population. Accordingly, restoration of wetlands falls within the definition of mitigation . . . . In this case, it is marine life that is abated or diminished." *Ibid*. In addition, it is important to understand that even after an owner or operator minimizes marine life mortality through best available site, design, and technology measures feasible there will still be some marine life mortality associated with the facility. . Desalination facilities must fully mitigate for all residual marine life mortality that occurs after the best available site, design, and technology measures feasible are used. Mitigation is defined in the proposed Desalination Amendment as "the replacement of marine life or habitat that is lost due to the construction and operation of a desalination facility after [emphasis added] minimizing marine life mortality through site, design, and technology measures." Mitigation will be required for all marine life mortality that occurs after the best available site, design, and technology are implemented.
21.87	In *Riverkeeper* II, the court strongly reaffirmed that allowing compliance with section 316(b) through environmental restoration measures constitutes an impermissible construction of the statute. The court explained that "restoration measures substitute after the-fact compensation for adverse environmental impacts that have already occurred for the minimization of those impacts in the first instance." As such, they are "plainly inconsistent" with the statute's text" and "contradict the unambiguous language of section 316(b)." In short, restoration is not "technology" under section 316(b) and, therefore, cannot take the place of alternative cooling technologies to satisfy that statute's best available technology requirement.	Disagree. The *Riverkeeper* cases interpreting Clean Water Act section 316(b) are inapplicable to interpretation of Water Code section 13142.5(b). See response to comment 21.29 above.
21.88	California Courts will Look to the Interpretation of 316(b) to Interpret Section 13142.5(b).	Disagree. A California appellate court has already rejected use of Clean Water Act section 316(b) jurisprudence in order to interpret Water Code section 13142.5(b). See, response to comment 21.29.

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	In interpreting similar language in section 13142.5(b) of the Porter-Cologne Act, modeled after and partially implementing section 316(b), state courts will look to this federal interpretation, as the State Board wisely did in crafting its OTC Policy. Although section CWA 316(b) does not apply to the intake systems for desalination facilities, section 13142.5(b) of the Porter-Cologne Act is not limited to power plants and it applies equally to industrial installations utilizing seawater. It is illogical for the State Board to interpret section 13142.5(b) not to allow after-the-fact mitigation for power plants while the Desal Policy allows the use of after-the-fact mitigation for other facilities using seawater. Indeed, as it currently stands, existing power plants must come into compliance with the OTC Policy by phasing out their open- ocean intake, while a brand new desalination facility operating under the same statutory provision would be allowed to use mitigation in lieu of satisfying best available site, design and technology requirements. That outcome not only undermines the new OTC Policy, but renders California's marine resource policies incomprehensible. A plain reading of section 13142.5(b), like that of CWA 316(b), precludes interpreting the term "mitigation" as synonymous with, or inclusive of, restorative measures. The language in the Porter -Cologne Act provides that all four elements - site, design, technology and mitigation - whether read holistically or individually - must "...minimize the intake and mortality of all forms of marine life." As explained by the *Riverkeeper* court, and instructive to interpreting 13142.5(b), "restoration measures substitute after-the-fact compensation for adverse environmental impacts that have already occurred for the minimization of those impacts in the first instance." In like fashion, restorative measures, by definition, do nothing to "mitigate" the intake and mortality of all marine life in the first instance. The mere use of the term "mitigation" is not sufficient to justify an interpretation of section 13142.5(b) that is inconsistent with the OTC Policy serving the same purpose. The Amendment must establish clear and unambiguous direction to regional boards to only consider restorative measures after fully enforcing the individual and collective "best" available site design and technology to minimize the intake and mortality of all forms of marine life.	Moreover, *Surfrider* expressly found that mitigation as used in Water Code section 13142.5(b) may include restoration measures that increase the population of marine life in an ecosystem by restoring habitat. See, response to comment 21.86 above.

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	And even then, the calculation and planning of restorative measures must be shown to achieve the performance standards of subsurface intakes. After the fact restoration is not allowed under the law. The State Board should revise the Desalination Policy to ensure restoration is not used in-lieu of the best available site, design, and technology for minimizing intake and mortality of marine life.	
21.89	The ETM/APF Model Contains too Many Scientific Assumptions. Any discussion of the use of ETM/APF for calculating the area of habitat construction/restoration, and even more so for any discussion of a "mitigation fee" based on APF, needs some qualifying assumptions and statements included in the Ocean Plan. Most importantly, it should be made clear that replacement of all forms of marine life is an inherently difficult, if not an impossible task. Experts have created models like ETM/APF to estimate the damage and convert the loss into an area that may create or improve the productivity of marine habitats to replace all the species and life stages of those species. But the experts admit that this model is a "best effort" and not an exact science. The marine environment and ecological systems are too complex and too poorly understood to have complete confidence that habitat restoration or creation will have the desired effect of replacing all forms of marine life lost to a facility. This has been recognized in the science community, the regulatory community and the judicial system. This is the reason it is sound public policy to ensure minimization of the intake and mortality of all forms of marine life in the first place. To the extent minimization achieves or approaches 100% performance, and elimination of the risk to healthy marine ecosystems and the myriad species that support that system is achieved, the task of trying to replace those organisms and maintain ecosystem function is unnecessary. The Amendment should establish clear enforceable standards to ensure the intake and mortality of marine life is minimized through implementation of the best available site, design and technology before	As stated in response to comment 21.86, it is important that desalination facilities fully mitigate for mortality of all forms of marine life. Mitigation is defined as, "the replacement of marine life or habitat that is lost due to the construction and operation of a desalination facility after [emphasis added] minimizing marine life mortality through site, design, and technology measures." Mitigation will be required for all marine life mortality that occurs after the best available site, design, and technology are implemented. No model is perfect; however, the ETM/APF method is the best method for mitigation assessment for the reasons described in section 8.5.1.1 of the Staff Report with SED. Furthermore, the proposed Desalination Amendment includes requirements for confidence intervals to be used for more certainty that the APF is representative of the species in the impacted ecosystem(s) and mitigation ratios to compensate for uncertainties associated with the “imperfect attempts to recreate complex marine ecosystems.”

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	turning to inherently difficult and admittedly imperfect attempts to recreate complex marine ecosystems.	
21.90	The ETM/APF Model Should be Qualified. As noted in the scientific literature, elsewhere in these comments and the Expert Panel workshops, ETM/APF is not an exact method for quantifying the area and types of habitats necessary to effectively replace all forms of marine life lost to the intake of a facility. Nonetheless, we agree it is a superior method for measuring ecological impacts from the loss of the myriad species and life-stages of marine life affected, as compared to an "Adult Equivalency Lost" or "Fecundity Hindcasting" model. Consequently, any attempt to "monetize" a replacement value based on APF must first ensure that the APF calculation is qualified, and the risk of under-compensation (or less than full replacement value) is minimized. The draft Desal Policy takes the first step in ensuring "full replacement value" by mandating a 90 percent confidence level in the APF calculation. The confidence level should be increased to 99 percent, and the acreage calculation should include a greater than 1:1 ratio to ensure against unpredictable and/or unquantifiable circumstances reducing the protected productivity of the restoration protect.	We have consulted with members of the Expert Review Panel, other agencies involved in issuing mitigation requirements, and agencies involved in the development of mitigation projects during the development of the proposed Desalination Amendment. The issue of applying a confidence level to increase certainty that impacts will be fully mitigated is ultimately a question of policy. Some commenters have stated that a 90 percent confidence level is overly conservative and requested that no confidence level be specified in the proposed Desalination Amendment. That approach is rejected because there is a significant risk that the required mitigation would be inadequate to fully mitigate for impacts. However, the commenter did not provide justification for the 99 percent confidence interval. The proposed Desalination Amendment was revised and the confidence value was raised to the upper 95% confidence bound. This value is consistent with previous values incorporated in the Ocean Plan for reasonable potential analysis and is used to define “significant” in the Ocean Plan definition of terms. This revision not only creates consistency with existing provisions in the Ocean Plan, but also increases confidence that the sample means will likely encompass the true mean. Additional information is provided below to support the use of a 95 percent confidence level. Production forgone is the biologic productivity lost when marine life is killed by an industrial activity. The area of production forgone (APF) is the amount of area needed to compensate for that lost productivity. APF is calculated by measuring the productivity forgone for a subset of species, then averaging those measurements together. A key assumption in the APF method is that the production forgone for a subset of species is a representative sample of all species present at that location, even those that were not directly measured. This means, for example, that the average APF for a small subset of species (e.g., 15-20 species) is characteristic of the much larger community, even a community comprised of thousands of different types of organisms.

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		The drawback of using an average APF lies in the certainty, or confidence level, that the calculated APF will fully compensate for a desalination facility's impacts. Using an average APF means that there is a 50 percent chance that a mitigation project will underestimate the mitigation area needed to fully compensate for a facility's impacts. The level of confidence in whether the APF acreage is fully compensatory can be increased by calculating confidence intervals from the available data, and then adding the confidence intervals to the average APF. The resulting value will be greater than the average APF, but will have a greater degree of confidence (a higher confidence level) that the project will fully mitigate for impacts to the environment. The Nth percent confidence level APF is the acreage required given an Nth level of certainty that a mitigation project will be fully compensatory. Confidence intervals and levels can be determined for any desired level of certainty (e.g., 70th percent, 80th percent, etc.). By using a higher confidence level, there will be a greater likelihood that a mitigation project will fully compensate for a facility's impacts. For example, using a 95th percentile confidence level means 95 percent certainty that the size of the mitigation project will fully compensate for entrainment impacts caused by a desalination facility. There are numerous examples where the Board or other state regulatory agencies have required greater statistical certainty for a regulatory action. The In-stream Flow Policy shifted calculations of minimum bypass flow upwards by three standard errors (approximately equivalent to a 99 percent confidence level) in order to increase certainty that the minimum stream flow calculations were protective of salmonids. Soil and groundwater cleanup standards at brownfield and underground storage tank contamination sites must meet a specified cleanup goal (typically 95 percent confidence level) based on numerous soil/water samples and replicates. The Carlsbad Desalination Project is required to compare their constructed mitigation project with natural reference sites, and must meet a 95 percent level of certainty that the constructed mitigation wetland is functioning similarly to the natural reference site. Wetlands are also frequently required to mitigate for a larger area than the impacted area, in order to ensure that productivity

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		of the restored/constructed area is equivalent to the productivity lost by removal of the native habitat. The Ocean Plan also requires a 95 percent confidence level when determining significance (see definition of “significant” in the Ocean Plan) and for the Reasonable Potential Analysis Procedure for Determining Which Table 1 Objectives Require Effluent Limitations in Appendix VI of the Ocean Plan (see Step 9). Including a requirement that the APF be calculated using a one-sided, upper 95 percent confidence bound for the 95th percentile of the APF distribution is consistent with existing requirements in the Ocean Plan. All of the examples listed above ask for greater statistical certainty that a proposed action will be successful. Although a 95th percentile confidence interval may appear to require a very high level of statistical certainty, the confidence level is less than other types of Board requirements (In-stream Flow Policy, cleanup standards). In practice, the amount of additional acreage needed for a 95th percentile confidence level is relatively low in comparison to the total size of a mitigation project. The amount of additional acreage needed will largely depend on how well the study was done. Two example data sets are provided in Tables and Figures 21.90-1 and 21.90-2 below to illustrate how a confidence level will impact the size of a required mitigation project based on the data collected. Data Set 1 (21.9-1) and Data Set 2 (21.90-2) are identical for the first ten species, but Data Set 2 includes data from an additional ten species. APF values have been measured for 10 species in Data Set 1. The ETM/APF analysis assumes the 10 species are diverse and are representative of all species in the ecosystem. The average APF is 77.4 acres, meaning that 77.4 acres is a representative mitigation area for all species present in the ecosystem; however, there is relatively low confidence (only 50 percent) that the calculated area is fully compensatory. To be more confident that the mitigation area fully compensates for a desalination facility’s surface intake, the confidence intervals can be set to a desired level of certainty. This can be done by calculating the confidence interval, and then adding that interval to the average APF.

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		The data in Data Set 1 shown in Table 21.90-1 below, the 80th percentile confidence interval is 10.4, the 90th percentile confidence interval is 15.8, and the 95th percentile confidence interval is 20.3. The size of a mitigation area that we are 95 percent confident will be fully compensatory is calculated as the average APF plus the confidence interval of 20.3, yielding a total of 97.7 acres. The acreage difference between the 50th percentile confidence level and the 95th percentile is not exponential but rather 26 percent larger than the average APF. The data in Data Set 2 shown in Table 21.90-2 below, the average APF is 77.0 acres. APF values have been measured for 20 species. The 20 species are diverse and are assumed to be representative of all species in the ecosystem. The 80th percentile confidence interval is only 5.6, the 90th percentile confidence interval is 8.6, and the 95th percentile confidence interval is 11.0. The size of a mitigation area that we are 95 percent confident will be fully compensatory is calculated as the average APF plus the confidence interval of 11, yielding a total of 87.9 acres. For Data Set 2, the acreage difference between the 50th percentile confidence level and the 95th percentile is only 14 percent larger than the average APF. This is almost half as much as the added acres for Data Set 1. Since the variance is lower in Data Set 1, the confidence intervals are smaller. This example demonstrates the value in conducting a complete analysis so the variance in the sample is low. This will make the confidence interval smaller and result in fewer acres of mitigation required when using a 95 percent confidence level.
21.91	But even then, any attempt to convert a restoration project to a fee paid to a "mitigation bank" only compounds the risk factor and results in less confidence in achieving the goal to "minimize the intake and mortality of all forms of marine life." We are not aware of any "mitigation banks" in the marine environment. And aside from designating and enforcing more area in marine reserves, we are not sure how a marine habitat mitigation bank would include all habitats necessary for replacing all forms of marine life lost to the facility intake. And mitigation banks established to restore or create coastal wetlands are clearly only attempts to increase productivity for a sub-set of the species' populations suffering intake and	The proposed Desalination Amendment lays out a process for quantifying amount of mitigation that will be required but does not require the use of mitigation banks. An owner or operator may carry out their own mitigation project which would require demonstrating that the project is indeed mitigating for the estimated mortality in the Marine Life Mortality Report. The other option is for an owner or operator to pay into a fee based mitigation program. Under that option, the proposed Desalination Amendment requires that the program have accountability, demonstrated history of successful projects, and associated high level of performance and financial stability. These

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	mortality at the facility. And again, this "not in-kind" habitat creation/restoration problem is compounded when the calculation "averages" all the APFs for different habitats affected.	requirements ensure that the mitigation will result in tangible and beneficial effects that can offset the mortality related losses. As described in chapter III.L.2.e (3)(b) i and vi, kelp beds, eel grass beds, estuaries, coastal wetlands, natural reefs or MPAs or other habitats approved by the regions are to be the focus of the mitigation. These habitats are selected due to their productivity and limited areal extent. Please also see response to comment 15.9 for how the acres calculated in the APF analysis will be partitioned into habitat type based on species affected and why out-of-kind should be permitted in some cases.
21.92	Further, the examples shown by the Expert Panel for how to calculate a "mitigation fee" included many assumptions that need clarification. For example, the presentation included several past restoration project costs from past efforts at mitigating the impact of cooling water intakes. It did not appear to capture the cost of land acquisition, project planning, and other costs that a full mitigation fee must include. And it seemed to include a past project that, in combination with wetlands creation/ restoration, created artificial rocky reef. This is an example of the difficulty, if not impossibility, of replacing "all forms of marine life - creating shallow rocky reef on areas of sandy bottom compounds the loss of species that inhabit sandy habitat or forage in sandy habitat.	Disagree. The proposed Desalination Amendment does not include any recommendation for the “mitigation fee.” The State Water Board did commission an expert panel to develop a mitigation fee for impacts associated with cooling water intakes for power plants and desalination facilities. (Foster et al. 2012) A public meeting was held July 5, 2011 to describe the project and solicit input regarding panel members and issues. The panel met several times to develop recommendations for the State Water Board. The panel released a draft report, solicited input from the public, and held a public meeting on December 8-9, 2011. The panel met again in February 2012 and submitted a Final Report with their findings and recommendations to the State Water Board. The issues the commenter mentioned were not raised during the Expert Panel’s public process. However, when State Water Board staff presented the idea of including the mitigation fee calculated in Foster et al. (2012) in the proposed Desalination Amendment during the June and July 2013 targeted stakeholder meetings, there was significant negative feedback from a variety of stakeholders. At the time, the stakeholders agreed to cooperate and hire a neutral third party resource economist to calculate a mitigation fee that all parties could agree on. But this process never took place. In light of the criticism regarding the mitigation fee calculated in Foster et al. (2012), the proposed Desalination Amendment did not include a dollar amount. A fee-based mitigation program as described in the proposed Desalination Amendment does not exist at this time, although

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		stakeholders may still hire a neutral third party resource economist to calculate a mitigation fee, if desired. If a fee-based mitigation program that meets the requirements in chapter III.L.2.e(4) is created in the future, a mitigation fee would be developed per III.L.2.e(4)(b), and the section 13142.5(b) determination that includes the mitigation fee would go through the public process as required by the regional water board's NPDES permit adoption process. Also, see response to comment 21.91.
21.93	We are reluctant to suggest methods for improving the confidence that a restoration project or a mitigation fee calculation will result in full replacement value beyond the recommendation to require a 99% confidence level and something greater than a 1:1 acreage ratio. However, we recommend a clarification in the draft, like that concerning a later determination of the best slot size for intake screens, that the staff will review comments on the subject before finalizing the Amendment - and we would add that both these details in the Amendment will be coordinated efforts of several agencies with relevant expertise and include full public notice and comment opportunities. The best solution is avoidance of the problem in the first place. A very strict adherence to a combination of "best available site, design and technology" standards will all but eliminate the need for "after-the-fact" restoration. Further, the complexities of marine ecosystems and the "benefit" of maintaining healthy ecosystems should form the basis of a "reasoned analysis" to prohibit "cost" as an element of defining "not feasible."	Please see response to comment 15.9 regarding the confidence level and mitigation ratios. As described in response 21.86 above, marine life mortality may occur even after the best available site, design, and technology measures feasible are implemented. The approach in the proposed Desalination Amendment is consistent with Water Code section 13142.5(b). Also, see response to comment 21.88.
21.94	Project Proponents are Asking for a Lower Confidence Level. Project proponents are requesting limits that would exacerbate the risk of under-compensation rather than recommendations for how to better ensure success of any "after the fact" restorative measures. Project proponents recommend lowering the "confidence level" in the draft Ocean Plan amendment from 90% to 50% based on past decisions using a 50/50 chance of success. They are arguing, in effect, that if past decisions have failed to incorporate measures to ensure success, the amendment should not correct those errors. We disagree. Amendments	The value was raised to the upper 95 percent confidence bound. This value is consistent with previous values incorporated in the Ocean Plan for reasonable potential analysis and used to define the "significant" in the Ocean Plan definition of terms, creating greater consistency within the Ocean Plan requirements and increasing confidence that sample means will likely encompass the true mean. Also, please see response to comment 21.90.

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	to the Ocean Plan to enforce the law are the right time to set statewide standards for resolving any past errors and ensure those errors are not repeated. The SED articulates why a higher confidence level is used in other regulatory schemes, and why it is necessary in this context. The limits of our understanding of marine ecosystems demands a precautionary approach and assurances that the restoration is scaled properly and performs properly over time.	
21.95	Finally, at the August 6th Workshop we have heard requests for "credit" in the restoration scaling method to account for higher productivity habitat created or restored to compensate for less productive habitat. A careful read of the ETM/APF assumptions, combined with a careful read of section 13142.5(b) shows why that request must be denied. The ETM model estimates the source water body for a sample of species in the entrainment studies, and the APF calculation includes several habitat types to represent the species in the sample. Those separate individual APFs are then combined to calculate a cumulative APF. But importantly, the assumption in the model is that the "cumulative APF", and the restoration project scaled on that calculation, will be proportional to the different species and habitats in the ETM calculation. And the language and intent of section 13142.5(b) is clear, but often overlooked. The relevant language states the intent to minimize the intake and mortality of "all forms of marine life." This is not simply a mandate to minimize the intake and mortality of marine life in general - it is a mandate to minimize the intake and mortality of each and every form of marine life. Taken collectively and within the context of "ecosystem-based" management, the assumptions in the APF model must be realized to ensure compliance with the intent of section 13142.5(b). There is no "credit" allowable for restoring or creating a single habitat type based on some productivity comparison. Just the opposite, the calculation must include a "multiplier" to ensure that, if the creation/restoration protect	The proposed Desalination Amendment requires that an owner or operator fully mitigate for intake and mortality of all forms of marine life associated with the facility. But how that is achieved may differ depending upon many factors. Not all habitats provide the same level of productivity or benefit to the same degree economically important or protected species as well as others habitats would. As described in the proposed Desalination Amendment, out-of-kind mitigation is permitted for open water or soft-bottom species. This is because the mitigation of habitats that these species utilize is impractical. In-kind mitigation should be done for all other species and habitats. Please see response to comment 15.9 for more on in-kind and out-of-kind mitigation and mitigation ratios.

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	replaces habitats that are not proportional to the species lost to the intake, the indirect benefits are reasonably "discounted"- not credited. It should be clarified in the draft amendment that the purpose of any habitat restoration/creation project is to fully replace "all forms of marine life." If that goal is to be measured in biomass, it must be species-specific biomass measured in proportion to the species lost. It is not "general biomass" that may or may not have some indirect benefit to the species.	
21.96	As noted above, we are reluctant to recommend a formula for ensuring that habitats in a restoration project are proportional to the lost productivity of myriad species lost to the intake of proposed facilities. Once again, the complexities and limits to accurately measure the impacts, and the inherent risk of under- compensation and disproportional compensation, argue for a very strict policy to minimize the intake and mortality of "all forms of marine life" in the first place. And once again, if the performance of sub-surface infiltration galleries is the enforceable standard for "best available technology" then the residual intake and mortality is all but eliminated, and reliance on imperfect models and restoration projects is minimized.	Comment noted. Quantifying impacts based on empirical data can be challenging, but is frequently conducted for a variety of programs. The proposed method for calculating the area of mitigation has been used in other programs as well. Please see section 8.5.1 of the Staff Report with SED for more information on why the ETM/APF model is being proposed. Subsurface intakes significantly reduce the need for mitigation as intake marine life mortality would be nonexistent requiring mitigation only for construction-related impacts. In regards to subsurface intakes and best available technology, see response to comments 21.5, 21.7, 21.12, 21.17, 21.19, 21.21, 21.22 and 21.23.
21.97	Mitigation Fees Need to be Spent Properly to Minimize the Intake and Mortality of Marine Life. We support the requirement to fully mitigate for all marine life mortality associated with a desalination facility, and to do at least three years of baseline monitoring to estimate that mortality. However, compensating for killing a wide variety of larvae and other sea life by restoring specific habitats is an embryonic, inexact and unproven science. The challenges of converting estimates of a sample of the sea life harmed by a project into an area of production foregone, then restoring sufficient habitat to replace the lost production for the full range of affected species underscore several key points in this policy.	Comment noted. As described in section 8.5 of the Staff Report with SED, the proposed approach empirical transport model used to calculate the area production foregone will benefit all entrained species throughout the operational lifetime for the facility, not simply those identified during sampling. The more critical issue is that the study is properly designed and that the mitigation project is successful. A poor sampling design and sampling error can result in uncertainty associated with the ETM. Appendix E of the Staff Report with SED reviews critical factors to consider when designing a study to collect data for an ETM/APF analysis. For example, the frequency of sampling should account for species with short spawning periods or a short larval duration. However, a one year sampling period is reasonable if entrainment sampling is done concurrently with source water sampling. (Steinbeck et al. 2007, Appendix E) Another benefit to using the ETM/APF model over other demographic models such as AEL and FH is that the estimates of the relative effects of entrainment should be less subject to interannual variations. (Steinbeck et al. 2007, Appendix E)

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		Also, see the report prepared by the Expert Panel III on Intake Impacts and Mitigation located here: http://www.waterboards.ca.gov/water_issues/programs/ocean/desalination/docs/erp_final.pdf and response to comment 15.5 regarding study duration.
21.98	First, it is critically important to minimize mortality in the first place by making the best choices about siting, design and technology respectively, due to the impossibility of guaranteeing successful replacement of larval production. Even a well-designed mitigation plan cannot be counted on to restore the exact species, the quantities of those species, and the ecological functions that surface intake structures harm. For that reason, we reiterate that subsurface intake technology should be required as best available technology and not left to best professional judgment on the combination of best site, design and technology.	See response to comments 21.5, 21.7, 21.12, 21.17, 21.19, 21.21, 21.22, 21.23, and 15.9.
21.99	Second, for impacts that cannot be avoided despite the use of best siting, design and technology, respectively, mitigation measures should be designed to replace an acre of production foregone with a significantly greater area of replacement production. In section III.L.2.e.(3)(b)iii, we urge the board to strive to achieve replacement value at least equivalent to the impact of the facility by calling for a ratio greater than 1:1 (area of production replaced to area of production lost) in this policy. As noted in the Staff Report, wetlands mitigation policies often require a ratio significantly greater than 1:1 to take into account the uncertainty and difficulty of replicating natural systems with their full array of ecosystem functions and benefits. The California Coastal Commission, for example, has in the past used a ratio of 4:1 for wetlands mitigation. A similar rationale applies in this case, where the track record of previous success is even more limited than that of wetlands mitigation. We recommend a ratio of 3:1 or higher to take into account the potential for less than 100 percent success and the significant uncertainty about how best to accomplish successful mitigation protects involving larval production. Such a ratio can also help account for the fact that desalination intakes and discharges may have adverse impacts on the	Comment noted. For in-kind mitigation chapter III.L.2 e.(3)(b) vii of the proposed Desalination Amendment establishes a lower bound of 1:1, but provides flexibility for the regional water boards to require more to account for uncertainty associated with the success of a mitigation project. Chapter III.L.2 e.(3)(b) vi established a lower limit for out-of-kind mitigation of 1:10. This is applied to those habitats mitigated that are significantly more productive than the source water habitat. For more on mitigation ratios, please see response to comment 15.9.

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	food web or other ecosystem functions that aren't fully captured in measurements of larval mortality.	
21.100	Next, we support including a broad list of potential mitigation projects as identified in section III.L.2.e.(3)(b)i [of the proposed Desalination Amendment], along with clear performance standards and measurement requirements. Having a broad list may help provide the flexibility needed to increase the prospects for a proportional and successful mix of restoration projects to fully replace "all forms of marine life" lost to the intake. The State Board should also include a preference for mitigation protects in the geographic vicinity of the proposed protect, to help match replacement production as closely as possible to marine life losses. However, some caution is necessary to ensure that the productivity of the restoration project is not within a "source water body" which may increase entrainment and reduce the replacement value of the restoration project.	As stated in response to comment 15.8, the proposed Desalination Amendment does not require that the mitigation project be located within the source water body. Chapter III.L.2.e.(3)(b)ii states that, “The owner or operator shall do modeling to evaluate the areal extent of the mitigation project’s production area* to confirm that it overlaps the facility’s source water body when feasible.” The production area from a mitigation project is the area where organisms originating at the mitigation site are dispersed to. The mitigation project should provide a source of organisms to replace those that were lost at a desalination facility. The goal of a mitigation project should be to compensate for losses of all forms of marine life and to ensure there is an increase in the populations of the lost species within the ecosystem. The provision requiring the overlap of the mitigation project’s production area with the source water body is to ensure that the production replaces what was lost. Since Water Code section 13142.5(b) includes the requirement that measures be feasible, the proposed Desalination Amendment was revised to include “when feasible” after this requirement. If it is not feasible to locate the mitigation project so that the production area overlaps the source water body, then the mitigation project can be located elsewhere. However, if the mitigation project’s production area does not overlap the source water body, the regional water board should carefully evaluate the mitigation project to ensure that it is still fully mitigating for losses. Additionally, the language in chapter III.L.2.e.(3)(b)ii only applies to facilities using surface intakes. Facilities using subsurface intakes will not have source water bodies from which species will be entrained, and consequently will not be required to perform modeling studies for dispersal. Facilities using subsurface intakes that require mitigation for construction or mitigation impacts should provide proposed mitigation locations to the regional water board for approval. The proposed mitigation locations should be in a habitat close enough to the facility to

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		fully mitigate for the losses.
21.101	We recognize the challenges of developing successful mitigation projects and the resulting need for flexibility in their location. We suggest balancing proximity value with geographic flexibility by adding, perhaps as a new Section III.L.2.e.(3)-(b)iv [in the proposed Desalination Amendment], a statement like: "Preference shall be given to projects in the geographic vicinity of the desalination facility." Such a preference would likely also have the advantage of better replicating the species mix impacted by the facility. In section III.L.2.e.(4), Mitigation Option 2, the State Board should add "or projects" after "ongoing implementation of a mitigation protect ..." in line 4 of that paragraph. We make this suggestion because a combination of projects may well be needed to fully mitigate impacts in certain cases.	The proposed language addition is unnecessary since an owner or operator is required to fully mitigate. The regional water boards will review and approve mitigation plans and use their professional judgment to discern the best available mitigation measures feasible for a project. Providing additional requirements on location or geographic proximity may limit the ability of the regional water boards to support unique, innovative, or highly-beneficial future mitigation projects. As described in response to comment 15.9, the mitigation acres calculated in the ETM/APF study should be broken down into habitat types based on the habitats that the entrained species used. This may result in an owner or operator completing a few mitigation projects (e.g. rocky reef mitigation and estuary mitigation) to fully mitigate for impacts to all species.
21.102	Additionally, we appreciate the emphasis on completing actual mitigation projects with measurable benefits as described in Chapter III.L.2.e.(3) or, as described in Chapter III.L.2.e.(4) [of the proposed Desalination Amendment], providing funding for available mitigation programs. The health of ocean ecosystems is the endpoint that matters with respect to mitigation. Mitigation efforts should therefore focus on full replacement of all forms of marine life that are harmed. Money can facilitate that restoration but is no substitute for it. In Section III.L.2.e.(3)(b)i, we suggest the following changes: "Mitigation shall be accomplished through expansion, restoration or creation of one or more of the following: kelp beds, estuaries, coastal wetlands, natural reefs, MPAs, State Water Quality Protection Areas, or other projects approved by the regional water board that will mitigate for intake and mortality of marine life associated with the facility." In Section III.L.2.e.(4)(b) suggest adding clause in caps: "The amount of the fee shall be based on the cost of the mitigation project, or if the project is designed IN WHOLE OR IN PART to mitigate cumulative impacts from multiple desalination facilities or other development projects."	Chapter III.L.2.e.(2) was amended to include the phrase “all forms of marine life” and now clearly requires mitigation for the mortality of all forms of marine life. And chapter III.L.2 e.(3)(b) ii includes the requirement that the production area of the mitigation projects overlap a facility’s source water body whenever feasible. These provisions, along with the oversight of mitigation plans by the regional water boards, will help to ensure that impacts are fully mitigated. With regard to the addition of State Water Quality Protected Areas, these do not specifically need to be listed since the concept is captured in “other projects approved by the regional water board.” With regard to chapter III.L.2.e.(4)(b), the language is unchanged as it states that the fee will be based on a facility’s “fair share” for projects mitigating cumulative impacts.

Please note all tables and figures referenced are present at the end of this document

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21.103	Lastly, Chapter III.L.2.e.(5) [of the proposed Desalination Amendment] authorizes agencies to conduct audits and inspections of any mitigation projects, but provides no guidance as to what steps those agencies can take to address problems or inadequacies they may find. We urge the State Board to add steps, including, at a minimum, actions to correct flaws in the project pursuant to the adaptive management portion of the mitigation plan, use of the audit findings to inform periodic reviews of waste discharge requirements and NPDES permits, authority to open a permit at any time to ensure compliance, as provided in the OTC Policy, and other actions as needed.	Mitigation would be included as a requirement in the applicable permit and as a result, unsuccessful mitigation would become an enforceable issue. Under the proposed Desalination Amendment, it is the responsibility of the permittee to ensure that mitigation projects are successful. Agencies would simply contact the appropriate regional water board if mitigation was not performed as required in the permit.
21.104	Requiring Treated Wastewater for Dilution will Conflict with California's Recycled Water Goals. Requiring treated wastewater for dilution will conflict with California's recycled water goals. The goal of reaching 2 million acre feet of recycled wastewater will be best met if every water purveyor statewide is able to contribute. So, it is a concern if wastewater discharge volumes are permanently allocated to brine dilution for a seawater desalination facility - effectively undermining the ability of any given region to fully contribute to reaching the State's goal to advance the use of recycled wastewater. For example, CalAm is currently considering whether to mix the brine from their proposed Monterey desalination facility with a wastewater discharge, or to install diffusers. That choice is dependent on the availability of the wastewater for recycling. While it is unclear whether the recycling facility will be available before the deadline to operate the desal facility (based on the Carmel River CDO deadline), should CalAm apply for a permitted comingling with wastewater in their NPDES permit, this desalination Ocean Plan should ensure against "enshrinement" of the commingled discharge - effectively eliminating the recycling option in the future. The permanent elimination of wastewater for recycling through a permitted comingling with brine would directly undermine the intent of the Recycled Water Policy to advance recycled wastewater. The State Board should apply these principles statewide for any potential future local opportunity to expand wastewater recycling capacity.	Disagree. Allowing commingling brine with wastewater is provided as an option for those facilities where that is available and feasible. There is nothing in the proposed Desalination Amendment that prevents a wastewater agency from recycling part or all of the effluent. Nor does the Recycled Water Policy require all effluent be recycled. In those cases where wastewater effluent is otherwise being discharged, there is no reason why that effluent should not be used for the purpose of diluting brine from desalination facilities. Most wastewater outfalls rely on diffusers in order to dilute the effluent to levels that meet Ocean Plan requirements. As a result, commingling brine with wastewater would in most cases result in much greater dilution in comparison to brine directly discharged through a diffuser.

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21.105	Industry is arguing that this provision is beyond the State Board's authority because: "Water supply agencies are responsible for development of water supply and reliability projects, not the SWRCB or its Regional Boards. This argument mis-states the authority of the State Water Board. The draft Amendment is simply enforcing the Clean Water Act and Porter-Cologne Act in regards to the discharge. In that sense, it does not necessarily place a limit on the water agencies' discretion to develop seawater desalination as a part of a portfolio. It simply ensures that the brine discharge does not violate the law. Further, the State Board has already exercised its authority in this field. While it is not asserted in the Amendment, this provision would ensure that the adopted State Board policy to develop recycled wastewater is consistent with the provisions of the Desalination Amendment. To our knowledge, water supply agencies did not have any objections to the State Board's policy on recycled water - which arguably had just as much connection with the choices made by local water agencies as this Ocean Plan amendment would have.	Disagree. As stated in response to comment 21.104, if wastewater is being discharged into the ocean, it is providing no benefit beyond moving treated wastewater out into the receiving water. Commingling with brine prior to discharge provides the additional benefit of diluting the brine prior to discharge and reducing potential shearing-related mortality associated with discharging raw brine through multiport diffusers. See response to comment 21.104 above.
21.106	Contention 106a.Spray Brine Diffusers are the Best Available Technology for Discharging Brine. The Brine Expert Panel did not cite any studies disproving that spray brine diffusers would cause the mortality of marine life - the calamity caused from trying to disprove a negative statement. Nonetheless, other experts concluded that it would likely be a small impact. There is no empirical data to support the hypothesis of intake and mortality in spray brine diffusers. And judging by the comments of several project proponents at the August 6th Workshop, either there is a divergence of opinion on the hypothesis, or the intake and mortality is extremely site specific. For example, Poseidon-Carlsbad has implied that the intake and mortality in the brine plume would exceed that of a modified intake system - although they have no studies to support that claim. On the other hand, MWDOC, CalDesal and Poseidon-Huntington seem to imply that any minimal mortality in the spray brine diffuser plume would be so small so that a minor adjustment to the restoration project should more than compensate for the harm (implying it is immeasurable). Industry should not be allowed to modify the Amendment in hopes that "site-specific"	Response 106a. Agree. Second to dilution of brine with wastewater, multiport diffusers are the best technology for achieving rapid mixing with receiving waters. We are not aware of any empirical data to suggest that jets discharged from diffusers harm aquatic life. Foster et al. (2013) and Jenkins and Wasyl (2013) were some of the first to estimate the marine life mortality associated with multiport diffusers through modeling. While both studies help elucidate potential mortality associated with shearing stress and the data from the studies are valuable, neither study was extensive nor empirical. Jenkins et al. 2014 also estimated diffuser-related mortality; however, these data are unreliable for the reasons stated in response to comment 15.20. Since Water Code section 13142.5(b) requires consideration of mortality of all forms of marine life, and there is the potential for shearing-related mortality, an owner or operator will have to estimate and discharge-related mortality. More studies, preferably peer-reviewed studies, are needed to better characterize mortality associated with diffusers. However, we agree that second to dilution of brine with wastewater, multiport diffusers are the best technology for diluting brine.

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	determinations undermine the goal of consistent statewide enforcement of the law, and simultaneously undermines the intent of the Clean Water Act to comply the "best technology available" for the control of polluted discharges. Contention 106b. As such, we recommend the following revisions to Chapter III.L.2.d.2.(b): "Multiport diffusers* are the best available method for disposing of brine.* --when the brine* cannot be diluted by wastewater and when there are no live organisms in the discharge-- Multiport diffusers* shall be engineered to maximize dilution, minimize the size of the brine mixing zone,* minimize the suspension of benthic sediments, and minimize marine life mortality."	Response106b. Disagree. The proposed Desalination Amendment states that the preferred technology is to commingle brine with wastewater, followed by direct discharge to multiport diffusers. Commingling allows for greater dilution prior to discharge, and potentially less shearing-related mortality.
21.107	We Support the Current Requirements for Toxicity Monitoring. In addition to the entrainment and impingement impacts from the intakes, desalination facilities pose a serious threat to marine ecosystems from concentrated brine discharge. Concentrated brine discharge can cause both acute and chronic toxicity to the ecosystems. In particular, brine discharges "can pose significant risks to sensitive habitats." For example, brine discharges have been associated with "reduced growth, reduced biomass, and the disappearance of seagrasses." In addition to toxicity associated with elevated salinity, brine plumes can form a physical barrier preventing adequate mixing of dissolved brine resulting in anoxia or hypoxia in benthic organisms. Exposure to brine and other potentially toxic constituents in desalination effluent can cause serious impacts on bottom-dwelling organisms including: osmotic stress or shock, endocrine disruption, compromised immune function, acute or chronic toxicity, and even death in extreme conditions. While mobile organisms may swim away from the discharge, stationary organisms cannot move away and thus might experience more serious effects. Due to the serious nature of the potential toxicity of brine discharges, we support the draft Desal Policy's requirement for a establishing a minimum of baseline monitoring for 36 months prior to commencing brine discharge and conducting a Whole Effluent Toxicity (WET) test.	Comment noted. Please see response to comment 15.5.

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21.108	The State Board is Using the Proper Species for the WET Test. The draft Desal Policy requirement that WET tests be conducted for germination and growth for giant kelp (*Macrocystis pvrifera*), development of red abalone (*Haliotis refescens*), development and fertilization for purple urchin (*Strongleocentrotus purpuratus*), development and fertilization for sand dollar (*Dendraster excentricus*), and larval growth rate for Topsmelt (*Athernipos affnis*) is scientifically sound and appropriate. In 2012, scientists at U.C. Davis Department of Environmental Toxicology conducted hyper-salinity studies using U.S. EPA west coast methods on a number of species including bay mussels, purple sea urchins, sand dollars, and red abalone, giant kelp, and topsmelt. These studies, known as the "Granite Canyon studies" form the basis for the recommended WET test studies in the SED. The State Water Board staff reduced the list of species to reduce costs and focused the species list on those that are most affected by salinity, while still representing a variety of taxa. This is a reasonable, while still scientifically sound approach. While the species list in the recommended WET test may not always be found at every proposed desalination site, it is still appropriate to conduct the WET test for all of these species as they are representative of other similar species that may occur along our coast. For example, abalone are in the Phylum Mollusca, which is a diverse tax that includes snails, shellfish, squid, octopus, nautilus and nudibranchs. Some desalination proponents have suggested running toxicity test on species at the location of the proposed discharge site to establish facility-specific receiving water limit. However that process would be cost, labor, and time intensive because an owner would have to first establish which species are the most sensitive to salinity changes and then would have to establish and validate U.S. EPA test protocols for the most sensitive species. Again the established indicator species listed in the SED were selected due to their sensitivity to toxicity and are appropriate as a minimum species to use for tests. Although we do not support substituting species for those established in the SED, we do support supplementing the established WET test with additional location-specific species as	Comment noted. The proposed Desalination Amendment requires use of select species approved for whole effluent toxicity testing for ocean discharges under the California Ocean Plan. Please see response to comment 6.10.

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	appropriate.	
21.109	Additionally, some desalination proponents have suggested running toxicity studies on species caught directly in the proposed discharge environment. This approach is also not scientifically advised as wild-caught species will have different levels of physical fitness, which can result in inconsistencies in the results. As the SED notes "there is a high probability toxicity studies on wild caught species will result in inconclusive results." We support the Staff recommendation of conducting toxicity studies on laboratory or farm raised species that have established U.S. EPA approved test protocols because it will increase the accuracy of the results.	Comment noted. See responses to comments 21.108 and 6.10.
21.110	Alternative Intake Technologies Need to Substantially Meet the Performance Standard of the Best Available Intake Technology - Subsurface Infiltration Galleries. The CWA, and thus California's granted authority to enforce the Water Code as long as the State's laws and regulations are as protective or more protective than those in the federal law, allows alternative technologies to be implemented if they are proven to be as effective as the "best available technology." The Porter-Cologne Act is used to implement California's duties under the CWA, and the "most salient characteristic of the [CWA], articulated time and again by its architects and embedded in the statutory language, is that it is technology-forcing." Meaning, as new technologies are developed, and permits are renewed, permittees are required through an iterative process to continue implementing the "best available" technologies.	While it is true that the State Water Board is required in implementing the CWA to be as protective as federal law, the federal law in question doesn't govern seawater desalination intake structures. Clean Water Act section 316(b) by its own terms applies to cooling water intake structures. See responses to comments 21.29, 21.35, and 21.40, specifically the requirement to implement best site design technology and mitigation measures feasible. As stated in responses to previous comments, Water Code section 13142.5 (b) requires best combination of all factors, not just technology.
21.111	We support this innovative approach to CWA and Water Code compliance, and agree that the State Board should provide an opportunity and requirement for innovation in the Amendment. The OTC Policy allowed for innovation in meeting its compliance standard. The approach taken in the OTC Policy found that "dry cooling towers" were the best technology for minimizing the adverse impacts, but used "wet cooling towers" as the basis for the performance standards.	Disagree. See responses to comments 21.29, 21.35, 21.40, 21.110 and 21.112.

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	The reasoned analysis concluded that the performance of wet towers was "equivalent" to dry towers (93 percent reduction), and that a marginally lower performance standard was justified to allow more universal availability. The OTC Policy clearly stated that either wet cooling towers or dry cooling towers would be allowed because dry towers exceeded the performance standard. Finally, the OTC Policy allowed alternative approaches where wet cooling towers were shown to be "not feasible." Arguably, the "90% reduction of a 93% reduction" allowed a "less than best" performance standard. Nonetheless, the State Board found this standard "functionally equivalent" to the "best".	
21.112	While we support the State Board's decision to allow innovative alternate technologies, those technologies must meet the performance standard set by the best available technology. The State Board followed the Second Circuit's ruling by requiring alternative technologies in the OTC Policy to meet the performance standard set by the best available technology - within a range of performance based on the agency's reasoned analysis. Unlike the OTC Policy, the draft Amendment does not require alternative technologies meet the best available technology performance standard. In fact, the draft does not include a clearly stated performance standard - nor an explanation how it is derived from the effectiveness the "best technology." Instead, the State Board is allowing alternative intake technologies "so long as the alternative method provides equivalent protection...as is provided by a [0.5 mm/0.75 mm/1.0 mm] slot size screen." Wedge-wire screens are not the proper performance standard by which alternative technologies should demonstrate compliance. As discussed above, and stressed in the *Riverkeeper* II decision, alternative technologies can be used to comply with the "best available" standard, but those technologies must demonstrate equivalent protection as the best available technology.	The proposed Desalination Amendment involves interpretation of California law (Water Code section 13142.5(b)) rather than enforcement of the Clean Water Act. California law requires that best available site, design, technology and mitigation measures feasible shall be used to minimize intake and mortality of marine life. Whereas, Clean Water Act section 316(b) includes a single requirement for implementation of “best technology available” and applies to the regulation of cooling water intake structures. Case law interpreting section 316(b) is inapplicable to the interpretation of Water Code section 13142.5(b) in the proposed Desalination Amendment. See, response to comment 21.29 above.
21.113	As discussed above, subsurface infiltration galleries should be determined as the best available intake technology for minimizing the intake and mortality of marine life. As expressed in *Riverkeeper* II, and followed by the State Board in the OTC Policy, the State Board should	Disagree. Designating a performance standard for all intakes as equivalent to subsurface infiltration gallery would make it very difficult for project proponents to construct desalination facilities in those areas where subsurface intakes are not feasible. This addition would be

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	only allow alternative technologies, or a suite of measures, that meet the performance standard of subsurface infiltration galleries. To ensure the Desalination Policy properly allows for innovative intake technologies, we offer the following revisions to Chapter L.2.d.l.c.iii.: "An owner or operator may use an alternative method of preventing entrainment so long as the alternative method provides equivalent protection of eggs, larvae, and juvenile organisms as is provided by subsurface infiltration galleries. --a [(0.5mm (0.02 in)/ 0.75 (0.03 in)/ 1.0 mm (0.04 in)] slot size screen [see note above]--The owner or operator must demonstrate the effectiveness of the alternative method to the regional water board. The owner or operator must conduct a pilot study to demonstrate the effectiveness of the alternative method, and use an Empirical Transport Model* (ETM)/Area of Production Forgone* (APF) approach* to estimate entrainment at the pilot study location."	conflict with the project goal of supporting the use of ocean water as a reliable supplement to traditional water supplies while protecting beneficial uses.
21.114	Alternative Discharge Technologies Need to Substantially Meet the Performance Standard of the "Preferred Technology"- Dilution with Wastewater. Alternative discharge technologies must demonstrate equivalent protections as dilution with wastewater. As discussed above, we support the ability of permittees to use innovative alternative technologies to comply with the Policy, but alternative technologies must meet the best available technology performance standard. Under Chapter L.2.d.2.a., "preferred technology for minimizing intake and mortality of marine life resulting from brine disposal is to commingle brine with wastewater." This "preferred technology" sets the performance standard as explained in *Riverkeeper* II and followed by the State Board in the OTC Policy. However, the draft Desal Amendment does not state that alternative technologies needs to meet the numeric water quality standard and numeric ZID limit as a performance standard. Chapter L.2.d.2.d. states that "[b]rine disposal technologies other than wastewater dilution and multiport diffusers, such as flow augmentation, may be used if an owner or operator can demonstrate to the regional water board that	Chapter III.L.2.d(2)(d) iv of the proposed Desalination Amendment was revised to read that flow augmentation may be used if it is as protective of all forms of marine life* as wastewater dilution if wastewater is available, or multiport diffusers of wastewater is unavailable. We disagree that "zero discharge desalination technologies need to be given special consideration as an alternative brine disposal technology. Please also see response to comment 30.1.

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	the technology provides a comparable level of protection." That "comparable level of protection" is the performance standard and the Amendment would be clearer if it used that terminology in the relevant areas. If the State Board intends alternative discharge technologies to be comparable to either wastewater dilution or multiport diffusers, then the State Board needs to be explicit that both technologies have the same performance standard. If the State Board does not find both technologies to have equivalent performance standards, then the State Board needs to be explicit that alternative discharge technologies must demonstrate equivalent protections as dilution with wastewater. To ensure the draft Desal Policy properly allows for innovative discharge technologies, we offer the following revisions to Chapter L.2.d.2.d.: "Brine disposal technologies other than wastewater dilution and multiport diffusers, such as flow augmentation, may be used if an owner or operator can demonstrate to the regional water board that the technology provides a comparable level of protection as dilution with wastewater."	
21.115	Zero Discharge Desalination Technologies Need to be Given Special Consideration as an Alternative Brine Disposal Technology. Zero discharge desalination (ZDD) should be explicitly allowed as an alternative discharge technology, and should be exempt from empirical studies demonstrating equivalent protections as dilution with wastewater. ZDD is a discharge technology specific for desalination facilities that separates salts into salable products. The ZDD concept utilizes the energy-saving feature of electrodialysis to remove salts from the brine reject and concentrate them about threefold before evaporation. Although ZDD systems have higher capital cost than traditional desalination facilities that discharge into the ocean, the ZDD technology could potentially reduce the cost of seawater desalination when all the costs and benefits are considered. ZDD also has the potential to reduce the regulatory burdens and costs associated with discharging brine directly into the ocean.	Disagree. Chapter III.L.3.a titled “Receiving Water Limitation for Salinity” is applicable to all desalination facilities. Regardless of discharge technology, each facility must meet the receiving water limit as described in chapter III.L.3. A zero discharge facility would not require any type of outfall or associated pipeline and as a result would be exempt from implementing the requirements pertaining to the discharge of brine. Therefore there is no need to promote zero discharge. Those benefits are clear and do not require special consideration. Please also see response to comment 30.1.

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	As the name suggests, ZDD results in zero discharge of brine from desalination facilities. This technology is the ultimate "best technology" for discharging of brine. However, we understand the State Board's concerns that this technology- while innovative- is not necessarily "available" in the context of a regulatory scheme. Despite ZDD not being "available", it is exactly the type of innovative technology this Policy should be cultivating. As we understand the Policy, ZDD would be approved as an alternative design technology because a project proponent can easily demonstrate equivalent protection as dilution with wastewater. However, Chapter III.L.2.d.(2)(d) requires empirical studies or modeling to demonstrate comparable levels of protection. While we support the requirement for empirical studies to demonstrate discharge compliance, we believe it is unwarranted for ZDD technology given the obvious benefits of zero discharge to the marine environment. Given ZDD's performance standard of zero brine discharge, we recommend the State Board incentive ZDD technology, and remove the discharge demonstration requirements under Chapter III.L.2.d(2)(d) [of the proposed Desalination Amendment] for ZDD projects.	
21.116	Allowing Flow Augmentation as an Alternative Discharge Technology is Illegal and Bad Public Policy. As discussed above, flow augmentation (increased intake volume), is illegal and should not be an allowable technology or practice for discharging brine. As the State Board admits, withdrawing "additional seawater through surface intakes for the purpose of diluting brine effluent to meet water quality standards (referred to as "flow augmentation") can significantly increase entrainment and impingement." Moreover, even if a technology can reduce entrainment through "low turbulence intakes" "[a]dditional mortality may occur through brine exposure in the mixing process and through predation in conveyance pipes."	The commenter provides no basis or authority for the assertion that allowing flow augmentation is illegal. See also response to comment 21.42 above.
21.117	Experts in the field of brine discharges have found flow augmentation leads to significant increases in marine life mortality. Studies have	Comment noted. The proposed Desalination Amendment requires each owner or operator that chooses to use flow augmentation to

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	demonstrated that 100 percent of entrained organisms die, and that entrainment impacts on individual populations and the ecosystem can be significant. Withdrawing additional source water with traditional pumps to dilute brine would result in significantly increased marine life mortality compared to discharging through multiport diffusers.	demonstrate the effectiveness through modeling and empirical studies as described in chapter III.L.2.d(2)(c) and (d) (formerly (d) and (e).) If an owner or operator does not demonstrate to the satisfaction of the regional water board that the alternative technology is equally protective, the permittee must make changes to the system or use an alternative technology per chapter III.L.2.d(2)(d)iv. Any marine life mortality associated with an equally protective alternative brine disposal technology must be fully mitigated. The proposed Desalination Amendment does not posit that flow augmentation systems are equally protective as multiport diffusers. That has not yet been demonstrated (See response to comment 15.20). However, the proposed Desalination Amendment does include flexibility for future technological innovations in the hope to drive the industry to improve technology that can reduce or eliminate marine life mortality.
21.118	Only one project proponent believes flow augmentation using low-turbulence screw pumps (e.g. Archimedes screws pumps, screw centrifugal pumps, or axial flow pumps) can significantly reduce marine life mortality by lowering turbulence and through-pump mortality at the point of intake. That singular project proponent and expert consultants, have failed to prove the claim - even though multiport diffusers are available in numerous places and tests could have been conducted years ago, and Alden Labs apparently told State Board staff the tests of alternative low-turbulence pumps could be performed in their test laboratories.	Comment noted. As described in response to comment 21.117, each owner or operator proposing to use flow augmentation or an alternative brine disposal technology will have to demonstrate that the technology is effective at reducing marine life mortality or modify the design and technology so that it provides equal protection as wastewater if available or multiport diffusers when wastewater is unavailable.
21.119	Proponents of flow augmentation have argued that flow augmentation can overall result in less marine life mortality compared to multiport diffusers even though the mechanisms to do so have not been clearly demonstrated. To date, there are no empirical data that have estimated egg, larvae and small juvenile mortality at the low-turbulence pumps, even though such studies are technically feasible.	See response to comments 21.117, 21.118, and 15.20. The proposed Desalination Amendment requires the studies the commenter is referring to if an owner or operator proposes to use an alternative discharge technology.
21.120	Besides no data demonstrating that low-turbulence screw pumps are capable of minimizing entrainment, flow augmentation does not prevent marine life mortality at the mixing zone. The State Board acknowledges that "[o]rganisms entrained in the flow augmented dilution water may	Comment noted. See response to comment 21.122 below. As stated in chapter III.L.2.d.(2)(d) iv of the proposed Desalination Amendment, if flow augmentation or an alternative brine disposal technology do not provide equivalent protection as wastewater dilution if available, or

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	experience turbulence and shearing stress, osmotic stress or shock, or thermal stress as brine and dilution water are mixed prior to discharge." Flow augmentation results in a net loss of marine life mortality, and no data exists to prove that low- turbulence screw pumps reduce entrainment. There is nothing to suggest that flow augmentation can demonstrate equivalent protections as that of dilution with wastewater. Despite no evidence to justify flow augmentation as an alternative discharge technology, the State Board is allowing a project proponent to invest in low-turbulence screw pumps and operate them for up to three years before demonstrating equivalent protections as dilution with wastewater. This is bad public policy, and allows regional boards to kick the proverbial compliance can down the road. Regulatory flexibility is important, but perverting regulations to "accommodate" every project is inappropriate. At some point, California needs to stand up for its marine environment - and the laws intended to protect it - by requiring facilities to meet their legal requirements. Allowing three years to build and then try to demonstrate compliance with their own corporate studies is unjustifiable. How will regional boards have the resources or expertise to know whether the empirical studies were done correctly? The proponent of low-turbulence pumps has already submitted questionable studies disputed by industry experts. Does anyone believe Water Boards will require a facility to shut down a water supply facility once it is in the local portfolio, rip-out their low-turbulence pumps, and install the proper discharge technologies once they fail to meet the performance standard? It's untenable and unworkable from a practical perspective. In order to prevent flow augmentation from undermining the best available intake and discharge technologies, we request the State Board explicitly prohibit flow augmentation under Chapter III.L.2.d.2. by deleting all of Chapter III.L.2.d.2.(e) [of the proposed Desalination Amendment].	multiport diffuser when wastewater is unavailable, then that technology cannot be used and an owner or operator will be required to upgrade the discharge system. The State Water Board has broad authority to regulate all discharges into waters of the state under Water Code section 13263.
21.121	Proponents of Flow Augmentation Failing to Demonstrate Equivalent Protections as the Preferred Discharge Technology Should not be Given Additional Opportunities to Re-design Their System. Project proponents that install low-turbulence intakes and fail to meet the	Comment noted. See response to comment 21.122 below. As stated in chapter III.L.2.d.(2)(d) iv of the proposed Desalination Amendment, if flow augmentation or an alternative brine disposal technology do not provide equivalent protection as wastewater dilution if available, or multiport diffuser when wastewater is unavailable, than that technology

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	required intake and discharge performance standards should not be allowed to continue operations. Instead, the State board allows project proponents that are not meeting the required performance standards to "re-design the flow augmentation system to minimize intake and mortality of marine life to a level that is comparable with wastewater dilution or multiport diffusers ..." As discussed above, it is already inappropriate to allow a project proponent to operate for three years with flow augmentation technology that is assumed to increase marine life mortality rather than minimizing it. Allowing proponents to continue using flow augmentation after failing to demonstrate compliance just perpetuates the impacts to marine life. How many opportunities does a project proponent get at re-designing their in-plant dilution technology? How many years after a re-design does the proponent get to prove the new design is in compliance? In fact, given the opportunities to collect empirical data on the mortality of marine life entrained in a diffuser plume, and the availability of laboratories to test low-turbulence pumps for efficacy reducing mortality - project proponents should be mandated to prove their hypothesis prior to issuance of a permit.	cannot be used and an owner or operator will be required to upgrade the discharge system. The State Water Board has broad authority to regulate all discharges into waters of the state under Water Code section 13263.
21.122	In order to minimize the damage of allowing flow augmentation as an alternative discharge technology, we request the State Water Board delete the option for project proponents to re-design their low- turbulence intakes after failing to demonstrate such technology meets the required performance standards. We offer the following revisions to Chapter L.2.d.2.d.iii.: "If the empirical study shows that flow augmentation* is less protective of marine life than a facility using wastewater dilution or multiport diffusers,* then the facility must --either (1)-- cease using flow augmentation* technology and install and use wastewater dilution or multiport diffusers* to discharge brine waste. --or (2) re-design the flow augmentation system to minimize intake and mortality of marine life to a level that is comparable with wastewater dilution or multiport diffusers, subject to regional water board approval--"	Disagree. Prior to installing and operating an alternative brine disposal system, an owner or operator must complete modeling or empirical studies to provide estimates of mortality. The system should be designed and all potential sources of mortality should be assessed before the system is installed. Once the system is installed, an owner or operator is required to submit results from empirical studies that evaluate intake and mortality of all forms of marine life throughout the system. Once installed, minor changes may need to be made to the system to reduce or eliminate marine life mortality. After this process, if the system is not as protective as a wastewater dilution if available, or multiport diffuser when wastewater is unavailable, then that technology cannot be used and an owner or operator will be required to upgrade the discharge system. See chapters III.L.2.d (2)(d) iii and iv of the proposed Desalination Amendment.
21.123	Scientists are Unsure Whether Reverse Osmosis Technologies Remove all Toxins from Harmful Algae Blooms.	Disagree. We are not aware of any studies specifically identifying desalination facilities as a cause of harmful algal blooms.

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	The science is unclear whether impacts from harmful algae blooms (HABs), commonly referred to as "red tides," may occur due to desalination operations. HABs are a concern for desalination plants due to the high biomass of microalgae present in ocean waters and a variety of substances that some of these algae produce. These compounds range from noxious substances to powerful neurotoxins that constitute significant public health risks if they are not effectively and completely removed by the RO membranes. Algal blooms can cause significant operational issues that result in increased chemical consumption, increased membrane fouling rates, and in extreme cases, a plant to be taken off-line. Early algal bloom detection by desalination facilities is essential so that operational adjustments can be made to ensure that production capacity remains unaffected. Although numerous issues involving the desalination process are now being examined, very limited information exists on the risks that algal blooms pose to seawater desalination facilities. The science community is unaware of any "published reports on the effectiveness of reverse osmosis for removing dissolved algal toxins from seawater." Some of these toxin molecules (e.g. domoic acid) are near the size of molecules rejected by reverse osmosis membranes, but experimental studies are required to validate the effectiveness of this process on toxin removal. Until more studies are conducted on the effectiveness of reverse osmosis to remove HAB toxins, the State Board should take a precautionary approach to siting desalination facilities near HABs.	
21.124	Discharges of Harmful Algae Bloom Toxins Back into the Marine Environment Amplify the Impacts. A desalination facility's pretreatment process may exacerbate HAB impacts. The science community has discovered that the desalinations' "pretreatment process might disrupt cells and create significantly higher concentrations of dissolved organic substances, including toxins, than were originally present in the source water." Therefore, it is important that	Disagree. Until more data are available on the presence of HABs and the potential for desalination facilities to contribute HAB related toxins to ongoing blooms, and monitoring techniques improve for HABs and HAB-related toxins, changes to monitoring requirements in the proposed Desalination Amendment are not supported or warranted.

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	the desalination community carefully characterize these potential contaminants and their removal to improve treatment approaches in seawater desalination. In addition, more information will be needed to understand the potential impact of discharged brine and pretreatment backwash water resulting from the reverse osmosis desalination process on the ecology of coastal ecosystems. Reports conclude that if HAB toxins are in the intake water, then pretreatment coagulant would "concentrate toxic algae and their associated toxins." Similarly, the "discharge of brine resulting from the reverse osmosis process would contain elevated concentrations of dissolved algal toxins relative to unfiltered seawater." Given the potential for brine discharges to elevate the impacts from HABs, it is critical that the State Board address HABs in the Amendment.	
21.125	Monitoring is Needed to Ensure Harmful Algae Blooms are not Discharged with the Brine. As detailed above, it is essential that a desalination facility incorporate a means of rapid algal bloom detection so that, when necessary, proper process changes can be made to maintain the production capacity. Sensors for detecting an eminent algal bloom can be located at the desalination facility to inform personnel regarding changes in water quality that are directly observed on the source water. When constructing a new intake pipeline, the selection of its location (e.g. depth and distance from shore) can be greatly enhanced through the use of offshore monitoring devices and efforts to take into account the presence of any local accumulations of algal biomass due to currents, water mass convergences/divergences or internal waves, and also subsurface maxima in algal abundance. Toxic blooms in the vicinity of desalination plants are rare or often unrecognized events, and plant operators are generally unaware of the threat that algal toxins pose. As a result, no measurements of marine algal toxins before and after treatment have been made at any full-scale desalination plant during an actual HAB. HABs on the U.S. west coast exhibit significant generalities but the details of bloom dynamics differ with geographic location, depth and season.	Disagree. There is little information available on the contribution of desalination intakes, processing, and discharges in relation to HABs. Current information is speculative. Please see response to comment 21.124.

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	The high degree of variability associated with these events makes constant monitoring of HABs in intake water for desalination a vital issue. It is also important to consider the benefits of subsurface intakes in regards to HABs. Subsurface intakes provide a natural barrier to suspended sediments, algal toxins, pathogens, dissolved or suspended organic compounds, harmful algal blooms, kelp, sea jellies, debris, or oil or chemical spills, and adult and juvenile marine organisms. The State Board should require all projects that are not using subsurface intakes to be required to conduct ocean monitoring for HABs, and be required to shut down all intake operations when a HAB is present.	
21.126	The State Board Should Include Drinking Water Permitting as Part of the Policy. During the initial drinking water permit review of the Carlsbad facility in 2006, the project proponent stated that toxins associated with potential red tide/algal bloom episode(s) in the waters around the plant intake should not pass through the various treatment processes. The public health office concluded that as "industry-wide understanding of the Harmful Algal Bloom (HAB) phenomenon, and related biotoxin toxicity issue, in drinking water progresses, both the monitoring and operations of permitted desalination facilities may require alteration." DPH went on to find that in the event that the Department makes a determination that biotoxins should be regulated, then Carlsbad would be "required to change their operations and monitoring plans to include, but not be limited to establishing: monitoring ranges, recording and reporting infrastructure, and shut down set points." Since 2006, the science community has become increasingly concerned about the effectiveness of reverse osmosis operations to filter all HAB toxins. As discussed above, the pretreatment process may elevate toxin levels in the source water, and scientists are unsure whether HAB toxins are completely removed. Moreover, the international community is now confronted with HAB incidents. In 2013, a desalination facility in Oman was "shut down due to the uncertainty that the drinking water would remain safe during the red tide."	Disagree. Neither the proposed Desalination Amendment nor the existing Ocean Plan are the appropriate body of regulation to address drinking water quality or the operation and production of drinking water facilities. That authority and responsibility lies with the State Water Board's Division of Drinking Water, which regulates drinking water through the issuance of permits to ensure drinking water is safe and reliable for all users. See http://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/permits/ApplicantPermitInstructions.pdf

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	Given the growing concerns regarding HABs and desalination operations, we believe California's Drinking Water Program should reassess whether desalination facilities should be required to monitor their source and product water to ensure HAB toxins are completely removed from the drinking water As such, we request the following revisions to Chapter III.L.2.c.: "The owner or operator of a desalination facility* must submit a Monitoring and Reporting PIan to the regional water board for approval. The Monitoring and Reporting Plan shall include monitoring of effluent and receiving water characteristics, monitoring for harmful algae blooms influent and final product water, and impacts to marine life. The Monitoring and Reporting Plan shall, at a minimum, include monitoring for benthic community health, aquatic life toxicity, and receiving water characteristics consistent with Appendix III of this PIan and for compliance with the receiving water limitation in chapter III.L.3. A project proponent implementing the best available technology of subsurface intakes shall not be required to monitoring for harmful algae blooms."	
21.127	The Emergency Exemption Needs to be Properly Defined. Chapter III.L.1.(a). of the draft Amendment defines exceptions where the Amendment would not apply. The exception includes an Executive Director waiver of the rule for "facilities that are operated to serve as a critical short-term water supply during a state of emergency as declared by the Governor." We do not oppose reasonable exceptions to the rule for emergency situations. We agree that, in a state of emergency declared by the Governor, these portable units should be available for temporary emergency relief. In fact, the draft exception to the rule should be expanded to ensure disaster relief for emergencies in California declared by Federal authorities, and to indicate that several portable units may be needed in an area to ensure public safety during disasters.	Disagree. Typically the Governor would declare a state of emergency and request federal relief as needed. Therefore no changes are necessary to address federal emergencies. (See https://www.fema.gov/disaster-process-disaster-aid-programs)
21.128	The second exception for "operation" of facilities to serve as a short-term water supply is not clearly defined and may create an "exception that swallows the rule." For example, permanent facilities are required to use the "best design" to minimize the intake and mortality of marine life. To	Disagree. The Executive Director of the State Water Board also has the authority to temporarily waive all or part of the requirements. The exception for the operation of desalination facilities to provide short-term water supply only applies during a state of emergency as

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	date, permanent facilities have been proposed for inclusion in a permanent water supply portfolio. It is not clear how a facility that is designed and operated as a permanent component of a water supply portfolio could change that "operation" to "serve as a critical short-term water supply." If it is designed to produce a determined volume of water, and that production capacity is relied on in non-emergency times, it is unclear how it can be "operated" differently during an emergency to produce a "short-term water supply" beyond what the facility normally produces. Therefore, the "executive director waiver" for operation of facilities to serve a short-term supply of water should be deleted - existing facilities can only produce what they are designed to produce regardless of whether the product water is used continuously or only during an emergency. Alternatively, if the draft is anticipating some use of “existing facility” we have not considered, the "waiver provision" should be clarified so that it is not applicable to projects proposed for permanent non-emergency use that just happen to apply for a permit during times of emergency - or any other application that undermines the intent of the rule.	declared by the Governor. Once the Governor declares the emergency has ended, the exception no longer applies. This approach appropriately limits the duration of the exception.
21.129	Co-location with an OTC Facility Demands 316(b) Standards Apply. The State Board should apply both Water Code Section 13142.5(b) and the CWA Section 316(b) to all desalination plants that are using a seawater intake that uses at least 25 percent of the influent for coolant. As currently written under Chapter III.L.2.a.(2) that the "regional water board shall conduct a Water Code section 13142.5(b) analysis for all new and expanded desalination facilities. But the Amendment makes no mention of CWA Section 316(b) applying to desalination facilities. CWA section 316(b) requires that the location, design, construction, and capacity of cooling intake structures reflect the best technology available for minimizing adverse environmental impact. Section 316(b) does not distinguish between new, expanded, or existing facilities, but does not explicitly state that desalination facilities are covered. Unlike Section 13142.5(b) which is explicit what type of facilities are covered (i.e. cooling and industrial facilities), 316(b) limits its coverage to any facilities that use "cooling intake structures." Meaning, a desalination facility would be covered by CWA 316(b) if the facility is co-located with an OTC facility and is using their cooling intake structure.	The State Water Board’s Once Through Cooling Policy separately applies to existing power plants subject to Clean Water Act section 316(b). Desalination facilities covered under the proposed Desalination Amendment do not propose to use of intake seawater for cooling purposes. Moreover, because the OTC Policy covers existing coastal power plants with which a proposed desalination facility could be co-located and will require specified reductions in cooling water intake, it is unnecessary to extend application of Clean Water Act section 316(b) to these facilities not otherwise subject to it.

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	Currently, numerous proposed facilities are sited adjacent to OTC facilities with the hope that the facility can utilize the existing OTC intake structure. These facilities should theoretically be required to meet both Section 13142.5(b) and 316(b). However, the U.S. EPA developed regulations that define 316(b) rule to apply only to facilities that withdraw at least two million gallons per day of cooling water and use 25 purposes or more of the water withdrawn exclusively for cooling purposes. Therefore, a desalination facility that is co-located with an OTC facility, and uses its intake structure which withdraws at least two MGDs, 25 percent of which goes to cooling purposes, would be required to comply with 316(b). The draft Amendment contains no provision requiring desalination facilities to comply with CWA Section 316(b). However, the State Board notes that Section 316(b) "indirectly applies to desalination facilities co-located with power plants and other industrial cooling water intakes insofar as a cooling water intake structure, used to withdraw water for use by both facilities, must meet the requirements of the federal statute and applicable regulations." The State Board goes on to note that "a desalination facility that collects source water through an existing, operational cooling water intake associated with a power plant, or certain other types of industrial facilities, may be required to comply with technology- based standards for minimizing impingement and entrainment impacts." To ensure desalination facilities are properly regulated under 316(b), the State Board should add a provision requiring new, expanded and existing facilities that are co-located with an OTC facility and meet the U.S. EPA regulations shall comply with both the OTC Policy and this Amendment.	
21.130	California has Feasible Water Supply Alternatives that Provide Multiple Benefits to Californians. Increased recycling of waste water is another important water supply option that is less impactful than seawater desalination. Between Santa Barbara and San Diego, sewage treatment facilities discharge between	Comment noted. The Water Boards promote sustainable use and reuse of water, as described in response to comment 21.131 below. Selection of alternative water supplies by water providers is described in 21.132 and 21.133. Water providers must continuously evaluate their water supplies to ensure reliability regardless of precipitation and climate conditions. As

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	1.5 to 3 billion gallons of freshwater a day. According to state estimates, development of water recycling projects can readily achieve an estimated 1.4 million to 1.7 million acre-feet by the year 2030, of which 0.9 million to 1.4 million acre-feet (62 to 82 percent) would be recycled from discharges that would otherwise be lost to the ocean, saline bays, or brackish bodies of water. In Orange County, the Sanitation District built a world-renowned water reuse facility which generates enough purified water to serve 500,000 people. According to the Report Card for America's Infrastructure, this facility is between 35 and 75% less expensive than saltwater desalination and will consume half the energy. By prohibiting ocean discharges from wastewater treatment plants by 2030, the State Board could dramatically accelerate the adoption of water recycling and significantly improve the drought resistance of urban communities. This would significantly increase available water supply for both agricultural and urban water users, at costs that are comparable to imported water and alternative supplies. This policy change would have at least two added benefits: it would improve coastal water quality by reducing ocean discharges, particularly of wastewater that is only treated to secondary levels; and it could potentially reduce greenhouse gas emissions, because recycled water consumes less electricity than many alternative water supply sources, including water imported from the Bay-Delta to Southern California and ocean or brackish water desalination. It is also recommended that the state develop a General Permit that would allow for the onsite use of greywater under specific conditions.	such, desalination is just one of several alternatives that those providers may consider in attempting to develop more reliable water supplies. Currently, the Water Boards promote sustainable water reuse practices such as those described by the commentator. The Water Boards encourage and support Low Impact Development (LID) through statewide stormwater general permits municipal stormwater permits issued by the Regions, waste discharge requirements and where applicable plans and policies (See http://www.swrcb.ca.gov/water_issues/programs/stormwater/). The State Water Board promotes and encourages the use of recycled water through the adoption of the Policy for Water Quality Control for Recycled Water (Recycled Water Policy) that went into effect April 25, 2013 (See http://www.waterboards.ca.gov/water_issues/programs/water_recycling_policy/docs/rwp_revtoc.pdf) and the General Waste Discharge Requirements for Recycled Water Use (See http://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2014/wqo2014_0090_dwq_revised.pdf). On the issue of greywater or graywater, that subject is regulated under the California Plumbing Code, Title 24, Part 5, Chapter 16A, Part 1 – Nonpotable Water Reuse Systems and enforced by local health agencies. It is not the intent of the State Water Board to address graywater in the proposed Desalination Amendment.
21.131	Alternative Water Supply Options are Less Expensive than Desalination. Water produced by seawater desalination is very expensive with an average price per acre foot 4 to 8 times higher than water from other sources. Estimates for plants proposed in California range from $1,900 to more than $3,000 per acre-foot. A 50 MGD plant, such as the one under construction in Carlsbad is projected to have a price between $2042-$2290 per acre foot. By comparison, the Department of Water Resources data cited in the 2009 California Water Plan Update found that: -The "estimated range of capital and operational costs of water recycling range from $300 to $1300 per acre-foot" depending on local conditions.	The economic basis for selecting desalination over other alternatives supplies (e.g. recycling) is not an issue addressed by the proposed Desalination Amendment. Each water provider is responsible for making informed decisions about future conditions to ensure reliability of supplies and affordability for rate payers. Any decision by a water provider to plan for and develop desalination of ocean waters among other potential water supplies is outside the purview of the Water Boards. The intent of the proposed Desalination Amendment, if adopted, is to ensure that aquatic life related beneficial uses are protected if desalination is selected by a water provider.

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	-The cost to realize an acre-foot of water savings through efficiency measures ranges from $223 to $522 per acre-foot. - The agricultural efficiency improvements that result in water savings of between 120,000 to 563,000 acre-feet per year can be achieved at a cost ranging from $35-$900 per acre-foot. While the cost of seawater desalination has declined over the past 20 years, the cost remains very high and there are unlikely to be major breakthroughs in the near- to mid-term that make it cost-competitive with the less expensive, and less impactful, alternatives.	
21.132	Alternative Water Supply Options are less Energy Intensive - do not Perpetuate Climate Change -Compared to Desalination. A 2011 life-cycle energy assessment of California's alternative water supplies commissioned by the California Energy Commission found that, while a desalination system can have a wide array of impacts depending on the water source: "In all cases, the energy use is higher than alternative water supply." Energy accounts for 36% of the cost to run a reverse osmosis seawater desalination plant. The seawater desalination plant under construction in Carlsbad will require 47 percent more energy than water delivered to San Diego from the State Water Project Transfers - currently the highest energy demand in the region's water supply portfolio. The Los Angeles Economic Development Corporation found ocean desalination to indirectly create more greenhouse gases than any other water source. The Inland Empire Utilities Agency has similarly reported that ocean desalination would use over ten times more energy than water recycling in its service area. California's current water management system is already extremely energy-intensive: "water-related energy use consumes 19 percent of the state's electricity, 30 percent of its natural gas, and 88 billion gallons of diesel fuel every year." In its 2008 Climate Change Scoping Plan document, the California Air Resources Board noted that one way for the state to achieve GHG emissions reductions is to replace existing water supply and treatment processes with more energy efficient alternatives. Because seawater desalination is so energy intensive, extensive	The proposed Desalination Amendment is intended to support desalination as an alternative source or water supply of California's ocean water in a manner that protects water quality and beneficial uses of ocean water. The State Water Board also promotes other water supply alternatives, including water recycling. As stated in Section 12.1.7 of the Staff Report with SED, potential greenhouse gas emissions may be significant if facility's energy is derived primarily from fossil fuels. However, as further stated in the Staff Report with SED, other forms of energy that result in much lower greenhouse gas emissions may be used that would result in little or no impact. If a project proponent elects to develop desalination as an alternative supply of water, the proponent must assess the project's contribution to greenhouse gas emissions and ensure that those emissions comply with the appropriate Air Quality Management District CEQA requirements for greenhouse gas emissions. To provide any more information as to what sources of energy would be used by future desalination facilities is speculative.

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	development of this technology could lead to "greater dependence on fossil fuels, an increase in greenhouse gas emissions, and a worsening of climate change." To effectively minimize the impacts of climate change and reduce GHG emissions, the state should prioritize water supply and treatment alternatives that are energy efficient.	
21.133	California Should not Encourage Desalination Because of the Drought. California should learn from Australia's mistakes. Severe drought from the mid-1990s until 2012 prompted Australia to construct six large-scale seawater desalination plants at a cost of $10 billion to provide an alternative source of drinking water. At the same time, water policy reforms and improved efficiency measures were implemented through the country's National Water Initiative. The plants took years to build, and by the time they were operational, the drought had eased and cheaper alternatives, made possible by the National Water Initiative, made the water from the desalination plants impractical. Today, four of the six Australian plants stand idle, illustrating the danger of demand risk, which "is the risk that water demand will be insufficient to justify continued operation of the desalination plant due to the availability of less expensive water supply and demand management alternatives." Because many of the seawater desalination projects proposed in California are privately financed: "Project developers may build large plants in an effort to capture economies of scale and reduce the unit cost of water. This can, however, lead to oversized projects that ultimately increase demand risk and threaten the long-term viability of a project." The plant in Sydney cost $2 billion to build, yet in 2012 it was shut down while taxpayers were left to pay $16 million per month for the cost of building the plant and its pipeline. Melbourne also reacted to the drought and built the $3.6 billion Wonthaggi desalination plant, which came online in 2012. Similar to the Sydney plant, Wonthaggi is now idle.	One of the project goals of the proposed Desalination Amendment is to support desalination as an alternative source of water supply of California’s ocean water in a manner that protects water quality and beneficial uses of ocean waters. The State Water Board also promotes other alternatives including water recycling, as described in response to comment 21.130. The proposed Desalination Amendment would establish an analytical framework for evaluating proposed desalination projects that would use seawater in order to increase availability of potable water supplies. It is up to the water providers to evaluate various supply options and costs of each to make informed decisions about future supplies. Selecting water supply alternatives is not the State Water Board’s role nor does the State Water Board have that authority.

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	Nevertheless, water consumers are continuing to pay $670 million annually for Wonthaggi's construction through water bill surcharges, and that is without one drop of water being drawn from the plane. If California reacts to the drought in the same manner as Australia, we may also find ourselves in a regrettable position - with taxpayers footing the bill for years to come.	
21.134	The State Board Should Consider the Real-world Implementation of the Amendment Before it is Adopted. Over the past decade, our organizations have engaged in numerous industry conferences, academic and policy research efforts, and regulatory permitting processes for several California desalination proposals. That experience has given us a deep understanding of the need for the State Board to articulate not only the intent of the Desalination Amendment, but the specific language needed to ensure that the intent is realized. Several past decisions by regional boards have clearly shown how the words and phrases of Water Code section 13142.5(b) can be interpreted and manipulated to undermine the goal of siting, designing and constructing seawater desalination facilities to minimize the intake and mortality of all forms of marine life. However, there are examples that exhibit the "good actors" ability to meet the intent of the law, and also ensure a quicker path to permits from several agencies, including regional boards. The simplified question is whether a project proponent seeking a permit from a Regional Board has done everything possible to reduce the intake and mortality of marine life of all forms and life stages, through a combination of the best site available, the best design available, and the best technology available to achieve that minimization of harm. Obviously, if the project combined these elements in a way that eliminated the intake and mortality of all forms of marine life, or got as close as possible to elimination, that would clearly be the best possible combination. But if the project proposal does not get as close as possible to eliminating the harm, the question then becomes whether there is a better site, better design or better technology available. Pre-determining any one of these elements without ensuring compatibility with the other	Disagree that the proposed Amendment lacks clarity or appropriate directives and requirements. Permitting of desalination facilities requires the analysis of multiple factors as described in Water Code section 13142.5(b). The proposed Desalination Amendment clearly articulates the type of information required for the analysis and how a regional water board must use it in making the determination. Additional clarification is not required. The State Water Board has used all available information and examples to inform the process of interpreting the requirements of section 13142.5(b) consistent with applicable case law.

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	elements can result in the other elements being considered "infeasible" - and consequently result in a "less than the best" desalination project that does not minimize environmental impacts. For example, when an applicant requests adoption of a "site-specific" best technology standard, they are clearly not combining the "best site" with the "best technology" to collectively minimize the intake and mortality of all forms of marine life. We know from experience that this is "code" for picking a site for some other reason than minimizing the intake and mortality of all forms of marine life, and then arguing that the best technology is not feasible at the site. Further, some proposals show an unnecessarily high reliance on "after-the-fact restoration" over full minimization, and then argue against full replacement through after-the-fact restoration. This is clearly undermining the intent of the law and the policy, but is arguably allowed under the currently proposed Amendment as written. Fortunately there are also examples of project proposals that do combine the elements - site, design, and technology - in a way that collectively minimizes the intake and mortality of all forms of marine life. Permitting of the Sand City project, and planning for the CalAm project in Monterey has, in effect, started with the identification of sub-surface intakes as the best technology, and then identified several sites that may be compatible with that technology. Further, in the CalAm proposal, the design is still contingent on whether recycled wastewater can provide a portion of the demand, either now or in the future. We recommend the State Board follow this approach and advance a Desal Policy that requires site location, facility design, and technology to be collectively combined to minimize the intake and mortality of all forms of marine life: each of the elements has to be the best available, and the combination has to emphasize that the separate elements must be compatible and collectively minimize the intake and mortality of marine life. While we agree with the Municipal Water District of Orange County (MWDOC) and Poseidon that "minimize" harm does not necessarily mean "eliminate" harm - it is important to clarify that eliminating harm is clearly the best minimization. And as the *Riverkeeper* court clearly articulated, if the best possible minimization is 100 percent, and there is an acceptable variance of 10 percent, then 90 percent is the performance standard - not 89 percent.	

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	Therefore, we request the State Board consider previous desalination permitting, and provide clear guidance and less discretion to Regional Boards to ensure consistent enforcement statewide. The final Amendment must include additional clarification language to ensure the elements of section 13142.5(b) minimize the intake and mortality of all forms of marine life both individually and through a combination that ensures compatibility and collective minimization.	
#22	**Sean Bothwell, California Coastkeeper Alliance et al.**	
22.1	It is critical that the State Board develop statewide standards for desalination that minimize the intake and mortality of all forms of marine life and maintain ecosystem functions. Substantial changes need to be made to the Amendment in order to achieve the intent of the Clean Water Act (CWA) and Porter-Cologne Act, uphold the OTC Policy, and protect and restore California's marine ecosystems. The State Board should be explicit that the "best available" standard is required for each 13142.5(b) factor and include guidance on how regional boards shall combine all factors. Generally speaking, we agree with the Amendment's intent of identifying the "best site", "best design" and "best technology" available for "minimizing the intake and mortality of all forms of marine life." These three elements should be fully enforced before turning to mitigation. And mitigation, to the extent it includes after-the-fact restoration, is still required to be "best." It is also a reasonable interpretation of the language to include an analysis of all the three primary elements in combination to ensure that, collectively, those elements of a facility meet the standard of "best" and "minimization" of the intake and mortality of all forms of marine life.	Please see responses to comments 21.5, 21.9, 21.12, 21.17, 21.27, and 21.29.
22.2	The State Board should make a finding that subsurface infiltration galleries are the best available technology. Subsurface infiltration galleries offer flexibility to desalination proponents, and are considered "highly feasible" because they are designed to replace the natural substrate with an engineered substrate that allows for high design capacity. The State Board should consider galleries and wells as two separate technologies with different performance standards. While	Please see responses to comments 21.19, 21.25, 21.29, and 21.31.

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	galleries and wells have the same operational impacts, they have different construction impacts - thus each has different performance standards for minimizing marine life mortality. Finding galleries to be the best available technology provides the State and Regional Boards flexibility, while achieving the legal requirements under 13142.5(b).	
22.3	Screens are not the best available technology. In its OTC Policy, the Water Board already considered the efficacy of screened intakes for minimizing the intake and mortality of marine life, and found them inferior. In fact, the OTC Policy only allowed the use of screens if, in combination with other measures, they could meet the performance standards established by the "best available technology." Nothing has changed since adoption of the OTC Policy. If anything, recent studies have only confirmed that the efficacy of screened surface intakes is still questionable and likely less than what was assumed when the OTC Policy was adopted. The consideration of screen efficacy in the Amendment needs to be consistent with the adopted approach in the OTC Policy, and the State Board needs to be explicit that surface intakes with fine mesh screens are not the "best available technology" - far from it.	Please see responses to comments 21.53, 21.54, and 21.55.
22.4	When determining the feasibility of the best available technology, cost should not be a factor. The federal courts have determined that "[j]ust as the Agency cannot determine BTA on the basis of cost--benefit analysis; it cannot authorize site-specific determinations of BTA based on cost-benefit analysis." There is no legislative intent to include a cost-benefit analysis in the Clean Water Act section 316(b), nor is any such intent evident in Porter-Cologne Act section 13142.5(b). They are similar and must be applied similarly. The State Board cannot authorize a site-specific determination of whether BTA is feasible using a cost-benefit analysis.	Please see responses to comments 21.29, 21.32, 21.33, and 21.35.
22.5	The State Board should properly define "not feasible" under the best available technology analysis. Given the Water Code does not define "feasible", the State Board should use the OTC Policy and CWA Section 316(b) as guidance. The proposed Amendment does not contain a definition of "not feasible", but rather a laundry list of criteria to be	Also, please see responses to comments 6.12, 21.15, 21.40, 21.41, 21.50, and 21.51.

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	evaluated by regional boards. These eight factors are not only vague and open-ended, allowing project proponents to excuse themselves from the best available technology standard, but they do not provide an actual definition. Black's Law Dictionary defines feasible as "capable of being accomplished." Therefore, we believe the definition of "not feasible" in the Amendment should be: "Cannot be constructed or operated given geotechnical data, hydrogeology, benthic topography, or oceanographic conditions. Cannot be accomplished because of the inability to obtain necessary permits due to unacceptable environmental impacts, local ordinances, State or local regulations, etc. Cost is not a factor to be considered when determining feasibility. Flow Augmentation for brine dilution is not a factor to be considered when determining feasibility."	
22.6	The State Board should determine design capacity to be the "best available design." It is critical that the State Board include design capacity as a factor to be considered under the best available design analysis, because designing a facility with a production design capacity to accommodate subsurface intakes is the best available design. We request the State Board define design capacity as the maximum amount of capacity achieved using the best available intake technology at the best available site for that technology.	Please see responses to comments 21.3, 21.63, 21.64, and 21.65.
22.7	The State Board should revise the best available site analysis to accommodate the best available technology and minimize impacts to Marine Protected Areas and other important ecological areas. Desalination plants with infrastructure sited in or near MPAs would likely result in significant impacts from intakes and brine discharge to marine life and ecosystem functions, similar to impacts from power plant intake and discharge sites. Desalination plants sited in proximity to MPAs may reduce larval connectivity between protected areas through entrainment and impingement, thereby compromising the effectiveness of the broader network of MPAs. We therefore fully support the clear directive in section L.2.b.6 of the draft policy that intake and discharge structures for desalination facilities shall not be located within MPAs or State Water Quality Protected Areas (SWQPAs). We also support the statement that discharges should be sited at a sufficient distance as to have no impacts on MPAs or SWQPAs. It is equally critical, as stated above, that the best	Please see responses to comments 21.82, 21.84

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	available site accommodate the best available technology, and that siting, design and technology each fully minimize the intake and mortality of marine life - especially potential impacts to MPAs and other ecologically important sites.	
22.8	The State Board should prohibit after-the-fact restoration as in-lieu mitigation for the best available technology; it should revise the mitigation fee calculation; and ensure mitigation fees are spent to minimize the intake and mortality of marine life. We agree that the best available mitigation should be implemented after minimizing marine life mortality through site, design, and technology measures. However, replacing marine life that is lost due to the activity of a desalination facility as a substitute for best available technology is illegal. Federal courts have concluded that after-the-fact restoration cannot be used "in-lieu" of the best technology available. Moreover, the mitigation fee calculation must include a "multiplier" to ensure that, if the restoration project replaces habitats that are not proportional to the species lost to the intake, the indirect benefits are reasonably "discounted" - that is, not credited. It should be clarified in the Amendment that the purpose of any habitat restoration project is to fully replace "all forms of marine life." We support including a broad list of potential mitigation projects as identified in section III.L.2.e.(3)(b)i, along with clear performance standards and measurement requirements. Having a broad list may help provide the flexibility needed to increase the prospects for a proportional and successful mix of restoration projects to fully replace "all forms of marine life" lost to the intake. The State Board should also include a preference for mitigation projects in the geographic vicinity of the proposed project, to help match replacement production as closely as possible to marine life losses.	The proposed Desalination Amendment does not contemplate replacement of marine life as a substitute for employing other measures to reduce intake and mortality of all forms of marine life. Regardless, the only applicable authority regarding illegality of after-the-fact restoration measures is *Riverkeeper* I, which interpreted Clean Water Act section 316(b). Federal case law interpreting section 316(b) is not applicable or controlling when interpreting Water Code section 13142.5(b). See also, response to comment 21.86.
22.9	The State Board should determine that spray-brine diffusers are the best available discharge technology; and prohibit flow augmentation for brine dilution. The Brine Expert Panel could not cite any studies disproving that spray brine diffusers would cause the mortality of marine life. Until there is some empirical evidence, or at a minimum laboratory tests, showing the degree of mortality in a spray brine plume, properly designed and sited diffusers should be considered the best available technology for brine	Commenter provides no clear basis for the claim that flow augmentation is illegal. Regardless, the draft Desalination Amendment does not propose allowing flow augmentation without a demonstration that the technology is protective and that the technology provides “a comparable level of protection as wastewater dilution if wastewater is available, or multiport diffusers if wastewater is unavailable.” The provision requires evaluation of “all of the individual and cumulative

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	dilution. Flow augmentation (increased intake volume) is illegal and should not be an allowable technology or practice for discharging brine. As the State Board admits, withdrawing "additional seawater through surface intakes for the purpose of diluting brine effluent to meet water quality standards (referred to as "flow augmentation") can significantly increase entrainment and impingement." Moreover, even if a technology can reduce entrainment through "low turbulence intakes" "[a]dditional mortality may occur through brine exposure in the mixing process and through predation in conveyance pipes." Spray-brine diffusers are the best available discharge technology and flow augmentation to dilute brine is illegal.	effects of the proposed alternative discharge method on mortality of all forms of marine life."
#23	**Deven N. Upadhyay, Metropolitan Water District of Southern California Water District of Southern California**	
23.1	Throughout this process, Metropolitan has stressed the need for science-based regulations that incorporate water agency studies and provide flexibility to accommodate project and site-specific conditions. These are reflected in the proposed regulations and we commend SWRCB staff for addressing our input. Metropolitan supports the flexible approach provided by the proposed regulations. This is especially true for intake determinations. Sub-surface intakes have been successfully employed for small to medium-sized projects -up to about 20 MGD -but are untested for projects capable of providing regional-scale supplies. The 50 MGD to 100+ MGD desalination projects in Australia and Israel all employ some form of open ocean intake. For regional-scale projects, the flexibility to consider wedge-wire screens and other technological solutions if sub--surface intakes are not feasible is critical. While wedge-wire screens have not been tested in large marine applications, studies performed by West Basin MWD and other water districts indicate they are both a viable option and protective of the environment. This flexible approach will be essential as water agencies incorporate desalination into future supply portfolios.	The comments and support for the proposed Desalination Amendment's flexibility in accommodating project-specific conditions is appreciated. The commenter questions the ability to employ subsurface intakes for a large scale desalination facility. Section 8.3.2 of the SED acknowledges that subsurface intakes may not be suitable in all locations due to geological constraints and that the largest desalination facility using subsurface intakes is the Fukuoka Japan facility that withdraws 27 MGD. The use of subsurface intakes has been investigated for large scale facilities (50-150 MGD SCWD 2009), but have not yet been built. As technological advancements are made (e.g,. horizontal directional drilling), the use of subsurface intakes at very large desalination facilities will become more feasible. Furthermore it is important to set an environmentally protective standard so there will be a push to improve technology to meet the standards. However, subsurface intakes may not be feasible at all locations and one of the project goals is to support the use of ocean water as an alternative water supply option. Screening technologies are an alternative when subsurface intakes are infeasible. However, screening technologies will require compensatory mitigation for marine life mortality since they do not eliminate entrainment and may impinge organisms. Please also see response to comment 18.2
23.2	Project proponents should perform 13142.5(b) analyses: The draft regulations require regional boards to perform 13142.5(b) analyses and	Please see response to comment 6.2.

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	make determinations regarding seawater desalination intake site, design, technology and mitigation based on information provided by project proponents. However, regional boards may lack the technical expertise and resources to perform 13142.5(b) analyses. After consulting with SWRCB staff during a recent stakeholder meeting, we understood that this provision would likely be implemented by having regional boards request that project proponents perform the necessary 13142.5(b) analyses. Regional boards would then review the analyses and make 13142.5(b) determinations in consultation with the SWRCB. Project proponents typically evaluate numerous alternatives during the development stage and will have the necessary technical expertise and resources to complete determination reports. We ask the Board to clarify that project proponents will perform the analysis and complete 13142.5(b) determination reports for the Regional Boards to review.	
23.3	State agency coordination should be reinforced: The draft regulations include provisions requiring regional boards to consult with other state agencies in making 13142.5(b) determinations. However, it is important to note that the regional boards would not be limited by any permit requirements imposed by these agencies. This potentially increases the permitting uncertainty facing project proponents, as different agencies could have conflicting permit requirements. It also could undermine the Ocean Protection Council's efforts to streamline the permitting process. We urge the Board to consider adding language that would require regional boards to harmonize their permit requirements with the State Lands Commission, Coastal Commission, and other state agencies with permitting authority over desalination projects.	L.2.a.(4) of the proposed Desalination Amendment states that when conducting a 13142.5(b) determination, the regional water boards shall consult with other state agencies involved in the permitting of that facility, including, but not limited to: California Coastal Commission, California State Lands Commission, California Department of Fish and Wildlife, and California Department of Public Health. The intent of this collaboration is to prevent confliction in permit requirements between these permitting authorities and to help streamline the permitting process. Please see responses to comments 18.13 and 12.18.
23.4	Regional need determination is beyond the scope of the Ocean Plan: Project size is not a factor in 13142.5(b) determinations. Yet, there is an inherent inconsistency as part of the siting analyses, which requires regional boards to make regional need and project capacity determinations for seawater desalination projects in relation to sub-surface intake feasibility. Developing long-term water needs analysis is typically the purview of local and regional water utilities, and project need and sizing options are considered in various water plans and studies long before permitting begins. During the CEQA environmental	Please see response 18.14.

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	impact review process, project alternatives are also thoroughly evaluated. For these reasons, we request that this provision be removed from the proposed Ocean Plan amendments.	
23.5	Growth projections and water resource plans are not circular: During the August 6 workshop it was suggested that growth projections and water resource plans are circular: growth is used to justify water supplies and water supplies are used to justify growth. We would respectfully like to clarify this misinterpretation. In Southern California, water agencies typically base their resource plans on growth projections from cities, counties and Regional Council of Governments (COGs). For example, Metropolitan ties its resource plans on growth projections from the Southern California Association of Governments (SCAG) and San Diego Association of Governments (SANDAG) - the COGs covering our service area. SCAG and SANDAG generate growth projections using demographic models that consider births, deaths, immigration, the economy and land use. Also, the California Department of Housing and Community Development requires COGs to plan for new housing through periodic Regional Housing Needs Assessments (RHNA). The RHNA process allocates new housing development to COGs in order to accommodate the State's future population. Water supply is not a driving or enabling factor in COG growth models.	Comment noted.
#24	**Charles Lester, California Coastal Commission**	
24.1	Use of subsurface intakes: We concur with the policy's conclusion that subsurface intakes are the preferred technology and that surface intakes are to be permitted only where subsurface intakes are determined to be infeasible. This approach is consistent with the requirement of Porter-Cologne Act Section 13142.5(b) to use all feasible means to minimize the intake and mortality of marine life and is also consistent with the approach the Coastal Commission has taken to implement Coastal Act Section 30231, which requires that the adverse effects of entrainment be minimized to the extent feasible. Although neither of these provisions specifies the use of subsurface intakes, the analysis required for each leads first to consideration of subsurface methods, since, where they are feasible, they essentially eliminate the "intake and mortality of marine life" and minimize the adverse effects of entrainment. We recognize that	Comment appreciated and noted.

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	subsurface intakes will not be feasible in all situations, but believe the policy should emphasize subsurface intake designs as the ones that will most fully meet the requirement of Section 13142.5(b).	
24.2	Determining "best available site; design, technology, and mitigation measures feasible": The policy proposes that regional boards evaluate proposed projects by considering Section 13142.5(b)'s feasibility components both individually and collectively, and then select the intake design that provides the best combination of alternatives to minimize the intake and mortality of marine life. We generally concur with this approach, though we recommend the final policy prioritize the importance of initially selecting a site or sites that will best minimize the intake and mortality of marine life. Of all the feasibility components of Section 13142.5(b), selecting an appropriate site is the most influential towards minimizing a facility's intake and mortality of marine life. The most obvious example is choosing a site where subsurface intakes are feasible versus choosing a site where only surface intakes are feasible. No combination of the other components - design, technology, and mitigation measures - will result in minimizing the intake and mortality of marine life as much as selecting a site where a subsurface intake can be used. In fact, several entities have already used this approach in the design of their facilities. We recommend the policy prioritize its feasibility components so that site selection has the highest priority during the regional boards' analysis of determining Section 13142.5(b) conformity. By requiring this "weighting" of the feasibility components with emphasis on site selection, we expect the policy will lead to more facilities that have little or no intake-related marine life effects.	The comment is appreciated and noted. The proposed Desalination Amendment requires the regional water boards to conduct a Water Code section 13142.5(b) analysis by first considering a feasible range of alternatives for each factor separately, and then consider the best combination of all factors collectively. As part of the individual assessments, the analysis for the preferred technology will require the feasibility of a subsurface intake. The feasibility analysis of a subsurface intake requires many factors, including location, to be considered in the feasibility process. Therefore, the process of analyzing the feasibility of a subsurface intake will overlap with the process of investigating the preferred siting alternative.
24.3	Additionally, and as discussed at the Board's August 6, 2014 workshop, we support efforts by the Board and other agencies to develop as part of the state's coastal mapping efforts the data layers needed to identify sites along the coast where subsurface intakes may or may not be feasible. We believe this could allow better conformity to Section 13142.5(b) and would also be supportive of the state's other extensive efforts to protect marine life.	Agree. We support coastal mapping efforts in California. The data layers could be used to identify locations of sensitive habitats and sensitive species as well as suitable locations for subsurface intakes. Identifying suitable locations for subsurface intakes will require extensive studies since there are many site-specific variables that can affect where subsurface intakes are feasible and how much water can be withdrawn from an intake. Data from subsurface intake feasibility studies for desalination facilities can be used to identify areas where subsurface intakes may be infeasible. For example, the City of Santa

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		Cruz completed an extensive offshore geophysical study and intake technical feasibility study. These data could be used in future coastal mapping efforts. However site/project-specific verification would still be required before any final determination of infeasibility could be made by the regional water board.
24.4	We also recommend that the SED's analyses of the "best available site, design, technology, and mitigation measures feasible" be modified so that they consistently apply the standard required in Section 13142.5(b) - i.e., the requirement to "minimize the intake and mortality of marine life." The analyses in the SED sometimes uses other more general standards - for example, the SED's analyses in Sections 8.4.8 and 8.4.9, which describe the options considered for selecting an intake, use standards such as a facility being "less protective" of marine life, or that the best site should "protect marine life, water quality, and the beneficial uses of ocean waters." These general standards may be appropriate to apply to other provisions of the Porter-Cologne Act or to other components of feasibility; however, for purposes of intake selection, we recommend the policy and SED consistently apply the requirement of Section 13142.5(b) to "minimize the intake and mortality of marine life."	Please see response to comment 6.1.
24.5	Siting consideration - "needs" test: Section L2.b.(1) of the proposed policy includes as part of its site considerations a "needs" test, which would require that the identified need for water to be provided by a proposed desalination facility be consistent with any of several plans, including a county general plan, an integrated water resource management plan, or an urban water management plan. Most of these plans are very general in nature and do not provide an adequate level of detail to determine whether a particular proposed desalination facility is consistent with identified local or regional water needs. We recommend instead that the policy be modified to require that proposed desalination facilities to be consistent with a current Urban Water Management Plan (UWMP) showing that the project and the amount of water expected from it are included as part of a water district's specifically identified Planned Water Supply Projects and Programs, required pursuant to Water Code Section 10631(h). This section of the	Chapter III.L.2.b.(2) was revised to consider whether the identified need for desalinated* water is consistent with applicable adopted county general plans, integrated regional water management plans, or urban water management plans, or other water planning documents if these plans are unavailable. In some cases, an urban water management will not be available. The other included water planning documents will ensure there is at least some demonstration of need for desalinated water.

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	Water Code requires that water districts identity the specific projects they expect to rely on for future water supplies under various conditions. A project identified in this section of an UWMP generally establishes a degree of commitment, planning, and engineering by a water district that the regional boards can rely upon with greater certainty as compared to inclusion of a proposed project in the other more general planning documents listed above.	
24.6	Screen slot size: If subsurface intakes are not feasible or do not provide the best combination of marine life benefits, the policy proposes that surface intakes be permitted, but only if screened. We concur with the policy's requirement that any approved open water intakes be screened, though we do not have a preference for which of the three slot sizes (0.5 mm, 0.75 mm, 1.0 mm) the Board selects. Review by the Board's expert panel and others showed that each of these screen sizes provided only a modest reduction in entrainment (see, for example, the SED at page 52). However, even these modest reductions help reduce entrainment to some degree and thereby help meet the standard stated in Porter-Cologne Act Section 13142.5(b) to minimize the intake and mortality of marine life. Nonetheless, the relatively minor benefits expected from screening suggest the policy should include a strong compensatory mitigation component, including those components described below.	Comment noted. Chapter III.L.2.e of the proposed Desalination Amendment ensures that appropriate impacts from desalination facilities are fully mitigated.
24.7	Flow augmentation: We concur with the policy allowing facilities with subsurface intakes to use flow augmentation to reduce brine concentrations. For several reasons, however, we recommend the policy not allow facilities with open or screened intakes to use flow augmentation. The proposed policy's Section III.L.2.d provides that facilities using screened, surface water intakes may use flow augmentation only if it provides a comparable level of protection as either wastewater dilution or multiport diffusers. The SED provides a brief description of flow augmentation and its potential benefits. However, allowing flow augmentation using screened, open intakes is inherently inconsistent with the requirement of Section 13142.5(b) to "minimize the intake and	In order to leave the opportunity for future technological innovations, the proposed Desalination Amendment includes an option for alternative brine disposal technologies, including flow augmentation. Commingling brine with wastewater is the preferred discharge alternative and discharging brine through multiport diffusers is the next preferred method when wastewater for dilution is unavailable or not feasible. An owner or operator proposing to use an alternative brine disposal technology must demonstrate to the regional water board that the alternative method is as protective as multiport diffusers. This approach accommodates for site-specific considerations and future technological innovations while maintaining a standard that is protective of beneficial uses.

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	mortality of all forms of marine life." By definition, flow augmentation would increase the volume of water drawn into the intake and thereby increase the number of organisms subject to entrainment mortality. As noted above, screening the intake would only slightly reduce the overall increased intake and mortality of marine life caused by flow augmentation. Additionally, the measures described in the SED that might be used to reduce the increased entrainment mortality caused by flow augmentation - e.g., low turbulence screw pumps, slowly mixing brine and dilution water, etc. are entirely speculative. As stated in the SED, "there are no empirical data" showing the rate of mortality resulting from low turbulence pumps and "[t]here are no case studies or engineering designs" describing how to mix brine and dilution water to reduce mortality rates. The SED acknowledges that mortality for organisms drawn into surface intakes is essentially 100% due to any number of factors. We recognize that results of future studies may show that flow augmentation can be done in a manner that is as protective as wastewater dilution or multiport diffusers. Should that occur, the policy could then be modified to allow for such methods. However, because flow augmentation is inconsistent with the basic performance requirement of Section 13142.5(b) and because all these described methods are speculative, we recommend that proposed flow augmentation for surface intakes not be included in the current policy.	
24.8	Purpose of mitigation: We concur with the policy generally requiring full mitigation for all marine life mortality resulting from desalination facility construction and operation. We also recognize that, in some cases, construction-related effects are temporary and the affected habitat is restored naturally.	Comment noted.
24.9	Determining the type and extent of facility's marine life effects: We concur with the proposed policy's requirement that owners or operators of a facility using a surface water intake base the proposed mitigation on a Marine Life Mortality Report to be prepared using criteria identified in the policy. We also concur that the Report should be based on results of an entrainment study and analysis using the Empirical Transport Model ("ETM") and that those results be used to calculate the Area of Production Foregone ("APF") resulting from project entrainment. This	Comment noted.

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	approach is consistent with the studies and analyses required or relied upon over the past decade by the State and Regional Boards, the California Energy Commission, and the Coastal Commission for determining the entrainment impacts of coastal power plants and desalination facilities.	
24.10	Amount and area of mitigation: The policy proposes that the APF be based on a 90% confidence level; that is, that there is a 90% level of confidence that the area of habitat created or restored to provide mitigation, if fully successful, will fully compensate for the identified level of marine life losses. A high confidence level is important for several reasons, including: - To make up for a low mitigation ratio: The policy's 90% confidence level is based on mitigation being provided at a 1:1 ratio. This is in lieu of the mitigation ratio approach generally used for mitigation projects - e.g., requiring that mitigation provide twice or four times the area of lost habitat to make up for the temporal and spatial habitat losses that occur until a mitigation site is successful. The policy's approach is due in part to entrainment impacts being measured as an annual loss of productivity rather than a loss of habitat. However, when using only a 1:1 mitigation ratio, it is particularly important to have a high degree of confidence that the mitigation will adequately compensate for the expected losses. - To better mitigate for entrainment impacts that are identified indirectly: The source water calculations used to develop the APF are generally based on no more than a handful of the dozens or hundreds of species entrained; therefore, the mitigation amounts derived from the ETM and APF methods are based on a relatively small number of species serving as surrogates for all entrained species. Requiring a high confidence level for the compensatory mitigation is therefore more likely to provide assurance of some level of mitigation for the many species that are not included in the source water calculations conducted as part of an entrainment study. - To make up for temporal losses: The recent history of creating or restoring sites to provide mitigation shows that it generally takes years (or	Please see response to comment 21.90 regarding the confidence level and 15.9 regarding mitigation ratios.

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	decades) to meet the necessary performance standards. Requiring an initial high confidence level will help identify the full expected type and amount of mitigation needed and may result in fewer future problems. For most projects, using a confidence level of 90% would not create a substantial additional burden or a substantial cost increase to provide the necessary mitigation. For example, using an APF with a 90% confidence level for the Poseidon Carlsbad desalination facility would have required only about 12% more mitigation acreage than the APF used at that time by the Coastal Commission, and a similar increase in mitigation cost would still have the total marine life mitigation costs represent less than 4% of the project's overall capital and construction costs.	
24.11	Mitigation methods: The policy proposes allowing either of two options to provide the compensatory mitigation needed to replace marine life or habitat lost due to desalination facility construction or operation. In either case, approval of the proposed mitigation is to be done in conjunction with other agencies, including the Commission. - Mitigation Option 1 would require a facility owner or operator to expand, restore, or create of any of several types of valuable habitat types - e.g., kelp beds, coastal wetlands, estuarine habitat, reefs, etc. It would also require that these mitigation projects include performance standards and success criteria, maintenance and management plans, legal instruments for site protection, land other similar features needed for successful habitat mitigation. - Mitigation Option 2 would allow a project proponent to provide funding to a public agency that would be used to create or restore habitat similar to that required under Mitigation Option 1. The proposed components of Mitigation Option 1 are generally consistent with the Commission's approach and we concur with its inclusion in the final adopted policy. However, we have several concerns about the proposed Mitigation Option 2. For example, it is not clear in the draft policy and SED that mitigation provided under this option is to meet the same standards required under Mitigation Option 1 - i.e., that the funds	Please see response to comment 18.5.

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	are to go towards a specific project (or projects) that will create or restore habitat in the same manner as Mitigation Option 1 and that the project(s) include the same performance standards, success criteria, legal protections, etc. We recommend this be clarified in the final policy and SED. It is also unclear what contingency measures will be built in to Mitigation Option 2 to ensure that the funds provided will result in successful mitigation - for example, if a facility operator pays the fee to a public agency, but the mitigation site is either not built or is not successful, what entity holds the responsibility for completing the mitigation as required? We understand, however, that the proposed Mitigation Option 2 fee-based approach is not yet available and would need to be established by a public agency. We are interested in continuing to work collaboratively with the Board staff and others to develop Mitigation Option 2 should it be adopted as part of the final policy.	
#26	**Lynne Harkins, General Public**	
26.1	Every drop matters and every desal site is individual and needs to be fully analyzed as per CEQA for environmental impacts. A site that cannot work with Alternative 1 in Biological section should not be considered; should be ruled out as a place to put a desalination plant. Every, absolutely every! other means of increasing water supply must be exhausted before desal even looked at as option. All strategies for conserving and recycling water along with storm water, off-stream storage and rainwater catchment must be deployed before we get into exploiting and further degrading the nearshore environment.	We agree that every drop matters. Every desalination facility proposed for construction in California will go through the CEQA process to evaluate project-specific impacts. The regional water board's role is in making the Water Code 13142.5(b) determination in order to evaluate the best available site, design, technology, and mitigation measures feasible that in combination minimize intake and mortality of all forms of marine life. Chapter III.L.2.a describes how the regional water boards will analyze the factors first independently and then will use the combination of factors that result in the least amount of intake and mortality of all forms of marine life. Restricting the site to locations where Alternative 1 is feasible may result in higher intake and mortality of marine life overall. For more on the approach, please see response to comment 21.5. For the justification of not requiring Alternative 1, please see section 12.2 of the Staff Report with SED. Waste water and storm water recycling, conservation, desalinated water, and rainwater capture are all solutions to water supply problems. Desalination is increasingly becoming an important water supply option for areas where water sources are limited. Please see response to comment 21.2 on considering desalination only as a last resort.

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26.2	Waste discharges from desalination facilities have the potential to form dense, non--buoyant plumes that settle and spread along the seafloor. Passive discharge of raw or undiluted brine is highly discouraged because of how slowly it will mix in the receiving waters, if at all. (Roberts et al. 2012) Studies have shown exposure to the brine and other potentially toxic constituents in the desalination effluent can have deleterious effects on bottom-dwelling marine life. (Crockett 1997, Talavera and Ruiz 2001; Gacia et al. 2007; Latorre 2005; Del Pilar Ruso et al. 2007; Riera et al. 2012; Roberts et al 2010) These effects include: osmotic stress or shock, the potential formation of hypoxic or anoxic zones, endocrine disruption, compromised immune function, acute or chronic toxicity, and in extreme conditions, death. Some organisms may move away from areas with high salinity or hypoxia, which will change the structure of the local community (Roberts et al. 201 0), but sessile organisms will not be able to move away from the impaired water body and may experience more severe effects. Other organisms have physiological or behavioral changes that occur as a result of environmental cues like changes in salinity. Migratory fish like anadromous salmonids begin their lifecycle in freshwater and move into seawater as juveniles. Increases in salinity concentrations trigger morphological, biochemical, physiological, and behavioral changes in the fish to prepare them for their pelagic life stage. (Bjornsson et al. 2011) These fish also rely on lower salinity concentrations as a cue to adapt to freshwater conditions when returning to their nascent spawning habitat. Brine discharges into salmonid habitat have the potential to interfere with the normal salinity adaptations that occur in the fish. (Roberts et al. 2012) Another study showed that flatfish generally avoided hypoxic environments and would only utilize habitats within a restricted range of suitable temperatures and salinities. (Switzer et al. 2009) Monitoring studies have found that salinity can have a range of localized environmental effects, particularly when brine is discharged into poorly flushed areas like coastal lagoons or embayments. However, there is a need for additional field and laboratory data to measure the environmental effects associated with brine discharges. Most laboratory	Chapters III.L.3 and III.L.4 of the proposed Desalination Amendment address issues associated with the brine discharge for all desalination facilities. The staff Report with SED discusses the issues in further detail in sections 8.6 and 8.7. The use and disposal of pre-treatment solutions, antiscalants, biocides, and cleaning in place (CIP) liquids is outside of the scope of the proposed Desalination Amendment. Even though these chemicals have potentially significant impacts on ocean waters and related beneficial uses, the type of chemicals and frequency of use will vary among facilities based on factors such as how much water the facility processes and the salinity of the intake water. Existing NPDES permits for desalination facilities address the disposal of pretreatment solutions and spent membrane cleaning solutions and often require the waste be discharged into a sanitary sewer system. Additionally, the Ocean Plan's existing acute and chronic toxicity requirements would address any toxicity associated with the discharge of pretreatment solutions and spent membrane cleaning solutions. The regulation of the discharge of these chemicals and spent cleaning solutions will be addressed by the regional water boards in a facility's individual NPDES permit. Additional information has been provided in 8.8 of the Staff Report with SED.

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	studies have focused on short-term chronic salinity toxicity associated with Whole Effluent Toxicity testing (WET), for which there is limited information on sub-lethal endpoints associated with reproduction, endocrine disruption, development, and behavior of benthic invertebrates and vertebrates. Additionally, existing WET studies have focused on the salinity of brine discharges, but have not addressed acute and chronic effects from different types of concentrates and mixtures of membrane treatment chemicals (antiscalants) associated with RO. (Roberts et al. 2012; Phillips et al. 2012) Antiscalants are typically used in desalinating seawater; however, chlorine or other chemicals may also be used at facilities to reduce biofouling. (Roberts et al. 2012)	
#27	**Chris Yates, NOAA, National Marine Fisheries Service**	
27.1	NMFS has been following this SWRCB process for many years and believes Alternative 1 in the proposed Desai Policy best avoids and minimizes impacts to NMFS trust resources. Alternative 1, which requires the use of subsurface intakes for water supply, would result in reduced impacts to NMFS trust resources from facility operations due to the elimination of entrainment and impingement impacts. There may be increased construction impacts due to subsurface intake development, compared with installation of wedgewire screens or alternative surface water intake structures allowed under Alternative 2. These potential construction impacts may be offset through the required mitigation under Alternative 1. Alternative 1 provides a greater assurance of minimized long term impacts to NMFS trust resources. NMFS anticipates commenting on these facilities individually as they go through permitting processes.	Comment noted. Alternative 1 was not selected for the reasons provided in Section 12.2 of the Staff Report with SED.
27.2	Alternative 2 may adequately address impacts to NMFS trust resources if some minor adjustments were incorporated into this alternative. Specifically, NMFS recommends 0.33 fps as a maximum through-screen velocity in order to minimize potential entrainment and impingement impacts. Currently, Alternative 2 allows for the use of screened surface water intakes operated at intake velocities not to exceed 0.5 feet per second (fps) and with slot opening sizes between 0.5 and 1 mm. Alternative, but equally protective, intake methods may be approved following site specific evaluations. Although NMFS does not have a	A maximum intake velocity of 0.5 feet per second was selected for the proposed Desalination Amendment to prevent impingement impacts against screens because it has been shown to preclude most small fish. This value is used by the U.S EPA CWA section 316(b) Phase I Rule for new power plant cooling water intakes and the State Water Board's OTC Policy for existing power plant seawater or estuarine water intakes.

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	through-screen velocity guidance criteria for non-salmonids in marine waters, it is important to note that the approach velocity criteria (synonymous with through-screen velocity as measured perpendicular to the screen face) put forward by NMFS for lakes, reservoirs and tidal areas for fingerling sized (<60mm) salmonids is 0.33 fps. The U.S. Fish and Wildlife Service has a criteria for Delta smelt of 0.2 fps. These criteria indicate that the proposed through-screen velocity of 0.5 fps may not be fully protective of weaker swimming species and life stages. NMFS reviewed the City of Santa Cruz and Soquel Creek Water District's Draft Environmental Impact Report for the Proposed Regional Seawater Desalination Project in July 2013. This project proposed using a wedgewire screen with a through-screen velocity of 0.33 fps which shows that more protective screening technologies are available at a commercial scale. This through-screen velocity was also low enough that turbulence in the nearshore environment where the intake was deployed eliminated the need for an air burst or other system to clean material from the surface of the screen. Therefore, NMFS recommends 0.33 fps as a maximum through--screen velocity as part of Alternative 2 in order to minimize potential entrainment and impingement impacts.	
27.3	During review NMFS noted that the monitoring requirements under section III.L.2.d.(1).(c).iii [of the proposed Desalination Amendment] did not include the requirement to use a 200 micron mesh or smaller net to provide a broader characterization of impacted organisms as is required under section III.L.2.e.(1).(a). NMFS requests that this 200 micron mesh net requirement be applied uniformly throughout the Desal policy where monitoring is required.	Please see response to comment 15.48.
27.4	NMFS notes that the SWRCB's expert panel analyzed data and pilot projects in its March 14, 2012 Expert Review Panel on Intakes: Final Report, as referenced repeatedly in the draft Desal Policy. The data compiled in that report (See appendix 3, Table 1 for example) clearly shows that a slot opening size no greater than 0.5mm is necessary to minimize the entrainment of fish eggs and larvae of many different species including several important commercial species managed under the MSA such northern anchovy, Dover sole, English sole, and	Please see response to comment 15.4.

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	sanddabs. Species of recreational importance that would experience a greater impact from a 1.0mm slot opening include California halibut, queenfish, California sheephead and various croakers and turbots. In addition, a slot size opening of 0.5mm would not prevent the entrainment of abalone larvae, which are typically smaller than this during their pelagic phases. However, careful siting of an intake may be able to eliminate or minimize impacts to ESA listed abalone species on an individual project.	
27.5	NMFS supports the requirement under both Alternative 1 and 2 to determine mitigation requirements to offset remaining impacts by using the Area Production Foregone methodology. NMFS requests the opportunity to review and give input to these draft mitigation proposals so that we may highlight opportunities that may be of particular importance to the management of the Nation's living marine resources.	Comment appreciated and noted. Marine Life Mortality Reports and mitigation proposals will be reviewed by regional water board staff. State Water Board staff who will consult with state and federal agencies involved in the permitting of a facility and agencies that condition approval of the project and require mitigation, as proposed in chapters III.L.2.a.(4) and III.L.2.e.(3)(c).
27.6	In addition, NMFS fully supports the following aspects of both Alternatives 1 and 2: - The Monitoring and Reporting Requirements - The restriction against placing a desalination facility within a Marine Protected Area or a State Water Quality Protection Area, or where a facility may impact these areas. - The requirement that salinity increases be restricted to less than 2 parts per thousand over background conditions at a distance of greater than 100 meters from the discharge point.	Comment is appreciated and noted.
27.7	As desalinated water becomes an increasingly important component of California's water supply, it is important that its potential impacts be minimized to the maximum extent practicable and any remaining impacts be fully mitigated. NMFS believes Alternative 1 of the Desal Policy should achieve this standard and Alternative 2 may also accomplish this with the incorporation of our recommended changes.	The comment is appreciated and noted.
#28	**William Bourcier, Ph.D., General Public**	
28.1	The analysis of the potential adverse environmental effect of greenhouse gases (GHG) emissions at section 12.1.7 [of the Staff Report with SED] fails to identify the effect of release of GHG from subsurface feed waters.	The commenter is correct in that the Staff Report with SED did not analyze the potential effect of greenhouse gas (GHG) emissions due to the use of subsurface intakes. Upon review, however, there are no

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	Likewise, the alternatives analysis at section 12.4.4 fails to recognize the difference in GHG emissions between desalination facilities using subsurface intakes versus desalination facilities using open ocean intakes. The amount of carbon dioxide contained in subsurface waters is much higher than surface water. When subsurface water is exposed to the atmosphere, the elevated level of carbon dioxide and, depending on the location of the subsurface waters methane gas, is discharged into the atmosphere. This is true in general for all pumped subsurface waters. The release of carbon dioxide and methane is therefore of concern in the siting of sea water intakes given the very large volumes of water being considered.	potentially significant effects from GHG emissions resulting from the use of subsurface intakes. The use of infiltration galleries will withdraw seawater directly from the ocean. The other diversion methods that use some type of well configuration may encounter "old marine groundwater", but this water would be replaced by ocean water within a year and only "new" ocean water would be diverted (Municipal Water District of Orange County, 2014). (See also response to comment 28.2)
28.2	Macpherson (Chemical Geology, 2009; 264:328-336) estimates that globally this C02 flux from pumping subsurface waters is about equal to the sum of all volcanic C02 release. Macpherson did not consider release from desalination plants in his assessment. However, one can estimate the flux of carbon dioxide into the atmosphere from desalination of sea water obtained from the subsurface. If we assume a typical carbon dioxide partial pressure of 0.1 bars in the subsurface, we can calculate that upon equilibration of the fluid with the atmosphere, one cubic meter of fluid will release about 1.5 kilograms of C02. For a 50 MGD sea water desalination plant this corresponds to about 200,000 tonnes per year of released C02- C02 that is basically pumped from the subsurface into the atmosphere as a result of the operation of the desalination facility. In addition, subsurface fluids often contain significant methane concentrations which would also be released into the atmosphere.	We are unable to replicate the commenter's calculations or conclusions. Global volcanic CO2 emissions are estimated to range from 0.15 to 0.26 gigaton per year, whereas anthropogenic CO2 emissions for 2010 were projected at 35 gigatons (Gerlach, 2011). Volcanic emissions are less than one percent of anthropogenic CO2 emissions. The estimated CO2 release from a 50 MGD desalination plant of 200,000 T/y appears to be excessive. Our estimate using the commenter's assumptions is 104,000 T/y, which is still high and greater than the estimated CO2 emissions from plant operation (80,000-90,000 T/y). Macpherson (2009) states that pCO2 (partial pressure of carbon dioxide) is highly dependent on pH. She presented multiple modelling results based on chemical-speciation of five water types. The highest CO2 production estimate for all of the water types was 1.47 mmol/L. This value translates into an estimated CO2 emission from groundwater of 1,220 T/y for a 50 MGD facility, less than two percent of the CO2 emissions from plant operations. This is within the estimate of the amount of potential greenhouse gas reduction from reduction in pretreatment power requirements as discussed in 12.4.4 Alternative 1. Therefore this impact is considered less than significant.
28.3	In contrast, sea water is generally near saturation with carbon dioxide so there is no significant carbon dioxide release that would occur from a desalination facility using an open ocean intake.	Comment noted. See response to comment 28.1.

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28.4	The SWRCB should consider the potential adverse environmental effect of GHG emissions from the operation of desalination facilities utilizing subsurface feed waters. The SWRCB should also compare the relative amount of potential GHG emissions from desalination facilities using surface water intakes versus desalination facilities using open ocean intakes.	See responses to comments 28.1 and 28.2.
#29	**Rich Nagel, West Basin Municipal Water District**	
29.1	Wedge Wire Screen Slot Size Recommendation While a 0.5mm slot size and 2.00mm slot size were tested, a 1.00mm slot size was also tested for approximately 12 months with no substantial fouling. While the 1.00mm slot sized screen saw positive operation, West Basin would still like to point out there is still no single full scale application of a 1.00mm slot sized screen for ocean water and it may be premature to set a state wide singular slot size due to site and marine variability. West Basin's recommendation for Board consideration: Project proponents may use a slot size no less than a 1.00mm for a marine intake.	Comment noted. For additional information on screen slot size, please see response to comment 15.4.
29.2	Impact Reduction Credit for Wedge Wire Screens (head capsule) West Basin agrees with the Board's recommendation to utilize a wedge wire screen as a means to prevent entrainment of mature larvae and juvenile fish. However, in the Draft OPA there is no credit for the reduction in entrainment that a wedge wire screen provides. The Empirical Transport Model (ETM) is recommended to calculate total entrainment impacts, yet the method utilizes the assumption a project has an open intake and could entrain more and larger organisms. Placing a screen on an open intake pipe would greatly reduce entrainment and limit the impacts to juvenile larvae that are not likely to survive to become a reproductive adult based on natural marine life mortality. This protection of larger and more organisms should receive a credit in the ETM as a form of a wedge wire screen slot size reduction based on head capsule	To address mitigation credit for the use of intake screens, the following provision was added to chapter III.L.2.e.(1)(a) of the proposed Desalination Amendment: *"The regional water board may apply a one percent reduction to the APF* acreage calculated in the Marine Life Mortality Report to account for the entrainment reduction when using a 1.0 mm slot size screen."* This provision was added based on the conclusions in the Expert Review Panel report. (Foster et al. 2013) Subsurface intakes do not impinge or entrain marine life and consequently do not require mitigation for operational-related mortality; however, they may not be feasible at all locations. Screens with small slot sizes (0.5 to 1.0 mm)

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	size. The head capsule size reduction would be calculated using the growth tables that can be found for the majority of living organisms in the ocean. This credit assume the most conservative case that every larvae with a head capsule size narrower than the slot size of the screen would be entrained and any larvae with a head capsule size larger than the slot size would be protected. Attached in Exhibit B is a study done for Morro Bay Power Plant by Tenera on the head capsule sizes for all the species susceptible to entrainment at the power plant. This type of report would be completed and compared to the 12 month entrainment study to be done at the project location to determine quantities of larvae that would be entrained based on their head capsule sizes. West Basin's recommendation for Board consideration: A credit to the ETM for applying a wedge wire screen shall be given utilizing a) the size of the slot, b) the head capsule size regression tables and c) the 12 month entrainment study and/or unitize existing data	can be installed at open seawater intakes to reduce entrainment of adult organisms and larger larvae. Smaller organisms like phytoplankton will still be entrained even if screens with very small (<0.5 mm) slot sizes are used. These small organisms are a critical component of the marine ecosystem because they form the base of the marine food web. Per Water Code section 13142.5(b), an owner or operator will be required to mitigate for any entrainment mortality that occurs at a screened intake. The Expert Review Panel on mitigation recommended using the empirical transport model coupled with the area of production forgone (ETM/APF) method to assess mitigation at desalination intakes. The ETM/APF model is based on an open pipe or unscreened intake. The ETM/APF model assumes that the species that are assessed in the model represent the species that are not assessed, including organisms that are too small to include in the ETM/APF model. (Foster et al. 2012 and 2013) The Expert Review Panel was asked how to adjust the mitigation acreage for entrainment reduction devices like screens. The Expert Review Panel provided a clear method for how to appropriately apply the entrainment reduction to the APF calculation. Additionally, the Expert Review Panel reported that while screens can be an effective tool for reducing entrainment of larger larval organisms, when all organisms in seawater are considered, screens reduce entrainment mortality less than one percent. (Foster et al. 2012 and 2013) The method used to calculate the mitigation credit can dramatically affect the mitigation credit as can the size of organisms included in the calculation. Figure 18.8-1 below demonstrates how the entrainment credit can change depending on the size of organisms included in the calculation. In this example, if the mitigation credit study evaluates organisms larger than 10 mm, entrainment is reduced by 100 percent. If the study evaluates organisms larger than 1.0 mm, on entrainment is reduced by 9 percent. But entrainment is reduced by only one percent for organisms 1 to 10 mm, meaning 99 percent are entrained. In this example, entrainment of all forms of marine life is reduced by 1.1 percent using a 1.0 mm slot size screen.

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		The ETM/APF study in the proposed Desalination Amendment only requires the analysis of organisms 0.3 mm and larger. As the example above illustrates, organisms smaller than 0.3 mm should be factored in to the entrainment reduction calculation; however, the proposed Desalination Amendment does not require an owner or operator to sample organisms smaller than 0.3 mm. In order to adequately assess entrainment, an owner or operator would be required to do additional studies to measure entrainment of organisms smaller than 0.3 mm. Mitigation models are complicated and costly enough without having to do additional studies and calculations to determine and apply a mitigation credit. In 2013, West Basin Municipal Water District submitted a report to the State Water Board called "Entrainment: Intake Entrainment 5 Step Calculation." The mitigation assessment method described in the report used a "whole-life cycle" approach and head capsule entrainment modeling data (to factor in the entrainment reduction from the screens) to come up with an entrainment ratio which they then applied to the acres required for mitigation. The State Water Board asked the Expert Review Panel to review West Basin's mitigation credit method and their comments are in Appendix 4 of the Final Report for Desalination Plant Entrainment Impacts and Mitigation (http://www.swrcb.ca.gov/water_issues/programs/ocean/desalination/docs/erp_final.pdf). In their review, the Expert Review Panel stated, "There are a number of questions/issues that need to be addressed prior to a substantive assessment of WBMWD (2013)." Some of the conclusions and assumptions in WBMWD's report were not adequately explained and their mitigation assessment method incorrectly applied the "credit" they calculated to the mitigation model, which significantly reduced the acres required for mitigation. The proposed Desalination Amendment was revised to include the one percent credit based on the Expert Review Panel's conclusions. Including the one percent credit in the proposed Desalination

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		Amendment prevents an owner or operator from having to perform additional studies and also prevents the risk of inadequate mitigation resulting from either the use of an inappropriate mitigation assessment model or an incorrect calculation in the ETM/APF model. This is also prevents the regional water boards for having to expend additional resources to review and approve the additional studies.
29.3	Impact Reduction Credit for Wedge Wire Screens (in-situ) West Basin has proposed the entrainment credit method in number 2 based on empirical and the entrainment study data for the site. The previous credit assumes a conservative reduction based on head capsule size and quantities of larvae present. It is assumed in the marine environment not every larvae that is in the vicinity of the screen will be entrained because not every larvae will move head first into the screen. This has been documented in West Basin's Intake Effects Assessment Study after evaluating numerous hours of night footage to identify impingement. To prove this state a special wedge wire screen efficiency study can be performed by placing a wedge wire screen and a simulated open intake side by side in a high density larval area to sample. This sampling would show the difference in entrainment between a screen intake and an open intake. This method works best because the current ETM assesses entrainment impacts based on an open pipe and this type of sampling would identify the true entrainment reduction. West Basin's recommendation for Board consideration: A credit to the ETM for applying a wedge wire screen shall be given based on a wedge wire screen efficiency study that quantifies the difference in entrainment between a wedge wire screen and an open intake.	Please see response to comment 29.2.
29.4	Use Time of Travel to Quantify Total Impacted Habitat West Basin acknowledges the importance of protecting Marine Protected Areas (MPAs) and mitigating for a project's total impacts. The current OPA does not provide guidance on calculating the mitigation and	At the August 6th public workshop and August 19th public hearing, West Basin proposed an alternative method for assessing intake entrainment, one that involves using Coastal Ocean Dynamics Application Radar (CODAR) technology. However, West Basin has not provided enough information to adequately analyze this mitigation

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	how to determine a project's location to MPAs. To calculate the mitigation necessary for a project the ETM will be calculated and then translated into Area of Production Forgone (APF) for habitat restoration though a mitigation project or a fee. When calculating the APF the local habitat must be surveyed to determine total available habitat the entrained species could have originated from. When a project applies a wedge wire screen the species entrained are smaller, due to larger head capsule sizes not being able to be entrained in small slot sizes and therefore they are younger in age. By applying a wedge wire screen the days a marine organism is able to be entrained until it grows larger than the slot size is significantly decreased. This would also limit how far a larva can travel to the intake while it is still in an entrainable state and how far away the larva's habitat can be to still be impacted by the proposed project. To quantify total impacted habitat a similar to the linear regression tables in Exhibit B can be developed based on the growth rates of specific organisms. This would provide the number of days it would take the organism to reach a head capsule size larger than the slot size and therefore in an unentrainable state. This number of days can then be partnered with CODAR systems that exist along the coast of California that mark all the currents and flow directions of the ocean to determine how far a larvae can travel in the set number of days they are entrainable. This calculation will determine how far a larva can travel from any habitat to be entrainable. This distance would then encompass any habitat that would need to be plugged into the AFP calculation for total mitigation. This distance can also be used to determine how long reaching a project's entrainment impacts could be and how close they are to MPAs. West Basin's recommendation for Board consideration: Allow project proponents to utilize head capsule size growth tables to determine the number of days entrainable and apply that to local CODAR data to quantify total impacted habitat to be utilized in the AFP	assessment method. CODAR is a way of mapping surface currents in the ocean and has been used by oil spill response teams and search-and-rescue operations. It can also be used to understand ocean current conditions that may influence juvenile salmon populations and to estimate larval dispersal from Marine Protected Areas. There are only a few studies that have used CODAR to look at larval dispersal. (Harlan et al. 2010) At least one of the comment letters we received expressed concerns with using the CODAR method as a mitigation assessment tool because they had not seen any data regarding the accuracy of this method, and CODAR is not available everywhere in California. Another concern with using the CODAR method is how the estimated number of species entrained would be converted into acres of habitat to mitigate. A primary benefit of the ETM/APF model is that it provides mitigation for all species in the ecosystem by restoring acres of habitat. In addition to the Expert Review Panel's recommendation of the ETM/APF method, the State Water Board subjected the proposed Desalination Amendment to a peer review process where peer reviewers were specifically asked to determine if the ETM/APF method can effectively calculate the mitigation area for a facility's intakes. Dr. E. Eric Adams of the Massachusetts Institute of Technology, Dr. Bronwyn Gillanders of the University of Adelaide, and Dr. Nathan Knott of the University of Wollongong supported the use of the ETM/APF method, and none of the peer reviewers suggested using another mitigation assessment method. At this time, there is not enough information to support including WBMWD's CODAR method as a mitigation assessment option or other mitigation assessment methods in the proposed Desalination Amendment. CODAR and other mitigation assessment methods could potentially be used in the future if adequately developed and reviewed and approved by experts in the field. Staff included the following optional additional language in the final draft of the proposed Desalination Amendment language for the State Water Board members to consider:

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		"OPTIONAL LANGUAGE ADDITION to Chapter III.L.2.d.e.(1): (1) Marine Life Mortality Report. The owner or operator of a facility shall submit a report to the regional water board ~~projecting~~ estimating the marine life mortality resulting from construction and operation of the facility after implementation of the facility's required site, design, and technology measures. (a) For operational mortality related to intakes, the report shall include a detailed entrainment study. The entrainment study period shall be at least ~~36~~ 12 consecutive months and sampling shall be designed to account for variation in oceanographic conditions and larval abundance and diversity such that abundance estimates are reasonably accurate. At their discretion, the regional water boards may permit the use of existing entrainment data from the facility to meet this requirement. Samples must be collected using a mesh size no larger than 335 microns and individuals collected shall be identified to the lowest taxonomical level practicable. ~~– Additional samples shall also be collected using a 200 micron mesh to provide a broader characterization of other entrained organisms.~~ The ETM/APF analysis* shall be representative of the entrained species collected using the 335 micron net. The APF* shall be calculated using a one-sided, upper ~~90~~ 95 percent confidence ~~level~~bound for the 95th percentile of the APF distribution. *[OPTIONAL LANGUAGE ADDITION: An owner or operator may use an alternative mitigation assessment method if the method assesses intake and mortality of all forms of marine life* and can be used to determine the number of mitigation acres needed to fully mitigate for the impacts. The method must be peer reviewed by a neutral third party expert review panel and then approved by the regional water board in consultation with the State Water Board staff.]* An owner or operator with subsurface* intakes* is not required to do an ETM/APF analysis* for their intakes and is not required to mitigate for intake-related operational mortality. The regional water board may apply a one percent reduction to

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		the APF* acreage calculated in the Marine Life Mortality Report to account for the entrainment reduction when using a 1.0 mm slot size screen. “
29.5	Habitat Credit West Basin would like to note that it has been stated that all habitats do not have the same productivity of marine life. This can best be proven by looking at the production of sandy bottom habitat and comparing it the production of other established habitats such as rocky reef, estuarine and kelp bed habitats. The other listed habitats have the potential to be significantly more productive than the sandy bottom and therefore should receive a credit as such. This was established by the California Coastal Commission for the Carlsbad Desalination Project in Carlsbad, CA. Their project received a credit of 10:1 for sandy bottom habitat for mitigation purposes. West Basin believes this value should be assessed and proposed by the project proponent with the assistance of expert marine biologists. West Basin’s recommendation for Board consideration: Allow a project proponent to propose a habitat credit for different habitat production types in the project’s local area.	Please see response to comment 15.9
29.6	ETM-APF Sample Calculation West Basin acknowledges and agrees with the Staff recommendation of utilizing the ETM and APF calculation for determining total intake impacts. In the Draft OPA a sample calculation was not provided and some of the stipulations regarding the 90% confidence interval were not clear. West Basin would like to request a sample mitigation calculation for all project proponents to follow. West Basin’s recommendation for Board consideration: Provide a sample calculation for industry guidance and comment.	Appendix E of the Staff Report with SED includes example calculations of ETM and APF for power plants in California. These sampling considerations, recommendations, and methods can be applied to estimating entrainment at desalination facilities using surface water intakes. Response to comment 21.90 includes an example of how to apply the one-sided upper 95 (formerly 90) percent confidence bound for the 95th percentile of the APF distribution. Using Data Set 2 from the example provided in response to comment 21.90, it was determined the total mitigation acreage for intake-related impacts was 88 acres (95 percent confidence level). Table 15.9-1 below includes an example of how mitigation ratios can be applied for the different impacts (intake, construction, and discharge) and habitat types. The example incorporates the APF from Data Set 2 in

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		response to comment 21.90 as well as including example acres of disturbed area for construction and discharges. In the table below, Column A includes the mitigation assessment method that will be used to determine the number of acres to mitigate. Column B is the number of acres initially calculated for mitigation using the assessment method in Column A. For intake-impacts, the number of acres to mitigate (as determined by APF) will be broken down based on the habitat the impacted species utilize and is listed in Column C. In this example, 10 percent of the entrained species inhabited rocky reefs, 5 percent surfgrass beds, 15 percent inhabited estuarine habitat, and 70 percent live in open coastal nearshore waters. Column D breaks down the numbers of acres to be mitigated per habitat type before consideration of a mitigation ratio. Column E includes an example mitigation ratio based on habitat type. Please note that these mitigation ratios are for example purposes only. The actual mitigation ratios per chapter III.L.2.e.(3)(b). Column F includes the number of acres to mitigate after applying the mitigation ratio. Column G includes whether the mitigation acres in Column F will be in-kind or out-of-kind.
29.7	Mitigation Fee Calculation West Basin agrees with the OPA’s draft recommendation of utilizing the ETM-APF methodology for calculating mitigation; however how to reach the final mitigation fee is still unclear. When calculating the APF a value needs to be placed on the impacted habitats and West Basin believes the project proponent would make this recommendation. The project proponent would be responsible for hiring a resource economist to determine a $/acre value for the habitat(s) impacted. This value would then be plugged into the APF calculation to help determine the final mitigation fee to be paid. West Basin’s recommendation for Board consideration: Allow a project proponent to hire a resource economist to determine a $/acre value of the habitat(s) impacted by the project. This value would then be utilized in the APF calculation for total facility mitigation.	The proposed Desalination Amendment requires an owner or operator to complete the Marine Life Mortality Report that would include an assessment of acres of impacted habitat. An owner or operator electing to complete Mitigation Option 2 (chapter III.L.2.e.(4)) would then pay on a per-acre of impacted habitat basis. Nothing in chapter III.L.2.e.(4) prevents an owner or operator from hiring a resource economist to determine a dollar per acre value for the impacted habitat(s). However, if an owner or operator would like to pursue hiring a resource economist, chapter III.L.2.a.(1) applies, which states that, “All studies and models are subject to the approval of the regional water board in consultation with State Water Board staff. The regional water board may require an owner or operator to hire a neutral third party entity to review studies and models and make recommendations to the regional water board.” This would include any studies done by a resource economist. Additionally, the regional water board could require that the resource economist be a neutral third party entity.
#30	**Stephen Keese, Effluent Free Desalination**	

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30.1	The Final Amendment state that the goal is to end all brine discharges of any sort. It could state that the smaller the discharge of RO effluent into the ocean the better, or the higher the percentage of the produced water the better.	Water Code section 13142.5(b) requires that the best available site, design, technology, and mitigation measures feasible shall be used to minimize the intake and mortality of all forms of marine life. No discharge to the ocean is preferred; however, it is important to recognize that the term “best available technology” is not used as equivalent to any specific standards set forth in the Clean Water Act for best available technology. A zero discharge facility would not require any type of outfall or associated pipeline and as a result would be exempt from implementing the requirements pertaining to the discharge of brine. Furthermore, the proposed Desalination Amendment recognizes that there are site-specific variables that will influence the best available site, design, technology, and mitigation measures feasible for each desalination facility. Consequently, the proposed Desalination Amendment provides flexibility for discharge options because a “no discharge” option may be infeasible for some facilities. More information on “no brine discharge” technologies is needed before it can be included in the proposed Desalination Amendment. However, sections 2 and 8.6 of the Staff Report with SED were revised to include references to future innovations in desalination technology that may result in a significant reduction or elimination of brine discharges.

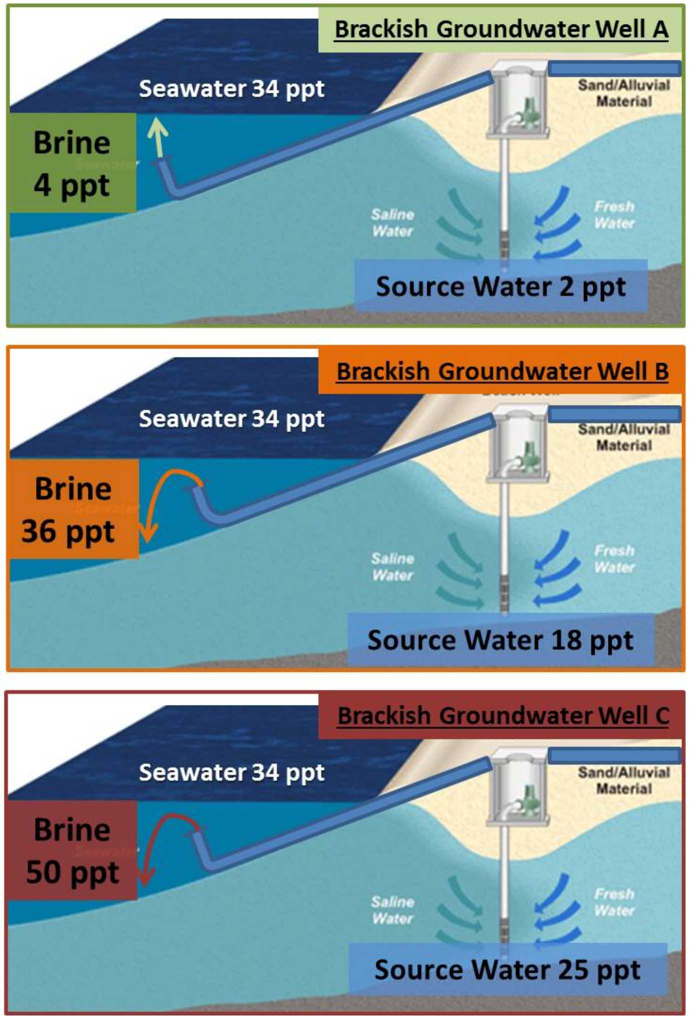


Figure 8.1-1. Three brackish groundwater desalination facilities with different source water and brine salinities measured in parts per thousand (ppt). Facility A produces a positively buoyant “brine” plume that would not affect the benthic marine environment. Facilities B and C would form dense, negatively buoyant plumes that could negatively affect the benthic marine environment if not properly discharged.

Table 9.31-1. Estimated percentage reductions (standard errors in parentheses) in mortality (relative to an open intake) to the population surviving past the size where they would be subject to entrainment,[1] based on probabilities of screen entrainment for larvae from seven taxonomic categories of fishes measured during DCPP entrainment studies conducted October 1996 through June 1999. Mortality adjusted from estimates in Table 4 (Tenera 2013a) based on length range of larvae measured from the studies, except for anchovies.

	Percentage Reduction in Mortality by Slot Opening Width [1]					
Taxon	**0.75 mm**	**1 mm**	**2 mm**	**3 mm**	**4 mm**	**6 mm**
sculpins	69.2 (5.4)	58.7 (5.3)	24.3 (4.6)	5.5 (2.2)	0.5 (0.4)	0.0 (0.0)
rockfishes	46.2 (5.7)	32.0 (5.0)	5.2 (1.7)	0.5 (0.2)	0.0 (0.0)	0.0 (0.0)
kelpfishes	72.1 (2.5)	63.0 (2.5)	21.8 (2.4)	0.8 (0.3)	0.0 (0.0)	0.0 (0.0)
monkeyface prickleback [2]	62.8 (3.9)	42.2 (3.8)	0.9 (0.4)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
anchovies *	55.4 (2.3)	45.1 (2.3)	5.5 (1.6)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
cabezon	36.3 (7.2)	19.0 (5.5)	0.6 (0.4)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
flatfishes	34.1 (7.1)	17.7 (6.0)	0.2 (0.2)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Average % Reduction	**53.7**	**39.7**	**8.4**	**1.0**	**0.1**	**0.0**

1 - Extrapolated to the size at which the larvae are no longer susceptible to entrainment (estimated to be 20–25 mm [0.98 in] for this analysis). Not the reduction in adult equivalents.

2 - 25 mm monkeyface prickleback in Table 7 not included as the length distribution shows the data point as an outlier.

* - Percentage reductions are the same as the values in Table 4.

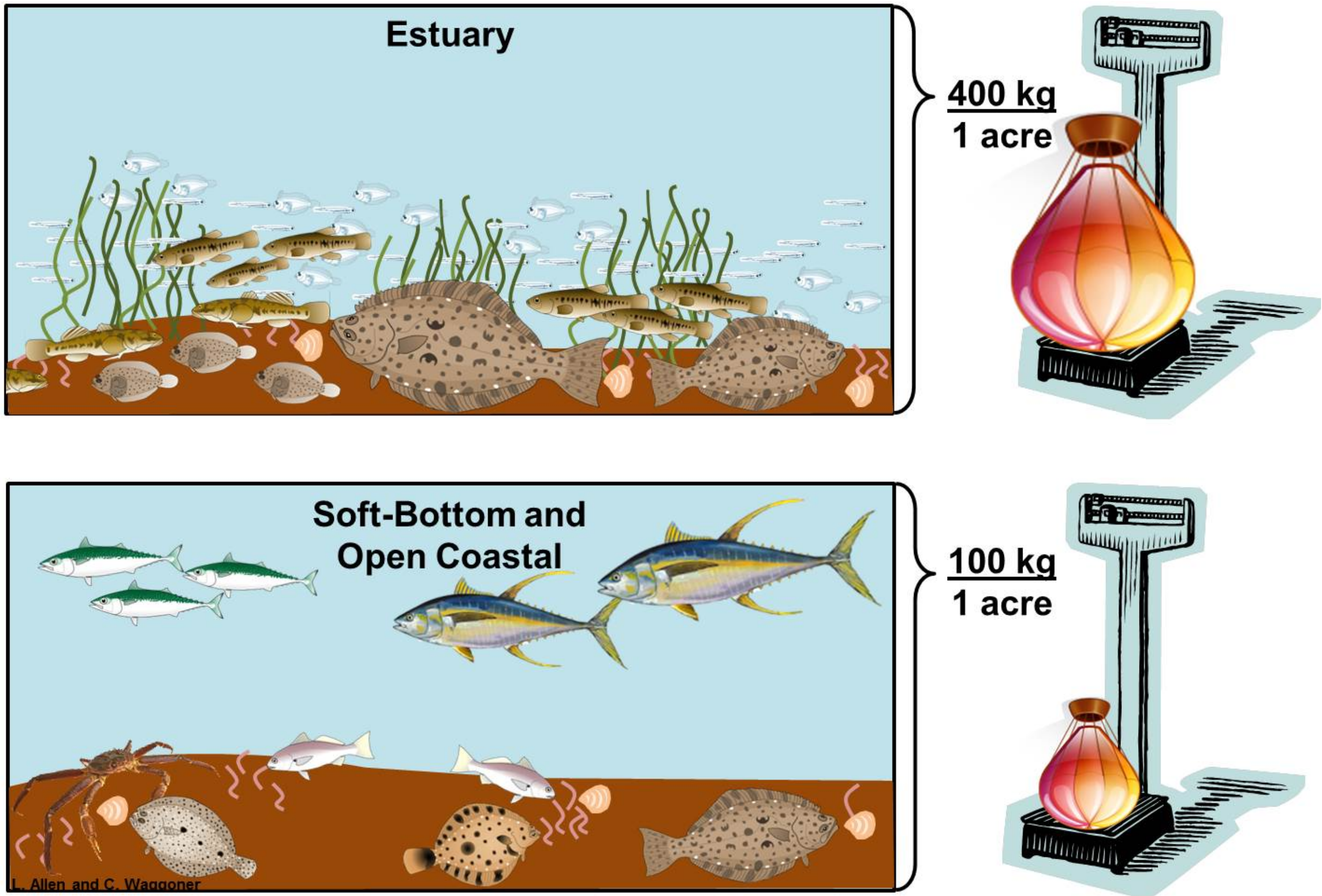
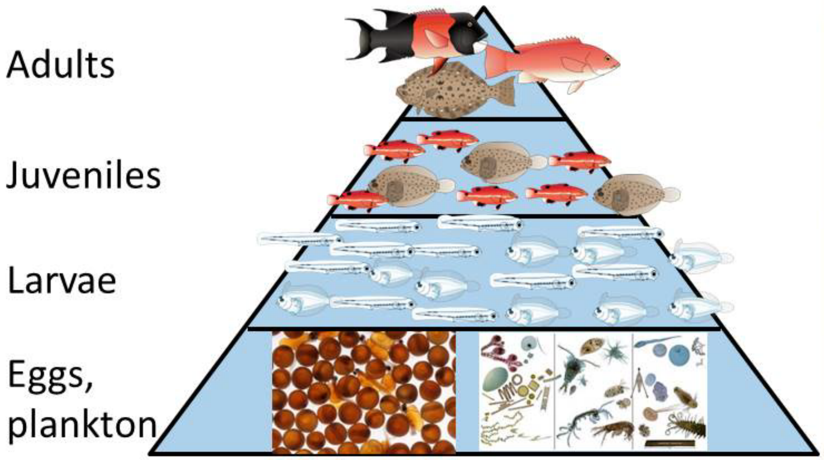


Figure 15.9-1. Marine inhabitants of an estuarine environment compared to a soft-bottom open coastal environment. Biological productivity can be compared using biomass, which is the weight of all of the organisms in a given area. In this example, the estuarine habitat is four times more productive than the soft-bottom open coastal habitat. (also associated with response to comment 29.6)

Table 15.9-1. Example mitigation calculation and how mitigation ratios could be applied.
(also associated with response to comment 29.6)

	A	B	C	D	E	F	G
	Mitigation Assessment Method	Total # of Acres to Mitigate	Habitat the Entrained Species Utilize	# of Acres to Mitigate per Habitat Type	Mitigation Ratio	# of Acres to Mitigate if applying a 10:1 mitigation ratio	Mitigation Acre Habitat Type
Intake	APF w/ 90% CI	55	9% Rocky Reef	5	1:1	5	Rocky Reef
			18% Estuary	10	2:1	20	Estuary
			73% Open Water	40	1:10	4	Rocky Reef or Estuary or as determined by regional water board
Discharge	Any Method	3	100% Soft-Bottom	3	1:10	0.3	
Construction	Any Method	7	100% Soft-Bottom	7	1:10	0.7	
Total Mitigation Acreage		**65**		**65**		**30**	

15.20-1. An aerial view of the offshore environment at the Carlsbad Desalination Project. The proposed location of the multiport diffusers is in black, the kelp beds are highlighted in red, and the green polygons are environmentally superior locations to site the diffuser array based on the location of the kelp beds alone.



Size Class (mm)	Abundance	# Entrained (1.0 mm slot size)	Percent Entrainment Reduction
>20	100	0	100
10-20	1,000	0	100
1-10	10,000	9,900	1
<1.0	100,000	100,000	0
Total	111,100	109,900	1.1

Figure 18.8-1. Example entrainment data for a 1.0 mm slot size screen divided up by size class. The pyramid on the left illustrates that the relative abundance of organism in the marine system. Small eggs and plankton are the most abundant in the water column and most susceptible to entrainment. In this example, all organisms smaller than 1.0 mm are entrained through a 1.0 mm slot size screen. 99 percent of organisms 1 to 10 mm are entrained through a 1.0 mm slot size screen. But the screen is effective at preventing entrainment for organisms larger than 10 mm. This example illustrates the importance of considering all size classes when determining the efficacy of a 1.0 mm screen or alternative screening technology. An analysis of entrainment reduction for organisms larger than 10 mm would determine the 1.0 mm screen is 100 percent effective at reducing entrainment, even though total entrainment is reduced by a mere 1.1 percent using a 1.0 mm slot size screen. (also associated with response to comment 29.2)

Table 21.90-1. Data Set 1 includes the area of production forgone data for Species 1 to 10. The average APF is included along with the 80th, 90th, and 95th percent confidence levels using the one-sided upper confidence bound.

Species	APF
Species 1	30
Species 2	90
Species 3	140
Species 4	55
Species 5	50
Species 6	110
Species 7	86
Species 8	68
Species 9	122
Species 10	23
50th Percentile Confidence Level = Average APF	**77.4 Acres**
80th Percentile Confidence Level = Average APF + 10.4 acres	**87.8 Acres**
90th Percentile Confidence Level = Average APF + 15.8 acres	**93.2 Acres**
95th Percentile Confidence Level = Average APF + 20.3 acres	**97.7 Acres**

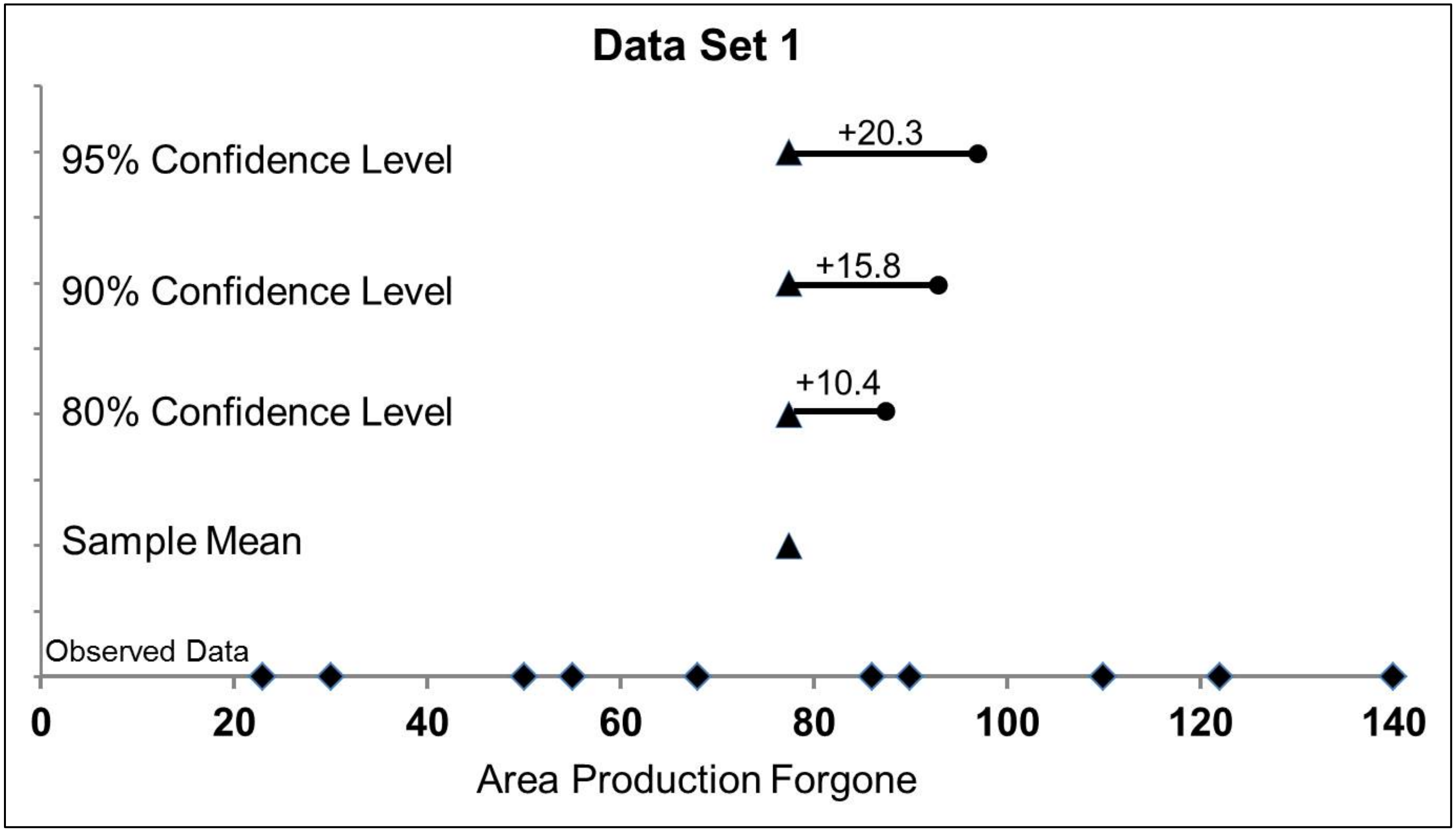


Figure 21.90-1: Visualization of the confidence interval data from Data Set 1. The observed data are plotted along the x axis. The average APF is included along with the 80th, 90th, and 95th percent confidence levels using the one-sided upper confidence bound. The circles to the right of the triangles show the acres required to mitigate once the upper bound confidence interval is applied.

Table 21.90-2: Data Set 2 includes the area of production forgone data for Species 1 to 20. The average APF is included along with the 80th, 90th, and 95th percent confidence levels using the one-sided upper confidence bound.

Species	APF
Species 1	30
Species 2	90
Species 3	140
Species 4	55
Species 5	50
Species 6	110
Species 7	86
Species 8	68
Species 9	122
Species 10	23
Species 11	94
Species 12	99
Species 13	96
Species 14	79
Species 15	91
Species 16	80
Species 17	68
Species 18	55
Species 19	49
Species 20	54
50th percentile Confidence Level = Average APF	**77.0 Acres**
80th percentile Confidence Level = Average APF + 5.6 acres	**82.6 Acres**
90th percentile Confidence Level = Average APF + 8.6 acres	**85.5 Acres**
95th percentile Confidence Level = Average APF + 11.0 acres	**87.9 Acres**

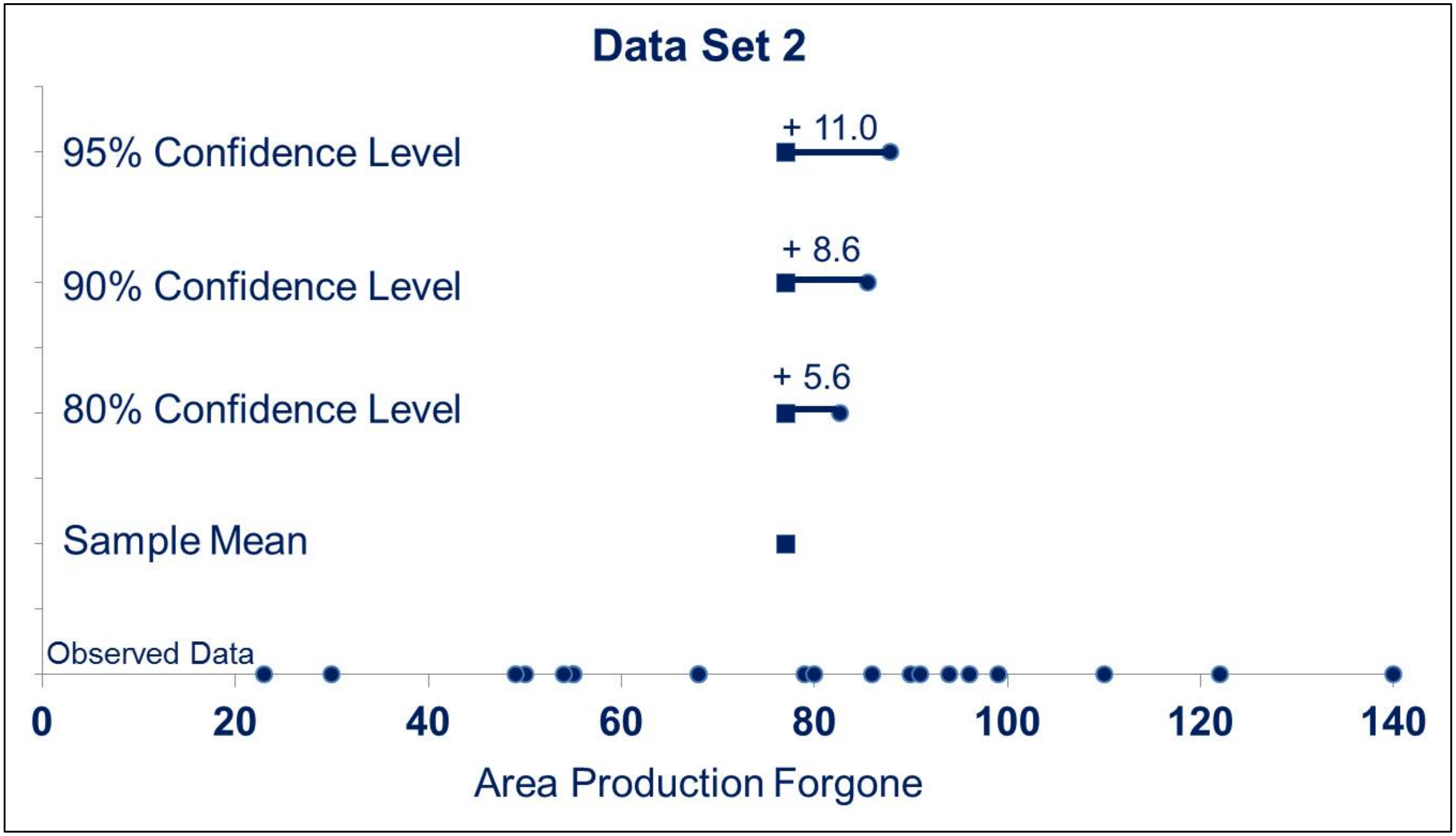


Figure 21.90-2. Visualization of the confidence interval data from Data Set 2. The observed data are plotted along the x axis. The average APF is included along with the 80th, 90th, and 95th percent confidence levels using the one-sided upper confidence bound. The circles to the right of the squares show the acres required to mitigate once the upper bound confidence interval is applied.