

Draft Amendment to the Water Quality Control Plan for Ocean Waters of California Addressing
Desalination Facility Intakes, Brine Discharges, and
to Incorporate Other Nonsubstantive Changes
Publicly Released July 3, 2014

L. Implementation Provisions for Desalination Facilities*

1. Applicability and General Provisions

a. Chapter III.L applies to desalination facilities* using seawater.* Chapter III.L.2 does not apply to desalination facilities* operated by a federal agency. Chapter III.L.2, L.3, and L.4 do not apply to portable desalination facilities* that produce less than 0.05 MGD of desalinated water and are operated by a governmental agency. These standards do not alter or limit in any way the authority of any public agency to implement its statutory obligations. The Executive Director of the State Water Board may temporarily waive the application of chapter III.L. to desalination facilities* that are operating to serve as a critical short term water supply during a state of emergency as declared by the Governor.

b. Definitions of New, Expanded, and Existing Facilities:

(1) For purposes of chapter III.L, “existing facilities” means desalination facilities* that have been issued an NPDES permit and all building permits and other governmental approvals necessary to commence construction 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 [effective date of this Plan]. Existing facilities do not include a facility for which permits and approvals were issued and construction commenced after January 1, 1977, but for which a regional water board did not make a determination of the best site, design, technology, and mitigations measures feasible, pursuant to Water Code section 13142.5, subdivision (b) (hereafter Water Code section 13142.5(b)).

(2) For purposes of chapter III.L, “expanded facilities” means existing facilities for which, after [effective date of the Plan], the owner or operator does either of the following in a manner that could increase intake or mortality of marine life: 1) increases the amount of seawater* used either exclusively by the facility or used by the facility in conjunction with other facilities or uses, or 2) changes the design or operation of the facility. To the extent that the desalination facility* is co-located with another facility that withdraws water for a different purpose and that other facility reduces the volume of water withdrawn to a level less than the desalination facility’s* volume of water withdrawn, the desalination facility* is considered to be an expanded facility.

(3) For purposes of chapter III.L, “new facilities” means desalination facilities* that are not existing facilities or expanded facilities.

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- c. 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.*
 - d. Chapter III.L.3 (Receiving Water Limitation for Salinity*) applies to all desalination facilities* that discharge into ocean waters.*
 - e. Chapter III.L.4 (Monitoring and Reporting Programs) applies to all desalination facilities* that discharge into ocean waters.*
 - f. References to the regional water board include the regional water board acting under delegated authority. For provisions that require consultation between regional water board and State Water Board staff, the regional water board shall notify and consult with the State Water Board staff prior to making a final determination on the item requiring consultation.
2. Water Code section 13142.5(b) Determinations for New and Expanded Facilities: Site, Design, Technology, and Mitigation Measures Feasibility Considerations
- a. General Considerations
 - (1) The owner or operator shall submit a request for a Water Code section 13142.5(b) determination to the appropriate regional water board as early as practicable. This request shall include sufficient information for the regional water board to conduct the analyses described below. 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. Studies and models are subject to the approval of the regional water board in consultation with State Water Board staff.
 - (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 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.

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- (3) The regional water board's 13142.5(b) analysis for expanded facilities 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.
- (4) In conducting the Water Code section 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 regional water board shall consider project-specific decisions made by other state agencies; however, the regional water board is not limited to project-specific requirements set forth by other agencies and may include additional requirements in a Water Code section 13142.5(b) determination.
- (5) A regional water board may expressly condition a Water Code section 13142.5(b) determination based on the expectation of the occurrence of a future event. Such future events may include, but are not limited to, the permanent shutdown of a co-located power plant with intake structures shared with the desalination facility* or a reduction in the volume of wastewater available for the dilution of brine.* The regional water board must make a new Water Code section 13142.5(b) determination if the foreseeable future event occurs.
 - (a) The owner or operator shall provide notice to the regional water board as soon as it becomes aware that the expected future event will occur, and shall submit a new request for a Water Code section 13142.5(b) determination to the regional water board at least one year prior to the event occurring. If the owner or operator does not become aware that the event will occur at least one year prior to the event occurring, the owner or operator shall submit the request as soon as possible.
 - (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 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 obtain a temporary replacement supply.

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- (c) If the regional water board makes a Water Code section 13142.5(b) determination for a desalination facility* that will be co-located with a power plant, the regional water board shall condition its determination on the power plant remaining in compliance with the Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling.
- b. 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. For each potential site, in order to determine whether a proposed facility site best minimizes intake and mortality of marine life, the regional water board shall require the owner or operator to:
- (1) 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 infeasible.
 - (2) Analyze the feasibility of placing intake, discharge, and other facility infrastructure in a location that avoid impacts to sensitive habitats* and sensitive species.
 - (3) Analyze the direct and indirect effects on marine life resulting from facility construction and operation, individually and in combination with potential anthropogenic effects on marine life resulting from other past, present, and reasonably foreseeable future activities within the geographic scope of the area affected by the facility.
 - (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.
 - (5) Analyze the presence of existing infrastructure, and the availability of wastewater to dilute the facility's brine* discharge.
 - (6) 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 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

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salinity.* To the extent feasible, intakes shall be sited so as to
maximize the distance from a MPA or SWQPA.*

- c. Design is the layout, form, and function of a facility, including the configuration and type of infrastructure, including intake 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:

- (1) For each potential site, analyze the potential design configurations of the intake, discharge, and other facility infrastructure to avoid impacts to sensitive habitats* and sensitive species.
- (2) 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.
- (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.

- d. 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) 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 criteria listed below, in consultation with State Water Board staff.

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- i. 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; 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.
 - ii. The 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.
- (b) Installation and maintenance of a subsurface* intake shall avoid, to the maximum extent feasible, the disturbance of sensitive habitats* and sensitive species.
- (c) If subsurface* intakes are not feasible, the regional water board may approve a surface water intake subject to the following conditions.
- i. The regional water board shall require that surface water intakes be screened. Screens must be functional while the facility is withdrawing seawater.*
 - ii. 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.]*
 - iii. An owner or operator may use an alternative method of preventing entrainment so long as the alternative method

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provides equivalent protection of eggs, larvae, and juvenile organisms as is provided by a [0.5 mm (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. The 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. 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. At their discretion, the regional water boards may permit the use of existing entrainment data from the facility to meet this requirement.

- (d) In order to minimize impingement, through-screen velocity at the surface water intake shall not exceed 0.15 meters per second (0.5 feet per second).

(2) Considerations for Brine* Discharge Technology:

- (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.
- (b) Multiport diffusers* are the next best 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.
- (c) The regional water board shall require 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

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stress from elevated salinity,* turbulence that occurs during water conveyance and mixing, and shearing stress at the point of discharge.

(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. 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, the regional water board shall require the owner or operator to use empirical studies or modeling to:

- i. Estimate intake entrainment impacts using an ETM/APF approach.*
- ii. Estimate degradation of marine life 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. Considerations shall be given to the most sensitive species, and community structure and function.
- iii. Estimate marine life mortality that occurs as a result of water conveyance, in-plant turbulence or mixing, and waste discharge.

(e) An owner or operator proposing to use flow augmentation* as an alternative brine* discharge technology must:

- i. Use low turbulence intakes (e.g., screw centrifugal pumps or axial flow pumps) and conveyance pipes.
- ii. Convey and mix dilution water in a manner that limits thermal stress, osmotic stress, turbulent shear stress, and other factors that could cause marine life mortality.
- iii. 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

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augmentation.* The study must evaluate impacts caused by augmented intake volume, intake and pump technology, water conveyance, waste brine* mixing, and effluent discharge. Unless demonstrated otherwise, organisms entrained by flow augmentation* are assumed to have a mortality rate of 100 percent.

- iv. 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.
 - v. Facilities proposing to using flow augmentation* must comply with chapter III.L.2.d.(1).
 - vi. Facilities proposing to using flow augmentation* through surface intakes are prohibited from discharging through multiport diffusers.*
- (f) Facilities that use subsurface* intakes to supply augmented flow water for dilution are exempt from the requirements of chapter III.L.2.d.(2) if the facility meets the receiving water limitation for salinity in chapter III.L.3.
- e. 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.*
- (1) *Marine Life Mortality Report.* The owner or operator of a facility shall submit a report to the regional water board 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.
- (a) For operational mortality related to intakes, the report shall include a detailed entrainment study. The entrainment study period shall be at least 36 consecutive months and sampling shall be designed

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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 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.

- (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.
 - (c) For construction-related mortality, the report shall use any acceptable approach for evaluating the mortality that occurs within the area disturbed by the facility's construction. 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.
 - (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.
- (2) 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 III.L.2.e.(4). The mitigation project or the use of a fee-based mitigation program and the amount of the fee that

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the owner or operator must pay is subject to regional water board
approval.

(3) *Mitigation Option 1: Complete a Mitigation Project.* The mitigation project must satisfy the following provisions:

(a) The owner or operator shall submit a Mitigation Plan. Mitigation Plans shall 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 and success criteria, monitoring requirements, and financial assurances.

(b) The mitigation project must meet the following requirements:

- 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 associated with the facility.
- ii. 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. 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.
- iii. 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. 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.

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- iv. 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.
 - (c) The Mitigation Plan is subject to approval by the regional water board in consultation with State Water Board staff and with other agencies having authority to permit the project and require mitigation.
- (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.
- (a) The agency that manages the fee-based mitigation program must have legal and budgetary authority to accept and spend mitigation funds, a history of successful mitigation projects documented by having set and met performance standards for past projects, and stable financial backing in order to manage mitigation sites for the operational life of the facility.
 - (b) The amount of the fee shall be based on the cost of the mitigation project, or if the project is designed to mitigate cumulative impacts from multiple desalination facilities or other development projects, the amount of the fee shall be based on the desalination facility's fair share of the cost of the mitigation project.
 - (c) The manager of the fee-based mitigation program must consult with the California Department of Fish and Wildlife, Ocean Protection Council, Coastal Commission, State Lands Commission, and State and regional water boards to develop mitigation projects that will best compensate for intake and mortality of marine life caused by the desalination facility.* Mitigation projects that increase or enhance the viability and sustainability of marine life in Marine Protected Areas are preferred, if feasible.

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- (5) California Department of Fish and Wildlife, the regional water board, and State Water Board may perform audits or site inspections of any mitigation project.
- (6) An owner or operator, or a manager of a fee-based mitigation program, must submit a mitigation project performance report to the regional water board 180 days prior to the expiration date of their NPDES permit.

3. Receiving Water Limitation for Salinity*

- a. Chapter III.L.3 is applicable to all desalination facilities discharging brine* into ocean waters,* including facilities that commingle brine* and wastewater.
- 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.
 - (2) In determining an effluent limit necessary to meet this receiving water limitation, permit writers shall use the formula in chapter III.C.4 that has been modified for brine* discharges as follows:

Equation 1: $C_e = (2,000 \text{ mg/l} + C_s) + D_m(2,000 \text{ mg/l})$

Where:

- C_e = the effluent concentration limit, mg/L
- C_o = the salinity* concentration to be met at the completion of initial* dilution= 2,000 mg/l + C_s
- C_s = the natural background salinity* mg/L
- D_m = minimum probable initial*dilution expressed as parts seawater* per part brine* discharge

- (a) The fixed distance referenced in the initial dilution* definition shall be no more than 100 meters (328 feet).
- (b) In addition, the owner or operator shall develop a dilution factor (D_m) based on the distance of 100 meters (328 feet) or initial*dilution, whichever is smaller.

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- (c) The value 2,000 mg/l in Equation 1 is the maximum incremental increase above ambient background salinity* (Cs) allowed at the edge of the brine* mixing zone. A regional water board may substitute an alternative numeric value for 2,000 mg/l in Equation 1 based upon the results of a facility-specific alternative salinity* receiving water limitation study, as described in chapter III.L.3.c below.
- c. An owner or operator may submit a proposal to the regional water board for approval of an alternative salinity* receiving water limitation.
- (1) To determine whether a proposed facility-specific alternative receiving water limitation is adequately protective of beneficial uses, an owner or operator shall:
- (a) 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.
- (b) Conduct at least the following Whole Effluent Toxicity (WET) tests: germination and growth for giant kelp (*Macrocystis pyrifera*); development for red abalone (*Haliotis refescens*); development and fertilization for purple urchin (*Strongylocentrotus purpuratus*); development and fertilization for sand dollar (*Dendraster excentricus*); larval growth rate for topsmelt (*Atherniops affinis*).
- (c) The regional water board in consultation with State Water Board staff may require an owner or operator to do additional toxicity studies if needed.
- (2) The regional water board in consultation with the State Water Board staff may require an owner or operator to provide additional studies or information in order to approve a facility-specific alternative receiving water limitation for salinity.*
- (3) The facility-specific alternative receiving water limitation shall be based on the no observed effect level (NOEL) 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

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has discretion to approve the proposed facility-specific alternative receiving water limitation for salinity.*

- (4) The regional water board may eliminate or revise a facility-specific alternative receiving water limitation for salinity* based on a facility's monitoring data, the results from their Before-After Control-Impact study as required in chapter III.L.4 below, or based on any other information that the regional water board deems to be relevant.
- d. Existing facilities that do not meet the receiving water limitation at the edge of the brine mixing zone* and throughout the water column by [the effective date of this plan] must either: 1) establish a facility-specific alternative receiving water limitation for salinity* as described in chapter III.L.3.(c); or, 2) upgrade the facility's brine* discharge method in order to meet the receiving water limitation in chapter III.L.3.b in accordance with the State Water Board's Compliance Schedule Policy, as set forth in (e) below. An owner or operator that chooses to upgrade the facility's method of brine* disposal:
- (1) Must demonstrate to the regional water board that the brine* discharge does not negatively impact sensitive habitats,* sensitive species, MPAs, or SWQPAs.
- (2) Is subject to the Considerations for Brine* Discharge Technology described in chapter III.L.2.e.(2).
- e. The regional water board may grant compliance schedules for the requirements for brine* waste discharges for existing desalination facilities.* All compliance schedules shall be in accordance with the State Water Board's Compliance Schedule Policy, except that the salinity* receiving water limitation set forth in chapter III.L.3.(b) shall be considered to be a "new water quality objective" as used in the Compliance Schedule Policy.

4. Monitoring and Reporting Programs

- a. The owner or operator of a desalination facility* must submit a Monitoring and Reporting Plan to the regional water board for approval. The Monitoring and Reporting Plan shall include monitoring of effluent and receiving water characteristics 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 Plan and for compliance with the receiving water limitation in chapter III .L.3. Receiving water monitoring for salinity* shall be conducted at times when the monitoring locations are most likely affected by the discharge. For new or expanded facilities the following additional requirements apply:

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- (1) 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. The monitoring and reporting plan shall be reviewed, and revised if necessary, upon NPDES permit renewal.
- (2) 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 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. The regional water board will use the data and results from the Before-After Control-Impact surveys for evaluating and renewing the requirements set forth in a facility's NPDES permit.

Add the following new definitions to, and amend existing definitions in, Appendix I of the Ocean Plan.

AREA PRODUCTION FOREGONE (APF), also known as habitat production foregone, is an estimate of the area that is required to produce (replace) the same amount of larvae or propagules* that are removed via entrainment at a desalination facility's* intakes. APF is calculated by multiplying the proportional mortality* by the source water body,* which are both determined using an empirical transport model.* (Raimondi 2014)

BRINE is the byproduct of desalinated* water having a salinity* concentration greater than a desalination facility's* intake source water.

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 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.

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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.

EELGRASS BEDS are aggregations of the aquatic plant species, *Zostera marina*.

EMPIRICAL TRANSPORT MODEL (ETM) is a methodology for determining the spatial area known as the source water body* that contains the source water population, which are the organisms that are at risk of entrainment as determined by factors that may include but are not limited to biological, hydrodynamic, and oceanographic data. ETM can also be used to estimate proportional mortality,* P_m . (Raimondi 2014)

ETM/APF APPROACH or ANALYSIS. For guidance on how to perform an ETM/APF analysis please see Raimondi 2011 and Steinbeck *et al.* 2007.

FLOW AUGMENTATION is a type of in-plant dilution and occurs when a desalination facility* withdraws additional source water for the specific purpose of diluting brine* prior to discharge.

KELP BEDS are aggregations of marine algae of the order Laminariales, including species in the genera *Macrocystis*, *Nereocystis*, and *Pelagophycus*. Kelp beds include the total foliage canopy throughout the water column.

MARKET SQUID NURSERIES are comprised of numerous egg capsules, each containing approximately 200 developing embryos, attached in clusters or mops to sandy substrate with moderate water flow. Market squid (*Doryteuthis opalescens*) nurseries occur at a wide range of depths; however, mop densities are greatest in shallow, nearshore waters between ten and 100 meters (328 feet) deep. *D. opalescens* egg nurseries commonly occur within a few hundred meters of the same location every year.

MULTIPOINT DIFFUSERS are linear structures consisting of many spaced ports or nozzles that are installed on submerged marine outfalls. Multipoint diffusers discharge brine* waste into an ambient receiving water body and enable rapid mixing, dispersal, and dilution of brine* within a relatively small area.

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.

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PROPAGULES are structures that are capable of propagating an organism to the next stage in its life cycle via dispersal. Dispersal is the movement of individuals from their birth site to their reproductive grounds.

PROPORTIONAL MORTALITY, P_m , is percentage of larval organisms or propagules* in the source water body* that is expected to be entrained at a desalination facility's* intake. It is assumed that all entrained larvae or propagules* die as a result of entrainment. (Raimondi 2014)

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.

SEAWATER is 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.

SENSITIVE HABITATS, for the purposes of this Plan, are kelp beds,* rocky substrate, surfgrass beds,* eelgrass beds,* oyster beds, spawning grounds for state or federally managed species, market squid nurseries,* or other habitats in need of special protection as determined by the Water Boards.

SOURCE WATER BODY is the spatial area that contains the organisms that are at risk of entrainment at a desalination facility* as determined by factors that may include but are not limited to biological, hydrodynamic, and oceanographic data. (Raimondi 2014)

SUBSURFACE, for the purposes of this Plan, is the area beneath the ocean floor or beneath the surface of the earth inland from the ocean.

SURFGRASS BEDS are aggregations of marine flowering plants of the genus *Phyllospadix*.