

Appendix C Life History Information for Selected California Marine Organisms
 Associated with the Draft **Final** Staff Report Including the Draft **Final** Substitute Environmental Documentation
 For the **Proposed-Draft Final** Desalination Amendment

Table C-1. Life History Information for Selected California Marine Algae (http://www.dfg.ca.gov/marine/table_inv.asp)

Species	Primary Depth Range in Feet	Primary Geographic Range Within CA (4 Regions)	Habitat Preference: Juveniles	Habitat Preference: Adults	Unique or Significant Life History Characteristics	Larval Duration (potential larval dispersal)
<i>Gelidium</i> spp.	Intertidal, to 100	All regions, including islands	rocky reefs	rocky reefs	may forms mats of algal turf	not applicable
<i>Gracilaria</i> spp.	Intertidal to 50	All regions, including islands	soft bottoms	soft bottoms	used as spawning substrate by herring in SF Bay	not applicable
<i>Porphyra</i> spp.	Intertidal to 100	All regions, including islands	rocky reefs	rocky reefs	may be common in high-energy surf zones	not applicable
Sea palm	Intertidal	N,NC,SC	exposed rocky reefs	exposed rocky reefs	individuals can regenerate blades but not stipe	not applicable
Kelp, giant	20-120	NC,SC,S	on sand and rock substrate	on sand and rock substrate	fronds may grow up to 24 inches per day	not applicable
Kelp, bull	10-70	N,NC,SC	on rock or cobble substrate	on rock or cobble substrate	found where water temp is less than 60°F	not applicable

Table C-2. Life History Information for Selected California Marine Invertebrates.
http://www.dfg.ca.gov/marine/table_inv.asp

Species	Primary Depth Range in Feet	Primary Geographic Range Within CA (4 Regions)	Habitat Preference: Juveniles	Habitat Preference: Adults	Unique or Significant Life History Characteristics	Larval Duration (potential larval dispersal)
Crab, box	0-1800	All regions, including islands	rocky reef, submarine canyons	rocky reef, submarine canyons	unknown	unknown
Crab, brown rock	0-300	All regions, including islands	rocky reefs, kelp beds	rocky reefs, kelp beds	rock crabs may live 5-6 years	3-4 months
Crab, Dungeness	0-750	N,NC,SC	sand, sand-mud, estuaries	sand, sand-mud	larvae may be transported more than 50 miles offshore	105-125 days
Crab, spider (sheep crab)	20-410	South	rocky reefs, kelp beds	rocky reefs, kelp beds	cease molting after reaching maturity	unknown
Crab, yellow rock	0-300	South	sand, soft bottom	sand, soft bottom	egg-bearing females may congregate in rock-sand interface habitat	3-4 months
Lobster, California	0-240	South, mainland and islands	surf grass beds	rocky reef, kelp beds, eel grass beds	egg-bearing females generally found in shallow water	5-9 months
Prawn, spot	150-1,600	All regions, including islands	shallower mud, mud-sand, sand/rock. rocky reef, submarine canyons	mud, mud-sand, sand/rock. rocky reef, submarine canyons	change sex from male to female during year 4	unknown

Species	Primary Depth Range in Feet	Primary Geographic Range Within CA (4 Regions)	Habitat Preference: Juveniles	Habitat Preference: Adults	Unique or Significant Life History Characteristics	Larval Duration (potential larval dispersal)
Prawn, ridgeback	145-525	South; mainland and islands	sand, shell, green mud	sand, shell, green mud	positive response to El Niño conditions	unknown
Shrimp, bay (several species)	0-575	All regions	soft bottom, estuaries	soft bottom, estuaries	major prey item for fishes	30-40 days
Shrimp, ghost and mud shrimp (several species)	Intertidal	All regions	sand, sand/mud, sand/gravel	sand, sand/mud, sand/gravel	form permanent burrows or impermanent tunnels	unknown
Shrimp, ocean	150-1200	N,NC,SC: Oregon border to Pt. Arguello	green mud, mud-sand	green mud, mud-sand	change sex from male to female during year 2	2.5 to 3 months
Cucumber, sea (several species)	0-300	All regions, including islands	rocky reefs, sand/mud	rocky reefs, sand/mud	do not form spawning aggregations	51-91 days
Urchin, purple	0-300	All regions, including islands	rocky reefs, kelp beds, under canopy of adults	rocky reefs, kelp beds	require high densities for successful spawning	6-8 weeks
Urchin, red	Intertidal to 500	All regions, including islands	rocky reefs, kelp beds, under canopy of adults	rocky reefs, kelp beds	require high densities for successful spawning	6-8 weeks

Species	Primary Depth Range in Feet	Primary Geographic Range Within CA (4 Regions)	Habitat Preference: Juveniles	Habitat Preference: Adults	Unique or Significant Life History Characteristics	Larval Duration (potential larval dispersal)
Urchin, white	0-990	South, including islands	sand, eel grass beds	sand, eel grass beds	extremely efficient grazers on smaller algae	30-60 days
Abalone, black	Intertidal, 0-20	NC,SC,S	crevices in rocky reefs, kelp beds	rocky reefs, kelp beds	susceptible to withering syndrome disease	4-7 days
Abalone, green	Intertidal, 0-30	South, mainland and islands	crevices in rocky reefs, kelp beds	rocky reefs, kelp beds	feed on drift algae	4-7 days
Abalone, pink	Intertidal, 20-120	South, mainland and islands	crevices in rocky reefs, kelp beds, rock outcrops	rocky reefs, kelp beds, rock outcrops	generally occurs where water temp is above 14 C	4-7 days
Abalone, red	Intertidal to 100	All regions, including islands	crevices in rocky reefs, kelp beds, boulder outcrops, under canopy of red urchins	rocky reefs, kelp beds, boulder outcrops	largest abalone species in the world	4-7 days
Abalone, white	80-200	South, mainland and islands	exposed rocky areas	exposed rocky areas	maximum age estimated at 40 years	4-7 days
Squid, market	0 to at least 600	NC,SC,S	over soft bottom	over soft bottom	short-lived; average squid in commercial fishery is year old.	unknown
Clam, chione (several species)	Intertidal to 165	South, mainland and islands	sandy mud, estuaries	sandy mud, estuaries	smooth chione subject to habitat loss due to harbor development	unknown

Species	Primary Depth Range in Feet	Primary Geographic Range Within CA (4 Regions)	Habitat Preference: Juveniles	Habitat Preference: Adults	Unique or Significant Life History Characteristics	Larval Duration (potential larval dispersal)
Clam, littleneck (several species)	Intertidal	All regions, including islands	cobble beds	cobble beds	prized food item	unknown
Clam, geoduck	0-360	All regions	sand, sand/mud, estuaries	sand, sand/mud, estuaries	individuals may exceed 10 pounds	2 weeks
Clam, Manila	Intertidal	All regions	sand, sand/mud, estuaries	sand, sand/mud, estuaries	introduced from Japan; important recreational species	3 weeks
Cockles	Intertidal to 660	All regions, including islands	sand, sand/mud, mud, estuaries	sand, sand/mud, mud, estuaries	one species may live to 16 years	unknown
Limpets	Intertidal to 100	All regions, including islands	rocky reefs	rocky reefs	some species may live 15 years	less than 1 week
Mussels (several species)	Intertidal to 130	All regions, including islands	rocky reefs, pilings	rocky reefs, pilings	bio-accumulator of toxins	1 month
Octopus (several species)	Intertidal to 660	All regions, including islands	rocky reefs, kelp beds, soft bottom	rocky reefs, kelp beds, soft bottom	eggs are attached to substrate and brooded by females	1 month or less

Species	Primary Depth Range in Feet	Primary Geographic Range Within CA (4 Regions)	Habitat Preference: Juveniles	Habitat Preference: Adults	Unique or Significant Life History Characteristics	Larval Duration (potential larval dispersal)
Scallop, rock	Intertidal to 100	All regions, including islands	rocky reefs, pier pilings, rock jetties	rocky reefs, pier pilings, rock jetties	intolerant of salinity less than 25 ppt	5 weeks
Sea hare (two species)	0-60	NC,SC,S	hard and soft bottom, kelp beds	hard and soft bottom, kelp beds	large nerve ganglia make them useful for research	4-5 weeks
Sea stars (many species)	Intertidal to deepest canyons	All regions, including islands	rocky reefs, hard bottom, sand	rocky reefs, hard bottom, sand	some species adapted to exposure at low tides	unknown
Snail, moon	Intertidal to 500	All regions, including islands	soft bottom	soft bottom	has aquiferous system of spongy sinuses in foot	2 weeks
Snail, top (several species)	0-100	S	rocky reefs, kelp beds, including canopy	rocky reefs, kelp beds, including canopy	common in upper kelp canopy	unknown
Snail, turban (several species)	Intertidal to 250	All regions, including islands	shallower rocky reefs, kelp beds, including canopy	rocky reefs, kelp beds, including canopy	feeds primarily on kelp and coralline algae	unknown
Whelk, Kellet's	0-230	South, including islands	rocky reefs, kelp beds, gravel, sand	rocky reefs, kelp beds, gravel, sand	spawning aggregations of up to 20 individuals occur in spring	unknown

Species	Primary Depth Range in Feet	Primary Geographic Range Within CA (4 Regions)	Habitat Preference: Juveniles	Habitat Preference: Adults	Unique or Significant Life History Characteristics	Larval Duration (potential larval dispersal)
Worms (polychaetes)	Intertidal to deepest canyons	All	rocky reefs in mussel beds, cobble beds, soft bottom	rocky reefs in mussel beds, cobble beds, soft bottom	several species have toothed proboscis	variable

Table C-3. Life History Information for Selected California Marine Fishes.

Species	Primary Depth Range in Feet (x0.305 =meters)	Primary Geographic Range Within CA Using Four Regions	Habitat Preference: Juveniles	Habitat Preference: Adults	Unique or Significant Life History Characteristics	Larval Duration [potential larval dispersal]
Bass, barred sand	0-120	South: southern California mainland	soft bottom less than 30 ft, eel grass beds	sand bottom	aggregate over sand in summer - early fall for spawning	3-4 weeks
Bass, giant sea	15-150	South: mainland and islands	rocky reefs, kelp beds, sand bottom	rocky reefs, kelp beds, sand flats	aggregate for several months during spawning	one month; settle at ca. in.
Bass, kelp	0-75	South: mainland and islands (uncommon central Calif.)	rocky reefs, kelp beds, eel grass beds	rocky reefs, kelp beds	aggregate in kelp beds and over rocky reefs for spawning in late May- September	28-30 days
Bass, spotted sand	0-200	South: Santa Monica Bay and south	sand, mud, jetties, eel grass beds	soft bottom, kelp forests, eel grass beds, jetties	aggregate near bays to spawn in summer	25-31 days
Blacksmith	0-150	South: (to Monterey Bay)	rocky reefs	rocky reefs, kelp beds	demersal eggs in nests; defended by male	short to moderate
Cabezon	0-250	All regions, including islands	rocky reefs, breakwaters, kelp beds, tide pools, open ocean	rocky reefs, kelp beds	eggs adhesive, attach to substrate, often macroalgae	3-4 months
Corbina, California	0-45	South: mainland	soft bottom, nearshore including surf zone	soft bottom, surf zone and bays	growth rate faster in estuaries; spawn offshore	short
Croaker, black	0-150	South: mainland	soft bottom, nearshore including surf zone	soft bottom, surf zone; occasionally rocky reefs	one of few croakers to prefer rocky reefs and kelp beds	short
Croaker, white	0-420	All; most common Point Reyes to Mexico border	near bottom in shallow soft habitat	soft bottom, primarily nearshore and estuaries	schooling; multiple spawning each year; adults in deeper water than juveniles	short
Croaker, yellowfin	0-150	South: mainland, Pt. Conception south	soft bottom, nearshore and estuaries	soft bottom, beaches and piers, estuaries, kelp beds	spawning primarily in summer	short
Eel, wolf	Intertidal to 600	N,NC,SC	pelagic	rocky reefs, kelp beds	not a true eel; spawn October-February	1-2 months

Species	Primary Depth Range in Feet (x0.305 =meters)	Primary Geographic Range Within CA Using Four Regions	Habitat Preference: Juveniles	Habitat Preference: Adults	Unique or Significant Life History Characteristics	Larval Duration [potential larval dispersal]
Garibaldi	0-95	SC	rocky reefs, kelp beds	rocky reefs, kelp beds	males guard eggs, attached to red algae	unknown
Goby, bluebanded	0-210 incl. intertidal	S (to Monterey Bay during El Nio yrs)	rocky reefs	rocky reefs, kelp beds	males guard eggs, attached on brood chambers	unknown
Greenling, kelp	0-150	N,NC,SC	rocky reefs, kelp beds	rocky reefs, kelp beds	eggs adhere to rocky substrate	unknown
Grunion, California	0-60	SC, S	sandy nearshore areas	sandy nearshore areas	eggs deposited on sandy beaches; lack filaments	low to moderate
Halibut, California	0-300	All	estuaries, shallow open coast soft bottom	estuaries and soft bottom open coast	distribution influenced by El Nio events	< 30 days
Jacksmelt	shallow	All	kelp and eel grass beds; sandy beaches; harbors	kelp and eel grass beds; sandy beaches; harbors	eggs with filaments for attachment to eel grass and shallow algal beds	low
Lingcod	0-1400	All	rocky reefs, kelp beds, hard bottom, soft bottom	rocky reefs, kelp beds, hard bottom, soft bottom	Spawns nearshore on rocky reefs; males guard eggs	3 months
Lizardfish, California	5-750	SC,S	primarily soft bottom	primarily soft bottom	rest on bottom using pelvic fins	unknown
Midshipman, plainfin	0-1000	All	soft bottom	soft bottom; spawn on hard substrate	Eggs deposited on rocks and hard substrate	unknown
Opaleye	0-95	SC, S	rocky intertidal	rocky reefs, kelp beds	regulates kelp growth by grazing	unknown
Pacific pompano (Butterfish)	30-300	All	coastal pelagic	coastal pelagic	a schooling species	unknown
Queenfish	0-180	SC, S	soft bottom	shallow water and sandy bottom; in bays and sloughs	spawn at night from March to September	short
Bocaccio	0-1050	All	over hard and soft bottom	midwater over hard bottom	live-bearing	moderate

Species	Primary Depth Range in Feet (x0.305 =meters)	Primary Geographic Range Within CA Using Four Regions	Habitat Preference: Juveniles	Habitat Preference: Adults	Unique or Significant Life History Characteristics	Larval Duration [potential larval dispersal]
Chilipepper	0-1080	All	soft bottom	midwater over hard bottom	live-bearing	moderate
Rockfish, blue	0-300	All	rocky reefs, kelp forests, soft bottom	rocky reefs, kelp forests	live-bearing	moderate
Rockfish, speckled	100-1200	All	hard bottom	hard bottom	live-bearing	moderate
Rockfish, vermilion	0-900	All	soft and hard bottom	wide depth range, rocky reefs, kelp forests, canyons	live-bearing	moderate
Rockfish, yellowtail	0-1800	All	midwater	midwater over hard bottom	live-bearing	moderate
Sanddab, Pacific	30-1800	All	soft bottom	soft bottom	may spawn twice a year	unknown
Sargo	0-130	S	rocky reefs, kelp beds, sand	rocky reefs, kelp beds, sand bottom	broadcast spawners	unknown
Scorpionfish, California	0-600	S	reef systems	hard and soft bottom	adults aggregate in 12 to 360 feet to spawn; eggs released in gelatinous masses that float to surface	unknown
Sculpin, staghorn	0-300	All	soft bottom, estuaries	soft bottom, estuaries	abundant in San Francisco estuary	unknown
Seabass, white	0-400	NC,SC,S occurs farther north during El Nio events	sandy area, estuaries, piers, jetties, kelp beds	kelp beds, rocky reefs, offshore banks, open ocean	adults aggregate in spring-summer during spawning	
Sheephead, California	0-180	SC, S	rocky reefs, kelp beds	rocky reefs, kelp beds	changes sex from female to male with size	unknown
Smelt, night	0-420	N, NC, SC	soft bottom	shallow sandy coastal areas	spawn in surf zone at night	low to moderate
Sole, English	60-1000	All	soft bottom, shelf	soft bottom	migrates, spawns at 200-360 ft	6-10 weeks
Sole, sand	5-312	N, NC, SC	soft bottom, nearshore, estuaries	soft bottom, nearshore	one of few medium-large flatfish found inshore	unknown

Species	Primary Depth Range in Feet (x0.305 =meters)	Primary Geographic Range Within CA Using Four Regions	Habitat Preference: Juveniles	Habitat Preference: Adults	Unique or Significant Life History Characteristics	Larval Duration [potential larval dispersal]
Surfperch, barred	0-240	NC, SC, S	beaches	beaches	bear live, free-swimming young	not applicable
Surfperch, shiner	0-480	All	estuaries, soft bottom, kelp beds, rocky reef	estuaries, soft bottom, kelp beds, rocky reef	bear live, free-swimming young	not applicable
Tomcod, Pacific	0-720	N, NC, SC	unknown	soft bottom	broadcast spawners; high fecundity	unknown
Topsmelt	shallow	All	kelp and eel grass beds; sandy beaches, harbors	kelp and eel grass beds; sandy beaches, harbors	spawns in eel grass and algal beds, possibly kelp beds; eggs attach to spawning substrate by adhesive filaments	low

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