



City Council  
311 Vernon Street  
Roseville, California 95678

March 30, 2012

Ms. Jeanine Townsend  
Clerk to the Board  
State Water Resources Control Board 1001 I Street, 24th Floor  
Sacramento, California 95814



Via E-Mail to [commentletters@waterboard.ca.gov](mailto:commentletters@waterboard.ca.gov)

**Subject:** Comment Letter - Statewide Mercury Policy - CEQA Scoping

Dear State Water Resources Control Board Members:

The City of Roseville has specific concerns that we request be considered as the State Water Resources Control Board ("Board") deliberates on the Statewide Mercury Policy and Mercury Control Program for Reservoirs.

On March 5, 2012, the Board held a CEQA Scoping meeting regarding a Statewide Mercury Policy and Mercury Control Program for Reservoirs ("Mercury Program"). The CEQA scoping notice names all reservoirs listed on the 303(d) list and includes: Shasta Reservoir, Lake Oroville, Folsom Reservoir, Whiskeytown Reservoir, Trinity Reservoir, Thermalito Afterbay, Castaic Lake, O'Neill Forebay, San Luis Reservoir and Pyramid Lake. The City of Roseville derives most of its water supply from Folsom Reservoir and relies on several of the listed facilities, both Central Valley Project (CVP) and State Water Project (SWP) facilities, for its hydropower energy supply.

The City of Roseville takes a great amount of pride for being a full service city - a key component of this is the fact that we own and operate our own water and electric utilities (Environmental Utilities and Roseville Electric).

Folsom Reservoir, a CVP facility, serves as the water supply source for over 120,000 Roseville residents and thousands of Roseville businesses. Additionally, many of the facilities listed above also contribute to the energy portfolio for the city by providing clean, renewable hydropower electricity.

The Board must carefully consider the impacts of an adopted Statewide Mercury Policy and Mercury Control Program for Reservoirs as these may have significant and far reaching impacts on water suppliers and power agencies. Reliability of both water and energy supplies is key to a vibrant economy in California. As such, deliberations on the Mercury Program cannot be taken

lightly or without considering the feedback of those that work hard every day to provide these basic resources to California's residents and businesses.

The City of Roseville wishes to state its support of two comment letters (attached) which incorporate concerns both from a water supply perspective and also from an energy generation perspective. The attached letters were sent to the Board by the State Water Contractors, Inc., ("SWC"), the San Luis & Delta-Mendota Water Authority (SLDMWA) (combined letter dated March 28, 2012) and the Sacramento Municipal Utility District (SMUD) (letter dated March 29, 2012).

By reference to the attached letters, the City of Roseville requests the Board carefully consider the following:

Mercury is Naturally Occurring in our Region - Mercury occurring in reservoirs is due largely to natural processes, historical and upstream activities and atmospheric deposition. Mercury in naturally occurring minerals and rocks of the California Coast Range and Sierra Nevada continues to erode and be deposited in the State's water bodies through natural processes and upstream anthropogenic activities.

Historic mercury mining and atmospheric deposition are the other major contributors to mercury in reservoirs. As such, reservoir operators and reservoir operations are not responsible for the majority of the mercury load in the reservoirs today and should not be responsible for a majority of the load reduction. The Board needs to consider who is responsible for the presence of mercury in impaired reservoirs when assigning load allocations and control responsibilities.

The Mercury Program should focus on source identification and source control. As stated above and detailed in the SMUD letter, the source of mercury impacting the listed reservoirs are out of the control of water and energy purveyors that rely on CVP and SWP facilities. Yet many of the proposed actions being considered by the State may impose significant regulatory burden and operation restrictions on water and power suppliers. The Board should give much consideration to those actions that are tied to source control or reduction rather than focusing on assigning actions which may or may not be effective in reducing mercury concentrations to those downstream of the mercury source.

The Mercury Program Should Be Flexible - The CEQA Scoping Notice considers implementing either a Mercury Program or alternatively implementing a control plan for individual reservoirs. Because each reservoir is unique, the control and implementation program must be flexible enough to adapt to reservoir specific conditions and considerations. Operators of each reservoir listed in the CEQA Scoping Notice along with the stakeholders that rely on the reservoirs for water supply, power generation and flood control should be sought out by the Board and consulted during development of the proposed Mercury Program.

The Mercury Program Must be Based Upon Best Available Science - The CEQA Scoping Notice for the Mercury Program identifies several potential implementation actions that would change reservoir operations to influence water chemistry. If TMDLs are established they must be based on well-documented, scientifically reliable evidence and thorough analyses. Further, the CEQA

document must include the scientific basis for the actions proposed to reduce or mitigate mercury levels or the rate of methylation and reduction in mercury accumulation in fish tissue.

Changes to Reservoir Operations are of Significant Concern - The Mercury Program is likely to have far-reaching impacts on water management and water supply planning. California's water storage facilities are asked to meet several important objectives from water supply for municipal and industrial users, agriculture, flood control and water quality and environmental response as currently being considered in many of the Delta actions being undertaken by the State. Any changes to reservoir operations must be carefully considered to ensure reservoir management changes will not negatively impact the ability of state reservoirs to meet these multiple objectives.

Impacts to Hydroelectric Resources Must Be Carefully Considered - Hydroelectricity is a critical resource to ensure clean, reliable power generation in California. The Board needs to carefully analyze and understand how a Mercury Program will impact hydroelectric generation at the listed facilities. Undermining hydroelectric generation will undermine the ability of energy purveyors from meeting the state's renewable energy and greenhouse gas emission reduction goals. By reference, the City of Roseville wants again to emphasize and support the important points made by SMUD's letter to the Board dated March 29, 2012.

The City of Roseville appreciates the opportunity to comment on the proposed CEQA Scoping for the Mercury Program. Should you have any questions please do not hesitate to contact Derrick Whitehead, Environmental Utilities Director at (916) 776-1704 or Michelle Bertolino, Roseville Electric Director at (916) 774-5636.

Sincerely,



Pauline Rocucci

Pauline Rocucci,  
Mayor

## **Attachments**

**San Luis & Delta-Mendota Water Authority**



P.O. Box 2157  
Los Banos, CA 93635  
Phone: (209) 826-9696  
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**State Water Contractors**



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March 28, 2012

Via E-Mail to [commentletters@waterboard.ca.gov](mailto:commentletters@waterboard.ca.gov)

Ms. Jeanine Townsend  
Clerk to the Board  
State Water Resources Control Board  
1001 I Street, 24th Floor  
Sacramento, California 95814

Subject: Comments for Statewide Mercury Policy- CEQA Scoping

The State Water Contractors, Inc., ("SWC") and the San Luis & Delta-Mendota Water Authority (SLDMWA) submit this letter on behalf of the SWC and its 27 member agencies and the SLDMWA and its 29 member agencies.<sup>1</sup> The SWC is a non-profit association of 27 public agencies from Northern, Central and Southern California that purchase water under contracts from the California State Water Project. Collectively, the SWC member agencies deliver water to more than 25 million residents throughout the state and more than 750,000 acres of agricultural lands. The SLDMWA is a joint powers authority comprised of 29 member agencies, 27 of which have historically received deliveries of Central Valley Project ("CVP") water up to 3,100,000 acre-feet annually for the irrigation of highly productive farm land primarily along the San Joaquin Valley's Westside, for municipal and industrial uses, including within California's Silicon Valley, and for publicly and privately managed wetlands situated in the Pacific Flyway. The SWC, SLDMWA, or any of their member agencies may participate in these proceedings in the future.

On March 5, 2012, the State Water Resources Control Board (Water Board) held a CEQA Scoping meeting regarding a Statewide Mercury Policy and Mercury Control Program for Reservoirs ("Mercury Program"). The CEQA scoping notice names all reservoirs listed on the 303(d) list and includes: Shasta Reservoir, Lake Oroville, Folsom Reservoir, Whiskeytown Reservoir, Trinity Reservoir, Thermalito Afterbay, Castaic Lake, O'Neill Forebay, San Luis Reservoir and Pyramid Lake. The SWC and SLDMWA members derive their water supply, in part, from these facilities.

Historical Mercury Sources

Mercury occurring in reservoirs is due largely to historical and upstream activities, natural processes, and atmospheric deposition. Mercury in naturally occurring minerals and rocks of the California Coast Range and Sierra Nevada continues to erode and be deposited in the State's water bodies through natural processes and upstream anthropogenic activities. Historic mercury mining

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<sup>1</sup> The SWC and SLDMWA member agencies are listed on Attachment "A" attached hereto.

and atmospheric deposition are the other major contributors to mercury in reservoirs. As such, reservoir operators and reservoir operations are not responsible for the majority of the mercury load in the reservoirs today and should not be responsible for a majority of the load reduction. The Water Boards need to consider who is responsible for the presence of mercury in impaired reservoirs when assigning load allocations and control responsibilities.

#### The Control Plan Should Provide Flexibility To Address Unique Factors

The CEQA Scoping Notice considers implementing either a Mercury Program or alternatively implementing a control plan for individual reservoirs. The SWC and SLDMWA support development of consistent mercury objectives and an over-arching structure statewide. However, there are over 92 reservoirs currently on 303(d) list ranging from Northern California to Southern California. Mercury inflow to each reservoir, the chemical composition, mercury sources, reservoir management considerations, and various other factors are wide ranging from reservoir to reservoir. Because each reservoir is unique, the control and implementation program must be flexible enough to adapt to reservoir specific conditions and considerations.

#### Best Available Science

The Mercury Program is likely to have far-reaching impacts on water management and water supply planning. If TMDLs are established they must be based on well-documented, scientifically reliable evidence and analyses. Additional scientific information in the following five major areas will be needed to develop adequate TMDLs for California reservoirs:

1. Determination of the relationship between mercury inputs and the resulting methylmercury concentrations in reservoirs;
2. Quantification of the effects of reservoir water level changes and other reservoir operations on production and mobilization of methylmercury in reservoirs;
3. Destruction of methylmercury in reservoirs by solar radiation;
4. Effects of sulfate concentrations on mercury methylation; and
5. Importance of airborne mercury deposition to mercury concentration and methylmercury formation in reservoirs, as compared to methylation of mercury in inflows, or mobilization from sediments.

Further, the CEQA Scoping Notice for the Mercury Program outlines potential implementation actions to be considered by the Water Board. Specifically, it includes changes to reservoir management and operations that will modify water chemistry to reduce biologically available forms of mercury and changes in fishery management practices to limit stocking fish that have higher mercury accumulation in fish tissue. It is important that the CEQA document for the Mercury Program be based on the best available scientific evidence. In developing the CEQA document the Water Board must present the scientific evidence available that demonstrates how changes in reservoir operations or fishery management will successfully reduce or mitigate mercury levels or the rate of methylation.

### Changes to Reservoir Operations

The CEQA Scoping Notice for the Mercury Program lists several potential implementation actions that would change reservoir operations to influence water chemistry. The actions being considered by the Water Board include:

- Water aeration and circulation to increase oxygen;
- Removal or capping of mercury contaminated sediment upstream and in reservoirs;
- Identifying areas where mercury accumulates in sediment through monitoring;
- Modifying channel geometry to direct flows away from mercury contaminated areas; and
- Modify water storage and discharge patterns to reduce mercury methylation.

The above contemplated activities could have significant impacts on water supply and energy production including negative effects on the approximately 25 million people who rely and the more than 2 million acres of prime farmland that depend upon SWP and CVP water deliveries. The Water Board must consider and analyze the following potential impacts:

- Changes to water supplies deliveries;
- Conflicts with the loss of water supply carryover;
- Impacts to ability to meet downstream water quality objectives, including objectives intended to protect beneficial uses by fish and wildlife;
- Conflicts that may occur with flood control operations;
- Conflicts with releases made for in-stream fishery requirements;
- Loss of hydropower generation due to reservoir reoperations;
- Consequences of increased carbon emissions from replacing energy supplies from decreased hydropower generation;
- Conflicts with existing energy and renewable energy policies;
- Impacts on potential loss of recreation activities; and
- Ability of reservoir operators to enter land upstream to minimize the amount of mercury entering the reservoir.

### In-stream Projects and Upland Earth Moving Projects

The CEQA Scoping Notice for the Mercury Program lists implementation actions that would change in-stream projects and upland earth moving projects that could disturb mercury contaminated soils or sediments. The SWC and the SLDMWA support and encourage efforts to minimize these sources of mercury. Actions that reduce or eliminate disturbance of mercury contaminated soils or sediments will likely reduce the mercury load in downstream reservoirs and reduce or eliminate the need for reservoir operators to mitigate for these impacts caused by others, using expensive technology and limited water supply resources. Related, the SWC and SLDMWA encourage the Water Board to consider continuation of the present moratorium on recreational suction dredging. The environmental impacts from suction dredging are significant and unavoidable in streams upstream of and in mercury impaired reservoirs. In other words, dredging in these waters would cause more mercury to move into reservoirs already designated as impaired.

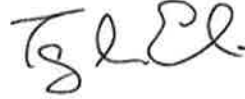
Ms. Jeanine Townsend  
March 28, 2012  
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The SWC and SLDMWA appreciate the opportunity to comment on the proposed CEQA Scoping for the Mercury Program. Should you have any questions please feel free to contact us.

Sincerely Yours,



Daniel G. Nelson  
Executive Director  
San Luis & Delta-Mendota Water Authority



Terry L. Erlewine  
General Manager  
State Water Contractors



## ATTACHMENT A

### SWC Member Agencies:

Alameda County Flood Control & Water Conservation District, Zone 7; Alameda County Water District; Antelope Valley East Kern Water Agency; Casitas Municipal Water District on behalf of the Ventura County Flood Control District; Castaic Lake Water Agency; Central Coast Water Authority on behalf of the Santa Barbara County Flood Control & Water District; City of Yuba City; Coachella Valley Water District; County of Kings; Crestline-Lake Arrowhead Water Agency; Desert Water Agency; Dudley Ridge Water District; Empire-West Side Irrigation District; Kern County Water Agency; Littlerock Creek Irrigation District; The Metropolitan Water District of Southern California; Mojave Water Agency; Napa County Flood Control & Water Conservation District; Oak Flat Water District; Palmdale Water District; San Bernardino Valley Municipal Water District; San Gabriel Valley Municipal Water District; San Geronimo Pass Water Agency; San Luis Obispo County Flood Control & Water Conservation District; Santa Clara Valley Water District; Solano County Water Agency; and, Tulare Lake Basin Water Storage District.

### SLDMWA Member Agencies:

Banta-Carbona Irrigation District; Broadview Water District; Centinella Water District; City of Tracy; Del Puerto Water District; Eagle Field Water District; Fresno Slough Water District; James Irrigation District; Laguna Water District; Mercy Springs Water District; Oro Loma Water District; Pacheco Water District; Panoche Water District; Patterson Water District; Plain View Water District; Reclamation District 1606; San Benito County Water District; San Luis Canal Company; San Luis Water District; Santa Clara Valley Water District; Tranquility Irrigation District; West Side Irrigation District; West Stanislaus Irrigation District; Westlands Water District; and Widren Water District.



DPG 12-199

March 29, 2012

Jeanine Townsend  
Clerk to the Board  
State Water Resources Control Board  
1001 I Street, 24<sup>th</sup> Floor  
Sacramento CA 95814

**SUBJECT: Comment Letter – Statewide Mercury Policy – CEQA Scoping Comments**

The Sacramento Municipal Utility District (SMUD) appreciates the opportunity afforded by the State Water Resources Control Board (State Board) to provide comments on the scoping of the State Board's CEQA project to establish a Statewide Mercury Policy and Mercury Control Program for Reservoirs. SMUD takes a special interest in this program given our ownership of the Upper American River Project (UARP), a hydroelectric project in the headwaters of the American River that consists of eleven reservoirs and eight powerhouses. The UARP is SMUD's most important generating facility, providing significant value to SMUD customer-owners not only in the production of 688 MW of clean and sustainable energy, but also offering abundant recreational opportunities, including reservoir fishing. Slab Creek Reservoir, the most-downstream UARP reservoir and lynchpin of the system as it controls water into the 224MW White Rock Powerhouse, is listed under Section 303(d) of the Clean Water Act, as a water body impaired for mercury.<sup>1</sup>

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<sup>1</sup> A 2009 report by PBS&J noted that mercury concentrations in fish tissues exceed the USEPA human health consumption criterion of 0.3 ppm for Sacramento pikeminnow at Slab Creek Reservoir, and tissue mercury concentrations for Sacramento sucker are borderline in the reservoir. The report concluded that subject to further monitoring, there appear to be no mercury bioaccumulation problems that would pose a human health risk for brown trout from Slab Creek. PBS&J, "Mercury Bioaccumulation Technical Report," January 2009, p. 2-7 (Prepared for SMUD, in re FERC Project No. 2101, Upper American River Project). The report concludes:

"In comparison to other lakes and reservoirs, UARP reservoirs have lower tissue mercury concentrations than do the same fish species from waterbodies in the Mother Lode or in waterbodies that are exposed to natural mercury deposits. While some mercury originates in the rocks of the Sierra Nevada, most mercury that ultimately enters the aquatic food web of UARP reservoirs is probably from atmospheric deposition. This conclusion is consistent with research that demonstrates mercury bioaccumulation in fish tissue from fish collected in pristine environments





With this interest at stake, coupled with a strong commitment to environmental stewardship and understanding of the need to protect humans and wildlife from consumption of excessive amounts of mercury, SMUD offers the following comments.

### **General Comment on the Proposed Mercury Control Program for Reservoirs**

The Summary for CEQA Scoping Meetings posted by the State Board explains that the first phases of a Statewide Mercury Policy will include establishment of a control program designed to attain water quality objectives in reservoirs. It lists three likely implementation plan elements of this control program, including, *“Changes in approaches to reservoir management that will modify water chemistry to reduce creation of the most biologically available form of mercury.”*

SMUD’s fundamental concern is that it is premature to consider implementation of reservoir management measures to attempt to control mercury before the State Board has basic knowledge of the sources of mercury entering California reservoirs, the role of reservoirs in exacerbating the buildup of mercury (inorganic and methylated) in the water column and food web, and the efficacy of various potential control measures. Not only is it critical to manage reservoirs effectively for power generation, and for water storage and flood control, but the State Board itself already regulates flows from hydro project reservoirs to achieve multiple water quality and biological goals. It is critical to determine the fundamental need for and efficacy of any new operational measures before considering them in a mercury policy.

How methyl mercury is manifested in the aquatic environment is seasonal and will vary with changes in organic matter availability, nutrient concentrations, oxygen levels, and hydrological interactions in a water body. Understanding this complicated natural process and the environmental variables influencing the formation of methyl mercury is extremely challenging. There is a great deal of variability among water bodies in how mercury is processed. Different types of water bodies can have different ranges of methylation, with wetlands generally expected to have higher percentages of methyl mercury than lakes, and lakes less than rivers or streams.<sup>2</sup>

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worldwide (e.g., alpine and arctic lakes). UARP reservoir operations do not appear to contribute to or enhance the mercury bioaccumulation process in fish.”

<sup>2</sup>PBS&J, “Mercury Bioaccumulation Technical Report,” January 2009, p. 2-7 (Prepared for SMUD, in re FERC Project No. 2101, Upper American River Project); U.S. Environmental Protection Agency, “Mercury Study Report to Congress, Vol. III: Fate and Transport of Mercury in the Environment,” December 1997 (EPA-452-R-97-005).





The rates of bacterial methylation of mercury are dependent on a wide range of environmental variables that affect Hg<sup>2+</sup> availability and the populations of bacteria themselves. The physical and chemical conditions affecting methylation include dissolved oxygen, pH, dissolved organic carbon, salinity, nutrients, selenium, temperature, sulfate and sulfide. Some parameters, such as pH and dissolved organic carbon, can create different impacts on the water column as they do on sediments. There are still other factors affecting bioaccumulation in fish populations.

Given this complexity, and that the dynamics enhancing methylation in lakes and reservoirs are particularly uncertain, and of unknown importance to bioaccumulation, SMUD suggests that proceeding to develop reservoir management controls is premature. SMUD would encourage coordination among state agencies to consolidate and enhance knowledge base on these issues, while SWRCB proceeds with the development of water quality objectives and the broader framework for a Statewide Mercury Policy.

### **CEQA Alternatives**

The Summary lists only two alternatives for the Mercury Control Program for Reservoirs. The first is the “no action” alternative, which is described as addressing California’s 74 reservoirs listed as impaired by mercury on an individual basis, such as through the TMDL process for individual water bodies. In turn, the TMDLs would be implemented through individual site cleanup orders, waste discharge requirements, waivers of waste discharge requirements, NPDES permits, and other enforcement actions as appropriate. Alternative 2 is described as a statewide control program for which implementation requirements would likely be similar, and would likely also be designed within a TMDL framework.

The Summary includes a list of potential implementation actions, which include measures to reduce upland contributions to reservoirs, development and implementation of reservoir management plans, fisheries management in reservoirs, minimizing mercury in sewage and storm water, and statewide, national and global measures to reduce atmospheric deposition of mercury. Since the Summary does not address how a statewide approach would affect the selection and development of control measures, we assume the State Board proposes to establish guidelines for when particular control measures should be employed, or to mandate the use of measures for all impaired reservoirs.

Regardless of whether a statewide policy is used, it is critical to base any implementation plan on a clear understanding of the complex systems and



pathways by which mercury is converted to methyl mercury and bioaccumulated in reservoir food webs. It must integrate the results of scientific studies performed in California and elsewhere into a clear foundation for a policy that deals with all aspects of the issue simultaneously, and then apply this understanding to the unique characteristics of each individual reservoir.

Thus, SMUD recommends that the State Board consider a third alternative that would ensure that the individual characteristics of each reservoir, including the significance of any threat to human health based on the nature of affected fish species and the specific causes of mercury bioaccumulation. These causes would then be addressed using a watershed approach that encompasses the entire river/reservoir system, along with the surrounding land resources. SMUD believes this approach will have the best chance of success in achieving the statewide fish tissue objectives for mercury being developed concurrently by the State Board. This approach would be critical to understanding and minimizing the environmental impacts of the program, as well.

The program should also ensure that it identifies the degree to which factors affecting mercury-related conditions in a reservoir are controllable, and who has control over them. In the Potential Implementation Actions table of the scoping materials, the State Board correctly identifies ongoing potential point and nonpoint mercury sources such as mine sites, atmospheric deposition, and upland land management activities in the reservoir watershed, such as timber harvesting, road development, fire management and other upland erosion-causing activities, which increase the influx of dissolved organic carbon and suspended sediments.

The mercury contamination in UARP water bodies such as Slab Creek Reservoir may be largely out of SMUD's control, a condition that would render mandated reservoir remediation measures ineffective. For example, a 2009 fire in the South Fork American River watershed above Slab Creek Reservoir could have contributed significant methyl mercury runoff into the reservoir, a cause and effect mechanism found in a Canadian study of the relationship between fire and mercury.<sup>3</sup> This dynamic involved increased bioaccumulation due not only to contributions of mercury from upland soils, but in even larger part with complex changes in the food chain associated with increased nutrient contributions.

These concerns are supported by findings over the past few decades of high concentration of mercury found in lake-dwelling fish of wilderness areas. Mercury contamination in Sierra Nevada reservoirs may be a systemic problem

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<sup>3</sup> Erin Kelly, David W. Schindler, Vincent L. St. Louis, David B. Donald, and Katherine E. Vladicka, Proceedings of the National Academy of Sciences, "Forest fire increases mercury accumulation by fishes via food web restructuring and increased mercury inputs" (December 2006).





primarily associated with a combination of atmospheric deposition and watershed land management. These issues need to be fully considered as the State Board develops the Mercury Control Program for Reservoirs.

As described, proposals to include measures aimed at affecting reservoir water chemistry could unduly impose significant regulatory burden and operational restrictions on California's water and power supplies without proof that paradigm changes in California's utility operations would actually reduce methylated mercury levels in California's waters. Additional study should precede development of any specific policy proposals that would include implementation measures affecting the operation of reservoirs. If the proposed project is pursued, however, a number of specific concerns must be addressed during CEQA review of the proposed actions and its alternatives.

### **Public Utility Impacts of Potential Modifications to Water Storage and Discharge Patterns in Reservoirs**

The State Board identifies "*modification of water storage and discharge patterns to reduce methyl mercury production*," as an example of an implementation action under the Mercury Control Program for Reservoirs. Potential modifications to reservoir operations are of significant concern to SMUD based on two considerations: (1) The current understanding of the complex physical, chemical, and biological interactions in Sierra Nevada reservoirs is not sufficient to predict or quantify the effectiveness of modified operations as it relates to altering mercury dynamics; and (2) the potential for significant impacts to the direct and indirect benefits provided by water supply and hydroelectric reservoirs as well as the other unintended impacts on social and natural resources.

Many reservoirs in the Sierra Nevada provide invaluable energy and grid services to California. Water management in reservoirs throughout the state is constrained by the license conditions of the Federal Energy Regulatory Commission (FERC). These constraints are in place to provide protection for a number of natural resources including, but not limited to, water quality, aquatic resources, terrestrial resources, and recreation. Modifying the operations of a hydroelectric reservoir could potentially conflict with the FERC license requirements. In its CEQA process, the State Board should evaluate the impacts of reservoir reoperation on the following services and values provided by hydroelectric projects.

#### *Power Generation and Capacity*

The UARP, like other hydroelectric projects, provides significant amounts of energy to SMUD's Sacramento customer-owners. SMUD's energy planners



utilize precise water management algorithms to ensure water is stored in reservoirs in a manner that minimizes uncontrolled spills and maximizes the delivery of power when it is most needed – primarily during summer months. If reoperation requires reservoirs to maintain otherwise high water elevations during spring runoff, for example, the net effect is a higher incidence of spill and concomitant reduction in energy production.

A primary value of hydro is its dispatchable capacity, or the use of stored water to meet demand throughout summer months. Any reservoir reoperation that reduces the dispatchable capacity of reservoirs would force SMUD to acquire alternative sources of reliable energy as backup. Backup power sources generally are derived from fossil fuel based sources such as gas-fired power plants.

Thus, the CEQA analysis should consider the impact of reservoir reoperation on energy production and dispatchable capacity. Reductions in both power products will require replacement power, which must be analyzed in the CEQA evaluation with respect to impacts on greenhouse gas emissions.

#### *Grid Services and Integration of Variable Renewable Resources*

Another value of hydropower is its flexibility as a power source. This ability of hydro to rapidly alter generation is critical to reliability of the power grid and the provision of ancillary services such as regulation up, regulation down, and spinning reserves. This role has become even more critical with the state mandate to achieving a renewable resource portfolio of 33% by 2020. Because wind and solar energy is inherently variable, hydropower will play a critical role integrating these important energy resources into the grid.<sup>4</sup> SMUD is currently contemplating adding a pumped-storage facility to the UARP, using Slab Creek Reservoir as a lower reservoir, which will increase our ability to integrate an even higher penetration of variable resources beyond 2020. Thus, constraints on reservoir operations created by the Mercury Control Program could significantly impact the hydropower ancillary services needed for grid stability and the integration of variable renewable power sources. In the case of the UARP, these impacts could reduce the value of the pumped-storage facility.

#### **Air Quality and Greenhouse Gas Impacts of Potential Modifications to Water Storage and Discharge Patterns in Reservoirs**

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<sup>4</sup> California Independent System Operator, "Integration of Renewable Resources: Transmission and operating issues and recommendations for integrating renewable resources on the CAISO-controlled grid" (November 2007); Electric Power Research Institute, "Quantifying the Value of Hydropower in the Electric Grid" (In Press).





As explained above, hydro provides great benefit in providing dispatchable capacity that can support the use of renewable wind and solar capacity. Reducing support for solar and wind power could increase the proportion of energy required from fossil fuel sources. In addition, any reductions in overall hydropower generation resulting from reservoir management measures would require replacement via other sources of power, which will generally be fossil fuel-based sources. The CEQA analysis of any proposed change in reservoir operation must therefore the environmental impacts of increases in generation from fossil fuel-based sources, including air quality, public health and greenhouse gas impacts.

### **Water Supply and Flood Control Impacts of Potential Modifications to Water Storage and Discharge Patterns in Reservoirs**

Reservoirs throughout California play a critical role in providing water for a variety of consumptive uses. The CEQA process must evaluate impacts of reservoir reoperation on the change in the volume, and timing of delivery of water for agricultural and municipal uses. Similarly, the impact of reservoir reoperations on flood control services from California reservoirs must be considered.

Reservoirs throughout California have a critical role in the storage of water for beneficial uses. The CEQA process must evaluate impacts of reservoir reoperation on the change in the volume, and timing of delivery of water on the water rights of downstream users under various water year conditions.

### **Recreational and Aesthetic Impacts of Potential Modifications to Water Storage and Discharge Patterns in Reservoirs**

An important value of California reservoirs is recreation, including boating, fishing, and swimming. These values are significantly enhanced by the visual appeal of near full reservoir water bodies. Reoperation of reservoirs can impact aesthetic values and recreational opportunities. The potential losses of these values should be evaluated and addressed in the CEQA process. In addition, the CEQA analysis should consider the effects on natural resources of displaced recreationalists traveling to other reservoirs creating crowding issues, or being induced to choose more attractive land-based activities on adjacent natural areas, which state or federal agencies may be ill-equipped to manage.

### **Water Quality and Aquatic Resources Impacts of Potential Modifications to Water Storage and Discharge Patterns in Reservoirs**

An increased incidence and magnitude of reservoir spill events resulting from a mandated reoperation has the potential to significantly impact water quality and





aquatic resources. If reservoirs are forced to release water early in the spring months, the resulting stored water may be warmer thereby resulting in increased water temperatures in downstream reaches. Spill events can also result in impacts to downstream aquatic resources, disrupting amphibian breeding, and rearing of young-of-the-year resident fish populations.

The State Board should also consider potentially competing mandates embodied in its 401 certification of hydro FERC licenses, which require minimum releases, reservoir lake level targets or requirements, pulse flows, and other water management requirements. A policy proposing changes to reservoir operations is likely to conflict with these requirements.

### **Changes in Fisheries Management in Reservoirs**

The State Board identifies "*fisheries management in reservoirs*" as another key implementation action planned for inclusion under the Mercury Control Program for Reservoirs. Examples include, "Manage nutrients/algae to improve production (at the base of the food web) and reduce Methyl mercury concentrations." During the CEQA process the State Board needs to consider whether increasing the algae levels will actually lower the mercury levels in fish and the potential for increased algae levels to impact water quality of public water supplies. Additionally, the State Board is developing proposed policies for Biological Objectives and Nutrients in Inland Surface Waters, which may be incompatible with this potential action.

Another fisheries management example listed by the State Board is, "Promote abundance of species and sizes of reservoir fish that accumulate smaller amounts of mercury in their tissue." The summary indicates this measure might be accomplished by reducing stocking of introduced species, promoting intensive fishing of species with higher mercury levels, or encouraging native anadromous fisheries, such as salmon and steelhead. During the CEQA process, the State Board needs to consider whether these actions will actually lower the mercury levels in fish tissue, and whether agencies could realistically manage such ecosystem changes. These concepts appear quite speculative given current knowledge and given the complexity of managing natural systems.

Additionally, neither the State Board nor SMUD has the authority to fully implement these actions. Fish stocking and the level of fishing allowed are under the jurisdiction of the California Department of Fish and Game and the US Fish and Wildlife Service.

### **Tailoring Methyl Mercury Objectives to Water Body Types and Conditions**



In addition to the potential fisheries management actions, the State Board should also consider a tiered approach to setting the methyl mercury fish tissue objective that applies to the State's water bodies. A wide range of reservoir and river conditions, fishing patterns, fish consumption rates, wildlife conditions, and mercury concentrations exist throughout the state. Having one fish tissue objective that fits all possible conditions is not reasonable. SMUD encourages the State Board to consider a tiered system of fish tissue objectives. Areas of documented high fish consumption rates, high methyl mercury levels, and easy or year-round access should have lower fish tissue objectives. Areas of lower fish consumption rates, low methyl mercury levels, and difficult or seasonal access should have higher fish tissue objectives.

In summary, before proposing specific types of operational control measures for reservoirs, there must be a scientific basis for the premise that changes to reservoir operation will result in measurable change to mercury levels. SMUD urges instead that the State Board continue to examine the sources of mercury and organic carbon to water bodies in the State with the highest methylation potential, and further study of the dynamics of mercury bioaccumulation. Consideration of implementation measures should be based on an understanding of the significance, controllability and causes of mercury levels, methylation of mercury, and bioaccumulation in each reservoir. We look forward to the opportunity to participate in further discussion of these issues.

SMUD appreciates the opportunity to comment on this proposed action and looks forward to working with the State Board on this issue. If you have questions or would like additional information concerning our comments, please contact David Hanson at 916-732-6703 or [David.Hanson@smud.org](mailto:David.Hanson@smud.org); or Brad Gacke at 916-732-5434 or [Brad.Gacke@smud.org](mailto:Brad.Gacke@smud.org).

Sincerely,

A handwritten signature in blue ink that reads "David Hanson". The signature is fluid and cursive, with a long horizontal line extending to the right.

for Scott Flake, P.E.  
Manager, Power Generation Department