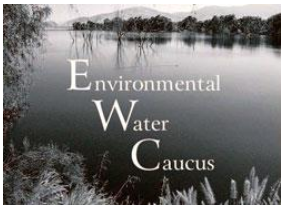
(5/5/15) Board Meeting
Desalination Amendments
Deadline: 4/9/15 by 12:00 noon



CALIFORNIA COASTKEEPER ALLIANCE

April 9, 2015

Chair Felicia Marcus and Board Members
c/o Jeanine Townsend, Clerk to the Board
State Water Resources Control Board
1001 I Street, 24th Floor
Sacramento, CA 95814

Sent via electronic mail to: commentletters@waterboards.ca.gov

RE: Comment Letter – Desalination Amendment

On behalf of California Coastkeeper Alliance, which represents 12 California Waterkeeper groups spanning the coast from the Oregon border to San Diego, Surfrider Foundation, Natural Resources Defense Council, Heal the Bay, and the undersigned organizations we appreciate the opportunity to provide comments on the State Water Resources Control Board's ("State Water Board") March 2015 revised Amendment to the Water Quality Control Plan For Oceans Waters of California Addressing Desalination Facility Intakes, Brine Discharges, and the Incorporation of Other Non-Substantive Changes ("Desalination Amendment").

Our organizations spent decades working with state and federal agencies to develop regulations to implement the federal Clean Water Act (CWA) and minimize the intake and mortality of marine life from open ocean intakes and antiquated "once-through cooling" (OTC) technology for coastal power plants.[1] Regulations adopted in 2010 by the State Board documented the significant impact to marine ecosystems from open ocean intakes, and required power plants on our coast and in estuaries to employ "best technology available" (BTA) to reduce the entrainment and impingement of marine life.[2] The State Water Board concluded that open ocean intakes were not BTA, and prohibited them for new OTC facilities. Now, ocean desalination proponents are seeking to continue using the very same intakes regulated and intended to be phased-out under the OTC Policy – undermining the Policy's objective of minimizing marine life mortality from entrainment and impingement.

Desalination facilities will have a detrimental impact on the chemical, physical, and biological integrity of California's waters. Today, California's desalination facilities have a combined design capacity of approximately 6.1 MGD.[3] That capacity would be dwarfed by the 15 seawater desalination plants currently proposed along the California coast, with a combined design capacity of 250 to 370 MGD—a 60-fold increase over today's current capacity.[4]

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[1] *See* STATE WATER RES. CONTROL BD., Website: "Once Through Cooling Water Policy" *available at* http://www.waterboards.ca.gov/water_issues/programs/ocean/cwa316/policy.shtml

[2] STATE WATER RES. CONTROL BD., WATER QUALITY CONTROL POLICY ON THE USE OF COASTAL AND ESTUARINE WATERS FOR POWER PLANT COOLING, Resolution No. 2010-0020, http://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2010/rs2010_0020.pdf; 2014 Amendments http://www.swrcb.ca.gov/water_issues/programs/ocean/cwa316/docs/otc_2014.pdf

[3] STATE WATER RES. CONTROL BD., Draft Substitute Environmental Document: Amendment to the Water Quality Control Plan for Ocean Waters of California: Addressing Desalination Facility Intakes, Brine Discharges, and the Incorporation of Nonsubstantive Changes, pg. 13 (July 2014), *available at* http://www.waterboards.ca.gov/water_issues/programs/ocean/desalination/docs/draft_desal_sed_070314.pdf.

[4] Cooley, H. and K. Donnelly. 2012. Proposed Seawater Desalination Facilities in California, Pacific Institute.

The drought places immense pressure on decision-makers to streamline and weaken water quality standards in the name of increased water supply. One only needs to be reminded of Australia's drought to understand why California should not rush to ocean desalination. Severe drought from the mid-1990s until 2012 prompted Australia to construct six large-scale seawater desalination plants at a cost of $10 billion to provide an alternative source of drinking water.[5] At the same time, water policy reforms and improved efficiency measures were implemented.[6] The facilities took years to build, and by the time they were operational, the drought had eased and cheaper alternatives made the water from the desalination plants impractical.[7] Today, four of the six Australian plants stand idle. If California reacts to the drought in the same manner as Australia, we may also find ourselves in a regrettable position – with taxpayers footing the bill for years to come.

If and when seawater desalination is appropriate, projects should be appropriately scaled to meet demonstrated water supply needs. Project permits should require the best available site, and technology to minimize the intake and mortality of marine life; minimize the brine discharge's adverse impacts to the marine environment; and avoid conflict with ecosystem-based management activities, especially ongoing implementation of the Marine Life Protection Act, and climate change and disaster preparedness.

Given the expected push for desalination in the near future—and the likely availability of environmentally preferable alternatives—it is critical that the State Water Board develop statewide standards to minimize the intake and mortality of all forms of marine life. However, substantial changes need to be made to the Desalination Amendment in order to be legal under the Porter-Cologne Act. As described in detail below, we request the State Board make the following revisions to the Desalination Amendment and the accompanying Substitute Environmental Document (SED):

(1) Use a narrow definition of "feasible" instead of CEQA's broad definition;
(2) Do not allow the illegal use of screened intakes as the best available technology feasible for minimizing the intake and mortality of all forms of marine life;
(3) Do not allow the use of after-the-fact restoration to mitigate a screened open-ocean intake's mortality rate;
(4) Do not violate the federal and state endangered species acts by allowing 1 mm screened intakes to be the proximate cause of a take;
(5) Uphold the public trust doctrine to limit the intake of seawater to avoid harms to public trust resources;
(6) Require the best available mitigation feasible to mitigate for all forms of marine life lost to intake and mortality;
(7) Re-define "need" to ensure the use of best site, design and technology to minimize the intake and mortality of all forms of marine life;
(8) Require the best available site to ensure the greatest minimization of marine life intake and mortality and ensure no impacts to marine protected areas;
(9) Ensure the best available technology prevents waste discharge impacts to marine habitat and marine life;
(10) Ensure the receiving water limitation prevents brine toxicity and hypoxia;
(11) Ensure expanded and conditionally approved facilities meet the Desalination Amendment's requirements in a timely manner; and
(12) Require all owners and operators to hire a neutral third party to conduct studies and models presented to the regional water boards.
(13) Be explicit that flow augmentation for brine dilution is illegal.

[5] Elizabeth Harball, "Aussies warn Calif. that it can't 'magically replub' its way out of drought," E&E Publishing, Inc. (March 19, 2014).
[6] *Id.*
[7] *Id.*

I. THE STATE WATER BOARD SHOULD USE A NARROW DEFINITION OF "FEASIBLE" INSTEAD OF CEQA'S BROAD DEFINITION.

The State Water Board should not rely on CEQA's definition of "feasible". The State Water Board has revised the Desalination Amendment to include a definition of "feasible" that is essentially identical to Public Resource Code § 15364 ("CEQA definition") definition of "feasible". To determine the feasibility of subsurface intakes, regional water board's will now be forced to interpret whether subsurface intakes are "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors."

A. Clean Water Act §316(b) and Water Code §13142.5(b) are similar statutes, targeting a particular issue, and should be interpreted similarly.

Clean Water Act §316(b) and §13142.5(b) are similar statutes that remedy similar evils, and thus should be interpreted similarly. California courts have stated that where a state and federal statutory scheme have the same "objectives and relevant wording", as they do here, California courts look to federal precedent for guidance.[8] The OTC Policy is based on §316(b), which has similar requirements as §13142.5(b), which applies to seawater withdrawals for "cooling water" and desalination facilities' "source water". For the OTC Policy the State Water Board developed a two-track approach, with Track 1 setting the best technology available standard, while Track 2 provided an alternative – but substantially the same – compliance track that could be pursued when an existing facility demonstrates to the State Water Board's satisfaction that Track 1 is "not feasible." The Desalination Amendment proposes a similar structure for the best available intake technology section. Section L.2.d.1.a. states that the "regional water board shall require subsurface intakes unless it determines that subsurface intakes are infeasible…" Like the OTC Policy, this sets-up a two-track approach for coming into compliance with the best available technology portion of Water Code Section 13142.5(b). Given the similar statutory language of CWA §316(b) and Water Code §13142.5(b), the similar two-track approach in both policies, and critical nature of the term "not feasible," the State Board should use the OTC Policy and CWA §316(b) as guidance for the desalination policy's definition of "not feasible."

The State Water Board's interpretation of §316(b) to develop and adopt the OTC Policy should be similarly applied to the interpretation of Water Code §13142.5(b) for developing the Desalination Amendment. The borrowed statute rule states that "when Congress borrows a statute, it adopts by implication interpretations placed on that statute, absent express statement to the contrary."[9] It is obvious from the construction of both §316(b) and Water Code §13142.5(b) that the California Water Code section was adopted from the federal Clean Water Act. *In pari material:* "similar statutes should be interpreted similarly, unless legislative history or purpose suggests material differences."[10] The California Legislature borrowed the Clean Water Act's §316(b)'s intent and similar terms when enacting Water Code §13142.5(b). Therefore, the State Water Board should apply the same narrow interpretation of "feasible" under the Desalination Amendment as it adopted in the OTC Policy.

"Specific provisions targeting a particular issue apply instead of provisions more generally covering the

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[8] *See, e.g., Reno v. Baird* (1998) 18 Cal. 4th 640, 64 7 (reasoning that where "the objectives and relevant wording" of a state statute are similar to a federal statute, "California courts often look to federal decisions interpreting these statutes for assistance in interpret[ation]"); *see also Guz v. Bechtel Nat 'I. Inc.* (2000) 24 Cal. 4th 317, 354; *Cal. State Univ. v. Superior Court* (2001) 90 Cal.App.4th 810, 823.

[9] William N. Eskridge, Jr., Philip P. Frickey, The Rehnquist Court's Canons of Stattutory Interpretation (Outline was derived from the Appendix to "Foreword: Law As Equilibrium,"), pg. 4 (1994), *available at* http://www.ncsl.org/documents/lsss/2013PDS/Rehnquist_Court_Canons_citations.pdf.

[10] *Id* at 9.

issue."[11] Clean Water Act §316(b) and Water Code §13142.5(b) target the same exact issue: the minimization of marine life mortality from the intake of seawater. They are two provisions addressing a particular issue – and thus should be applied similarly. California case law on an agency's statutory interpretation also suggests that the State Water Board should use the OTC Policy as guidance when determining feasibility for the Desalination Amendment. When determining whether the State Water Board properly interpreted §13142.5(b) a court will "`take into account matters such as context, the object in view, the evils to be remedied, the history of the times and of legislation upon the same subject, public policy, and contemporaneous construction.'"[12] The State Water Board developed the OTC Policy with the intent to eliminate the unnecessary mortality of marine life from seawater intake – the same "evils to be remedied" as the Desalination Amendment.

Moreover, the §316(b) applies to desalination facilities in certain situations. The Clean Water Act §316(b) applies to desalination facilities when they are co-located with an OTC facility and at least 25 percent of the combined intake is for cooling. As the State Water Board admits on page 28 of the SED:

> *CWA section 316(b) indirectly applies to desalination facilities co-located with power plants and other industrial cooling water intakes insofar as a cooling water intake structure, used to withdraw water for use by both facilities, must meet the requirements of the federal statute and applicable regulations. Thus, a desalination facility that collects source water through an existing, operational cooling water intake associated with a power plant, or certain other types of industrial facilities, may be required to comply with technology-based standards for minimizing impingement and entrainment impacts.*[13]

While agreeing with the intent of the State Water Board's statement on page 28, §316(b) does not just apply "indirectly" to desalination facilities – but directly under certain circumstances. CWA section 316(b) requires that the location, design, construction, and capacity *of cooling intake structures* reflect the best technology available for minimizing adverse environmental impact. Unlike §13142.5(b) which is explicit what type of facilities are covered (ie cooling and industrial facilities), §316(b) limits its coverage to any facilities that use "cooling intake structures." Meaning, a desalination facility would be covered by §316(b) if the facility is co-located with an OTC facility *and is using their cooling intake structure.* The State Water Board acknowledges the close connection between §316(b) and §13142.5(b), and even states that desalination facilities may be regulated by the Clean Water Act by being "required to comply with technology-based standards for minimizing impingement and entrainment impacts."[14]

Furthermore, the State Water Board explains that "[m]uch of the information relied upon during the development of the OTC Policy was used to guide the development of the proposed Desalination Amendment described in this document."[15] The similarities, and the "evils to be remedied", between §316(b) and §13142.5(b) cannot be denied, and thus the State Water Board should interpret both statutes the same.

Yet rather than look to the Clean Water Act, and its own interpretation of "feasible" under the OTC Policy, the State Water Board instead uses the more general CEQA definition. The State Water Board attempts to distinguish §316(b) from §13142.5(b) by replying that determining "feasibility of subsurface

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[11] *Id* at 3.
[12] *Cossack* v. *City of Los Angeles* (1974) 11 Cal.3d 726, 733 [114 Cal. Rptr. 460, 523 P.2d 266], quoting *Alford* v. *Pierno* (1972) 27 Cal. App.3d 682, 688 [104 Cal. Rptr. 110]; *United Business Com.* v. *City of San Diego, supra,* at p. 170.
[13] State Water Resources Control Board, Draft Staff Report Including the Draft Substitute Environmental Document, pg. 28 (March 20, 2015), *available at* http://www.swrcb.ca.gov/water_issues/programs/ocean/desalination/docs/amendment/150320_sr_sed.pdf.
[14] *Id.*
[15] *Id* at 36-37.

intakes is a site-specific inquiry requiring consideration of a number of factors." We are unable to see how that is any different than the narrow definition of "not feasible" under the OTC Policy. The definition there included a site-specific inquiry requiring consideration of a number of factors:

> *Cannot be accomplished because of space constraints or the inability to obtain necessary permits due to public safety considerations, unacceptable environmental impacts, local ordinances, regulations, etc. Cost is not a factor to be considered when determining feasibility under Track 1.*[16]

The State Water Board goes on to explain that "a broader definition of feasible is appropriate, with additional criteria to inform the analysis for potential use of subsurface intakes." This additional criteria greatly expands the scope of what is technically feasible, and considers cost, which as discussed in our 2014 comments, was not intended by the California Legislature. Finally, the State Water Board goes on to explain that a broader definition of feasible is necessary because "[a]ll communities that are suffering from limited water supplies should be able to consider desalination as a potential alternative means of meeting water supply demands." Section 13142.5(b) does not allow the State Water Board to excuse the best available technology for minimizing marine life because communities are suffering from limited water needs. That is not an appropriate reason to interpret "feasible" to be broad and include cost.

The California Environmental Quality Act (CEQA) and the Porter-Cologne Act have vastly different purposes. CEQA is primarily designed to identify and disclose to decision-makers and the public the significant environmental impacts of a proposed project prior to its consideration and approval. An EIR is "'the heart of CEQA'" and the "environmental 'alarm bell' whose purpose it is to alert the public and its responsible officials to environmental changes before they have reached ecological points of no return."[17] It is intended, further, "'to demonstrate to an apprehensive citizenry that the agency has, in fact, analyzed and considered the ecological implications of its action.'"[18] "Because the EIR must be certified or rejected by public officials, it is a document of accountability."[19]

CEQA is an information-forcing law that keeps the public informed and agencies accountable. Porter-Cologne's purpose is to regulate the "water resources of the state" and ensure "the quality of all the waters of the state shall be protected for use and enjoyment by the people of the state."[20] Porter-Cologne expects sources of pollution, like desalination facilities, to "be regulated to attain the highest water quality which is reasonable."[21] As such, the State Water Board should revise the definition of feasible to be narrowly tailored to those instances where subsurface intakes are not technically feasible, which should not include a cost consideration.

B. The State Water Board would not apply the CEQA definition of "feasible" to new OTC facilities.

The OTC Policy's narrow definition of "feasible" should be used as guidance for the Desalination Amendment because §13142.5(b) does not distinguish between withdrawals for cooling water and any other industrial withdrawal of seawater. In the Response to Comments, the State Water Board attempts to distinguish the OTC Policy from the Desalination Amendment because the OTC Policy was only

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[16] STATE WATER RES. CONTROL BD., WATER QUALITY CONTROL POLICY ON THE USE OF COASTAL AND ESTUARINE WATERS FOR POWER PLANT COOLING, Resolution No. 2010-0020, pg. 18 (2010), *available at* http://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2010/rs2010_0020.pdf; 2014 Amendments *available at* http://www.swrcb.ca.gov/water_issues/programs/ocean/cwa316/docs/otc_2014.pdf.

[17] *Laurel Heights Improvement Assn.* v. *Regents of the University of California* (1988) 47 Cal.3d 376, 392 [253 Cal. Rptr. 426, 764 P.2d 278].)

[18] *Id.*

[19] *Id.*

[20] *See* Cal. Water Code §§ 13000 *et seq.*

[21] *See* Cal. Water Code §§ 13000 *et seq.*

regulating existing OTC facilities, while the Desalination Amendment applies to new and expanded facilities.

We appreciate the difference between existing facilities under §316(b) and new or expanded facilities under Water Code §13142.5(b). But that begs the question, would the State Water Board apply the CEQA definition of "feasible" for a newly proposed coastal power plant looking to use OTC? By interpreting the term "feasible" under §13142.5(b) to be that as defined under CEQA, it seems that the State Water Board is suggesting that a newly proposed OTC facility would only be required to install cooling towers if they were "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors." This would result in an absurd interpretation of the law. Why would existing facilities be required to retrofit for cooling towers in almost all instances, while new facilities, yet to be constructed, would be allowed a broad definition to avoid using cooling towers as the best available technology?

The State Water Board cannot apply any other interpretation for "feasible" in the context of cooling water because §13142.5(b) makes no distinction in the statute between withdrawals for cooling water and any other industrial withdrawal of seawater. We request the State Water Board explain whether the CEQA definition of "feasible" would apply to a new OTC facility. If the State Water Board would apply a different definition of feasible for new cooling water intakes, please explain where in the record such a distinction between new cooling water withdrawals and new industrial withdrawals is justified.

As the State Water Board has concluded several times, Water Code Section 13142.5(b) is more restrictive than Section 316(b) of the Clean Water Act. In the OTC Policy's CEQA document, the State Water Board admitted that:

> *Cal. Wat. Code §13142.5(b) contains specific requirements for "new or expanded coastal power plants" that mandate the "best available site, design, technology, and mitigation measures feasible shall be used to minimize the intake and mortality of all forms of marine life," but does not define the characteristics of an "expanded" facility.* ***The Cal. Wat. Code's explicit requirement to minimize intake and mortality can be read as more restrictive than §316(b)'s requirement to minimize adverse environmental impact****, but it remains unclear whether this requirement would be applicable to a facility meeting the Phase I definition of "existing" or if the term can be considered substantially similar to "expanded."*[22]

The State Water Board has already made the conclusion we argue throughout these comments – that 13124.5(b) is more restrictive than Section 316(b) because the Water Code requires several factors to be the "best available" to minimize "all forms of marine life", while Section 316(b) only requires the best technology available to minimize adverse environmental impacts. Therefore, there is no justification for why the definition of "feasible" in §13142.5(b) should be less restrictive than the definition of "feasible" under §316(b).

C. Project proponents should not be given two opportunities to argue subsurface intakes are not feasible.

The revised Desalination Amendment now offers two separate feasibility determinations: one general definition of feasible that applies to the entire Amendment, and a second feasibility determination under the best available technology section. In our previous comments, we requested that the feasibility criteria

[22] STATE WATER RES. CONTROL BD., Final Substitute Environmental Document: Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling, pg. 49 (May 2010), *available at* http://www.waterboards.ca.gov/water_issues/programs/ocean/cwa316/docs/final_sed_otc.pdf.

listed in Chapter III.L.2.(1) be replaced with a narrow definition of "feasible." Instead, the State Water Board has provided a broad CEQA definition of feasible, while retaining the second feasibility analysis under the best available technology section. This provides project proponents with two opportunities to argue that a subsurface intake is not feasible.

Chapter III.L.2.(1).a. states that subsurface intakes are required unless the regional water board "determines that subsurface intakes are infeasible based upon an analysis of the criteria listed below…" Subsection (i) then goes on to list numerous factors a project proponent can use to exempt themselves from their legal responsibilities to install the best available technology, including:

(1) Geotechnical data, hydrogeology, benthic topography, oceanographic conditions;
(2) Presence of sensitive habitats;
(3) Presence of sensitive species;
(4) Energy use;
(5) Impact on freshwater aquifers;
(6) Local water supply, and existing water users;
(7) Desalinated water conveyance, existing infrastructure,
(8) Design constraints (engineering, constructability); and
(9) Project life cycle cost.

Only factors (1) and (8) should be considered when determining whether subsurface intakes are infeasible. Each and every other factor listed above has no relevance pertaining to whether subsurface intakes are feasible. And factor 1 is not a consideration of whether any sub-surface intake is feasible. The data in Factor 1 is useful only in determining whether an infiltration gallery is necessary and feasible or whether the geology is suitable for subsurface wells of different types. Factors (2) "Presence of sensitive habitats" and (3) "Presence of sensitive species" should not be a consideration because the "best available site" for minimizing marine life would not be in an area with sensitive habitat and/or species. Moreover, the operation of subsurface intakes would not result in any marine life mortality of sensitive species, and any possible construction impacts would be a one-time temporary impact. It is unacceptable that the "presence of sensitive species" is only considered in the feasibility for subsurface intakes, but is not a limiting factor in where a facility can place an open-ocean intake – for example the Hedionda Lagoon where source water will be withdrawn for the Poseidon-Carlsbad facility. Coastal wetlands have been filled and degraded in California to the point where 90 percent of that habitat type is lost. Surely the species inhabiting the 10 percent of coastal lagoons left are worthy of special protections. But the Water Code does not distinguish protections of "sensitive species." There is no need for heightened protection of any species. All forms of marine life would be adequately protected by the Water Code, but for the inadequate protections in the revised Desalination Amendment.

Feasibility criteria (4) "Energy use" has no bearing on whether subsurface intakes are feasible. There is nothing in the record to support the State Water Board's conclusion that energy use has any bearing on whether subsurface intakes are feasible. Criteria (5) "Impact on freshwater aquifers" is not applicable because the best available site and design criteria should ensure no impact to aquifers exist. Criteria (6) "Local water supply, and existing water users" and Criteria (7) "Desalinated water conveyance, existing infrastructure" again has no bearing on whether subsurface intakes are feasible. These are just carefully disguised ways of using cost – again – to show infeasibility. And finally, Criteria (8) "project life cycle cost" should not be a consideration as discussed above. However, if the State Water Board intends #8 to be its interpretation of how "economics" will be analyzed under the CEQA definition – then the Board should make that clear. Furthermore, the State Water Board should be explicit that "project life cycle costs" should include the operational costs of the facility, and use recent studies evaluating the operational

cost of a facility using subsurface intakes.[23] Mitigation required for surface water intakes should also be considered when determining "life cycle cost". Regardless of explicit language to explain "project life cycle costs", the State Water Board should not provide project proponents with two – if not more – opportunities to argue that cost considerations make subsurface intakes infeasible.

We request the State Water Board explain how criteria factors 2-7, and 9, are determinative on whether subsurface intakes are feasible. There is no factual basis in the record to explain how these 7 factors are determinative of whether subsurface intakes are feasible. Instead, they constitute another opportunity for project proponents to escape using subsurface intakes as the best available technology, and instead are allowed to use the futile technology of open-ocean screened intakes.

It is worth noting here that the difference between Track 1 and Track 2 in the Revised Amendment is in stark contrast to the 2-track approach in the OTC Policy. In the OTC Policy, Track 2 ensured an approximate equality in performance to the Track 1 option. Here, Track 1 virtually eliminates intake and mortality of all forms of marine life, and Track 2 accepts nearly complete intake and mortality of all forms of marine life, and mitigation through restoring wetlands habitat and "biomass" with little to no relationship to the marine life lost to the intake. This policy change from what was adopted in the OTC Policy is indefensible and unacceptable. As we state above, §13142.5(b) should be interpreted to be more restrictive – not less – than §316(b).

The law requires the State Water Board to ensure use of the best available technology feasible for minimizing the intake and mortality of all forms of marine life. The law does not condition a determination of the best available technology on whether or not it meets the project proponents' business goals. Instead of providing a list of criteria for project proponents to excuse themselves from complying with the law, the State Water Board should look at the OTC Policy's definition of "not feasible."

The State Board determined that "the technology must be "available" in the sense that it is *technically* and *logistically* feasible at *most facilities* subject to the proposed Policy…"[24] From that definition of "available" the State Board created a definition of "not feasible":

> *"Cannot be accomplished because of space constraints or the inability to obtain necessary permits due to public safety considerations, unacceptable environmental impacts, local ordinances, regulations, etc. Cost is not a factor to be considered when determining feasibility under Track 1."*[25]

In order to provide a legally defensible definition of "feasible", we suggest the following revisions to Chapter III.L.2.d.(1).a.i.:

> *The regional water board shall use the following definition of "not feasible"* ~~*consider the following criteria*~~ *in determining feasibility of subsurface* intakes: Cannot be constructed or operated given geotechnical data, hydrogeology, benthic topography, or oceanographic conditions. Cannot be accomplished because of the inability to obtain necessary permits due to unacceptable environmental impacts, local ordinances, State or local regulations, etc. Cost is not a factor to be considered when determining feasibility. Flow Augmentation for brine dilution is not a factor to be considered when determining feasibility.* ~~*, presence of sensitive habitats,* presence of sensitive species, energy use; impact on freshwater*~~

[23] *See* Missimer, T.M., N. Ghaffour, A.H.A. Dehwah, R. Rachman, R.G. Malvia and G. Amy. Subsurface intakes for seawater reverse osmosis facilities: Capacity, limitation, water quality improvement, and economics. Desalination. Vol. 322 (2013).
[24] Supra note 22, at 67.
[25] Supra note 16, at 19.

~~*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.*~~

D. If CEQA's "feasible" definition remains in the Desalination Amendment, then the State Water Board should require a narrow reading of when subsurface intakes are not feasible.

If the State Water Board insists on using the CEQA definition for "feasible" then the Board should require a narrow reading of the definition to ensure project proponents are required to truly use the best available technology feasible. To narrowly interpret the CEQA definition, the State Water Board should look to existing case law explaining how to limit the feasibility analysis demonstrating an economic burden.

The burden of demonstrating economic (or other) infeasibility falls squarely on the project proponent, and the Water Boards should not merely accept the infeasibility claims of the project developers. Rather, the Water Boards must actually study and analyze any claim of infeasibility.[26] Moreover, to pass legal muster, the feasibility analysis may not simply conclude that more environmentally protective options are infeasible because they will place the proponent at a competitive disadvantage or make project financing more expensive or difficult. Rather, to constitute substantial evidence in the record, the feasibility analysis must contain and assess "meaningful comparative data" and concrete information about lender positions.[27]

Significantly, "[t]he fact that an alternative may be more expensive or less profitable is not sufficient to show that the alternative is financially infeasible. What is required is evidence that the additional costs or lost profitability are sufficiently severe as to render it impractical to proceed with the project."[28] That is, an environmentally superior technology or mitigation must be "truly infeasible," not just undesirable from the proponent's perspective.[29] Recent case law makes it clear that the courts will demand a robust, credible, and well documented analysis to support any claim of economic infeasibility, even under the comparatively less stringent and more procedural California Environmental Quality Act.[30]

More specifically, the accompanying EIR in *Goleta Valley* concluded that archeological resources would be adversely affected by the proposed development and, therefore, the county imposed conditions of approval to mitigate some of these adverse impacts, including a requirement that the project proponent develop a cultural resources plan and avoid culturally significant burial sites. The project proponent argued that the project was, for this reason, "designed . . . to minimize impact on the sites, particularly the important and sensitive ones, to the maximum extent consistent with the development."[31] The challengers, on the other hand, argued that the LCP required "avoidance of such sites, if possible, not just mitigation, and that only if such avoidance is infeasible is 'mitigation' permitted."[32]

[26] *Goleta Valley*, 197 Cal. App. 3d at 1187.
[27] *Center for Biological Diversity v. County of San Bernardino*, 185 Cal. App. 4th 866, 884-85 (2010).
[28] *Goleta Valley*, 197 Cal. App. 3d at 1181.
[29] *City of Marina v. Board of Trustees of the California State University,* 39 Cal. 4th 341, 269 (2006).
[30] *Center for Biological Diversity*, 185 Cal. App. 4th at 885; *Save Round Valley Alliance v. County of Inyo*, 157 Cal. App. 4th 1437, 1461-62 (2007); *Sierra Club v. Friends of the West Shore*, 916 F. Supp. 2d 1098, 1124-29 (E.D. Cal. 2012).
[31] *Goleta Valley*, 197 Cal. App. 3d at 1186.
[32] *Id.*

The *Goleta Valley* court concluded that the board of supervisors erred, explaining that "[i]mposition of conditions to partially ameliorate adverse environmental impacts of the proposed project does not excuse failure to evaluate the alternative scaled-down alternative."[33] The LCP, with language virtually identical to section 30260 of the Coastal Act, "requires that project design avoid such impacts, if possible."[34] "In as much as there was no substantial evidence to support respondent's finding that the alternate design was economically infeasible, further consideration at the administrative level is required. . . . The economic feasibility of such a design should have been studied. Without such a study the preliminary plans for the development run afoul of the Local Coastal Program."[35]

In particular, CEQA's definition of "feasible" is identical to the definition in the Coastal Act: "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors."[36] Accordingly, CEQA cases reviewing a proponent's or lead agency's claims of economic infeasibility provide useful guidance here.

In interpreting the feasibility concept under CEQA, the courts have repeatedly held that the decision record must show that an alternative or mitigation measures is "truly infeasible," not merely undesirable from the proponent's perspective.[37] The appropriate question for the feasibility analysis is whether the project as mitigated can be "economically successful" – that is, whether the mitigated project "cannot operate at a profit so as to render it impractical."[38]

II. THE STATE WATER BOARD SHOULD NOT ALLOW THE ILLEGAL USE OF SCREENED INTAKES AS THE BEST AVAILABLE TECHNOLOGY FEASIBLE FOR MINIMIZING ALL FORMS OF MARINE LIFE MORTALITY.

The State Water Board's revised Desalination Amendment provides a broad definition of "feasible" leading to a weak standard for requiring subsurface intakes. Essentially, the State Water Board has created a "straw man" for requiring subsurface intakes, a requirement that can and will be easily knocked down by project proponents. This "straw man" requirement will allow proponents to escape the legally required use of subsurface intakes as the best available technology, and instead will be allowed to use open-ocean screened intakes as the best available technology feasible. Open-ocean screened intakes have minimal – if any – reductions in marine life entrainment. The State Water Board is knowingly allowing projects to use a 1 mm screened open-ocean intake, which studies conclude have zero reduction of entrainment for certain species. Since the law requires the State Water Board to require the best available technology to reduce all forms of marine life intake and mortality, the option of using open-ocean screens as the best available technology feasible is illegal.

A. The revised Desalination Amendment's weak feasibility standard will allow project proponents to escape using subsurface intakes as the best available technology.

Water Code §13142.5(b) requires "each new or expanded coastal power plant or other industrial installation using seawater for cooling, heating, or industrial processing, the best available site, design, technology, and mitigation measures feasible shall be used to minimize the intake and mortality of all forms of marine life." As discussed in detail above, the State Water Board has interpreted "feasible" to mean "capable of being accomplished in a successful manner within a reasonable period of time, taking

[33] *Id. At 1187.*
[34] *Id.*
[35] *Id.*
[36] *Id.* § 21061.1.
[37] *City of Marina v. Board of Trustees of the California State University,* 39 Cal. 4th 341, 269 (2006) (finding that mitigation is not infeasible merely because funding for the measure is uncertain).
[38] *Maintain Our Desert Environment v. Town of Apple Valley*, 120 Cal. App. 4th 396, 449 (2004).

into account economic, environmental, social, and technological factors." This broad definition allows project proponents great discretion to claim that subsurface surface intakes are not feasible. The definition is so broad that the State Water Board should foreseeably expect many, if not all, project proponents to successfully argue subsurface intakes do not fit into their economic considerations, and thus be allowed to use screened open-ocean intakes.

Moreover, the list of feasible criteria regional water boards shall consider to excuse project proponents is broad and extensive. As noted above, seven of the nine feasibility criteria have no bearing on whether subsurface intakes are feasible. Instead, the feasibility criteria is simply a list of excuses project proponents can use to justify why surface intakes are more appropriate.

Given these two broad feasibility analyses, the requirement to use subsurface intakes should be viewed as a "straw man" requirement, one that will foreseeably be knocked down by most, if not all, project proponents. It is inevitable that the majority, if not all, proposed projects will be allowed to use screened open-ocean intakes as a result of the Desalination Amendment.

B. The law requires the best available technology to minimize marine life mortality of "all forms of marine life".

Water Code §13142.5(b) is clear: the best available technology feasible is required to minimize *all forms of marine life*. However, the initial Amendment excluded the "all forms of marine life" reference. In our August 18th, 2014 Comment Letter, we stated that "the intent of the Amendment should not be to minimize the intake of "some" species at "some" life stage - instead, it should be to minimize the intake and mortality of "all" forms of marine life." In response to our comment, the State Water Board stated that they "[a]gree, per comment 21.8, a definition of 'all forms of marine life' was added to the proposed Desalination Amendment and 'all forms' was added in front of 'marine life' in the amendment language and Staff Report with SED as appropriate."[39] We appreciate and thank the State Water Board for clearly and accurately stating the law.

The State Water Board revised the SED to state:

> *Section 13142.5(b) requires that the Ocean Plan consider all forms of marine life, regardless of size. Subsurface intakes are more protective of marine life than surface water intakes. However, when subsurface intakes are proven to be infeasible, small slot-sized screens will protect larger juvenile and adult organisms (particularly fishes) from entrainment.*[40]

We agree with the State Water Board that §13142.5(b) requires minimization of marine life mortality for all forms of marine life, "regardless of size" or species. We also agree that "screens will protect larger juvenile and adult organisms from entrainment." However, this does not satisfy the law. The State Water Board's own response acknowledges that mortality from all forms of marine life, regardless of size, must be minimized, but goes on to say that open-ocean screens will only protect larger juvenile and adult organisms. Further, the Amendment fails to account for the potential adverse impact of greater *impingement* of organisms when using smaller mesh sizes to reduce entrainment. By not requiring a best available technology that reduces the entrainment of smaller and younger organisms, the State Water Board is failing to uphold its legal responsibility to minimize marine life mortality for all forms of marine life.

[39] State Water Resources Control Board, Appendix H. Response to Public Comments on the Proposed Desalination Amendment and Staff Report with Substitute Environmental Documentation, Response 21.6 (2015).
[40] Supra note 13 at 52.

C. The requirement to use a 1 mm screen size will result in 100 percent entrainment of some marine organisms.

The State Water Board has determined that a 1 mm slot size is the best available technology for minimizing marine life intake and mortality when subsurface intakes are determined to not be feasible. However, studies cited in the State Water Board's SED show that a 1 mm screen size is not effective at minimizing marine life mortality, and in some instances results in a zero percent reduction of entrainment for some marine organisms.

Studies of a 1 mm slot size screen have shown zero reductions of entrainment. In California, "data for two of the *most prevalent larva in California* waters showed that all northern anchovy larva less than 8 mm in length (74.5% of the population) and all CIQ gobies less than 6 mm (92.2% of the population) would be entrained using a 1 mm wedgewire screen."[41] And in Maryland, an entrainment study on 1, 2, and 3 mm slot-size wedgewire screens showed that anchovy and goby larvae less than 5 mm long were entrained "*regardless of the screen slot size*."[42]

Other studies nationwide, using slower intake velocities than those required by the Desalination Amendment, have concluded that a 1 mm screened intake does not reduce entrainment of all forms of marine life. A laboratory study reported "screens with 1 mm slot size reduced entrainment of larvae with large head capsules, but *did not reduce entrainment* of eggs smaller than 2.3 mm in diameter."[43] A study in Narragansett Bay, Rhode Island and Lake Erie, Ohio measured entrainment of fish eggs and larvae through 1.0 mm wedgewire screens, both operating at lower through-slot velocities than required by the Desalination Amendment (0.15 and 0.30 m/s).[44] The study concluded that the effects of a "1.0 mm screen on egg entrainment *were not distinguishable* from egg entrainment at an *unscreened intake*."[45]

Even for larger marine life organisms, studies find that a 1 mm slot screen reduces marine life mortality only marginally. According to a study that modeled entrainment based on head capsule size, "a 1 mm wedgewire-screened intake resulted in a net reduction in entrainment of approximately *10 percent*."[46] In addition, a modeling study by Tenera Environmental (2013b) investigated reduction in entrainment at the Diablo Canyon Power Plant intake when using a 1 mm wedgewire screen. The study showed entrainment reductions ranging from 4.6-15.8 percent relative to open water intakes.[47]

Even the State Water Board's own Expert Review Panel, and the Desalination Amendment itself, admits that screens account for marginal, if any, minimization of marine life mortality. The Expert Review Panel was asked how to adjust the mitigation acreage for entrainment reduction devices like screens. The Expert Review Panel reported that while screens can be an effective tool for reducing entrainment of larger larval organisms, *when all organisms in seawater are considered*, screens reduce entrainment mortality *less than one percent*.[48] The Expert Panel therefore concluded that "intake screens reduce entrainment of all organisms present in seawater *by no more than one percent*."[49] The State Water Board relied on the

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[41] *Id* at 61.
[42] *Id* at 60.
[43] *Id*; Electric Power Research Institute (EPRI). 2005. Field Evaluation of Wedgewire Screens for Protecting Early Life Stages of Fish at Cooling Water Intakes. Report No. 1010112. Palo Alto, CA.
[44] *Id*.
[45] Supra note 13, at 60.
[46] *Id* at 61.
[47] *Id* at 62.
[48] *Id* at 98; Foster, M.S., G.M. Cailliet, J. Callaway, K.M. Vetter, P. Raimondi and P.J.W. Roberts. 2013. Desalination Plant Entrainment Impacts and Mitigation. Expert Review Panel III, available at http://www.swrcb.ca.gov/water_issues/programs/ocean/desalination/docs/erp_final.pdf.
[49] Foster, M.S., G.M. Cailliet, J. Callaway, K.M. Vetter, P. Raimondi and P.J.W. Roberts. 2013. Desalination Plant Entrainment Impacts and Mitigation. Expert Review Panel III.

Expert Panel's finding to revise the Desalination Amendment to account for the one percent minimization in the mitigation fee calculation. In Chapter L.2.e.(1).a. page 12 of the revised draft Amendment, the State Water Board states that the "the mitigation credit applied to the APF to account for entrainment reduction provided by a screen *should be no more than one percent*."[50]

The State Water Board's own studies within its SED find that 1 mm screened intakes will result in zero reductions of entrainment for "some of the most prevalent larva in California waters." Other studies conclude that even for larger species, a 1 mm screened intake will only maximize entrainment reductions by 15 percent. And when you consider all species as a whole, the State Water Board's Expert Review Panel concluded that the net benefit of a 1 mm screened intake is less than one percent. And because it is foreseeable that many, if not all, project proponents will be allowed to use a 1 mm screened open-ocean intake, the State Water Board has illegally ignored its duty to minimize the intake and mortality of all forms of marine life.

III. THE STATE WATER BOARD SHOULD NOT ALLOW THE USE OF AFTER-THE-FACT RESTORATION TO MITIGATE FOR A 1 MM SCREENED INTAKE'S MORTALITY RATE.

The State Water Board's use of "mitigation" to purportedly "replace" all of the marine life lost due to a screened intake constitutes in-lieu mitigation. As discussed in Section I above, it is foreseeable that project proponents will be allowed to use a 1 mm screened intake to meet the best available technology requirement under §13142.5(b). As discussed in Section II, allowing a 1 mm screen will result in a net minimization of one percent – and a zero percent reduction for some species according to the SED's studies. Allowing mitigation to restore 99 percent of all marine life mortality after-the-fact is counter to the California Water Code – especially when the restorative measures allowed are not the same kind of habitat productivity as what was lost to intake and mortality.

As the State Water Board is well aware, the Clean Water Act prohibits the use of "restorative" or "corrective" measures (that is, "after the fact" mitigation measures) to meet the §316(b) best available technology requirement. The Second Circuit has definitively affirmed that the technology requirement of §316(b) cannot be satisfied with "after-the-fact" mitigation. As the court explained in *Riverkeeper I,* which dealt with "new" cooling water intakes, as does Water Code §13142.5(b), *"*restoration measures correct for the adverse environmental impacts of impingement and entrainment; they do not *minimize those impacts in the first place*."[51] It cannot be disputed that §316(b) and §13142.5(b) both require minimization of impacts. Regardless of sentence structure, Riverkeeper I demands that minimization be done in the first place – not done after-the-fact to correct for adverse impacts.

A plain reading of §13142.5(b), like that of CWA §316(b), precludes interpreting the term "mitigation" as synonymous with, or inclusive of, restorative measures. The language in the Porter-Cologne Act provides that all four elements – site, design, technology and mitigation -- whether read holistically or individually – must "…minimize the intake and mortality of all forms of marine life." As explained by the *Riverkeeper* court, and instructive to interpreting §13142.5(b): "restoration measures substitute after-the-fact compensation for adverse environmental impacts that have already occurred for the minimization of those impacts in the first instance."[52] In like fashion, restorative measures, by definition, do nothing to "mitigate" the intake and mortality of all marine life in the first instance.

Furthermore, the State Board cannot ignore that *Riverkeeper I* went beyond a mere statutory interpretation to include the practical limitations, that:

[50] Supra note 13, at 97.
[51] *Riverkeeper I,* 358 F.3d at 189.
[52] 475 F.3d at 110 (citing Riverkeeper I, 358 F.3d at 189).

> *Restoration measures resemble the pre-1972 approach to water pollution, which regulated point sources based on their effect on the surrounding water and allowed sources to discharge pollutants provided the discharge did not cause water quality to dip below an acceptable level. See CPC Int'l, Inc. v. Train, 515 F.2d 1032, 1034-35 (8th Cir.1975). Similarly, restoration measures would allow a facility, at least in theory, to impinge and entrain unlimited numbers of organisms provided that other steps maintained acceptable water quality, here measured by wildlife levels as opposed to pollutant concentration. But "[i]t was ... dissatisfaction with water quality standards as a method of pollution control that led to the proposal that they be replaced or supplemented with `effluent limitations.'" Bethlehem Steel Corp. v. EPA, 538 F.2d 513, 515 (2d Cir.1976). A plaintiff attempting to prove a violation of the Clean Water Act faced "a virtually unbridgeable causal gap," CPC, 515 F.2d. at 1035, for "the burden of proving that a particular polluter had caused the water quality to dip below the standards was all but impossible to satisfy," Bethlehem Steel, 538 F.2d at 515. Allowing compliance through restoration measures would involve exactly the same hurdles. As the EPA itself recognized in the preamble to the Rule,* [B]ecause of the complexity of biological studies, it is very difficult to assess the cause and effect of cooling water intake structures on ecosystems or on important species within an ecosystem.... [U]nlike in the laboratory, where conditions are controlled, a multitude of confounding factors make biological studies very difficult to perform *and make causation, in particular, difficult to determine.*[53]

The flawed attempts in the Draft Amendment to calculate the intake and mortality of marine life, and replace that loss through inadequate "restorative measures", are the same as those rejected by the court in *Riverkeeper I* – despite the different language in the Clean Water Act and the Water Code.

The State Board should look to the practical implication of attempts to restore marine life articulated in *Riverkeeper I* to interpret §13142.5(b) in interpreting similar language in §13142.5(b) of the Porter-Cologne Act -- as the State Board implicitly did in crafting its OTC Policy. Although CWA §316(b) does not apply, in most cases, to the intake systems for desalination facilities, §13142.5(b) of the Porter-Cologne Act is not limited to power plants and it applies equally to industrial installations utilizing seawater. It is illogical for the State Water Board to interpret §13142.5(b) to not to allow after-the-fact mitigation for power plants, while the Amendment allows the use of after-the-fact mitigation for other facilities using seawater. Indeed, as it currently stands, existing power plants must come into compliance with the OTC Policy by phasing out their open-ocean intake, while a brand new desalination facility operating under the same statutory provision would be allowed to use mitigation in lieu of satisfying best available site, design and technology requirements. It is hard to imagine which of these rules would apply to "new" cooling water intakes. And contrary to the opinion in *Surfrider*, that it is not the court's "role to interpret legislative [intent in order to harmonize federal and State statute]", that is the role of the State Board and now is the time to exercise that authority. The Desalination Amendment not only undermines the OTC Policy adopted by the State Board, but renders California's marine resource policies incomprehensible.

After-the-fact restoration is an illegal substitution for fully enforcing the mandate to "minimize the intake and mortality of all forms of marine life" under the law. The State Water Board should distinguish the *Surfrider* decision as it was discretion allowed the Regional Board for a temporary permit and under much different facts. The State Board can and must revise the Amendment's definition of "feasible" to be narrowly interpreted as "capable of being accomplished considering geotechnical data, and permit or

[53] *Id.*

design constraints." Furthermore, "mitigation" should not be narrowly defined as "after-the-fact restorative measures", but should be more broadly interpreted to include any measure that would minimize the intake and mortality of marine life in the first place[54]. The State Water Board should avoid in-lieu restorative measures that, in hindsight, was clearly allowed in the *Surfrider* case, and is repeated in the draft Amendment.

IV. THE STATE WATER BOARD SHOULD NOT VIOLATE THE FEDERAL AND STATE ENDANGERED SPECIES ACTS BY ALLOWING A 1MM SCREENED INTAKE TO BE THE PROXIMATE CAUSE OF A TAKE.

The State Water Board should prevent the illegal take of endangered and threatened listed species by requiring subsurface intakes in the Desalination Amendment. The Endangered Species Act (ESA) was enacted with the purpose of conserving endangered and threatened species and the ecosystems on which they depend.[55] The ESA is "the most comprehensive legislation for the preservation of endangered species ever enacted by any nation."[56] The Act empowers the Secretary of Commerce to recommend to the Secretary of the Interior that a species be listed as endangered or threatened and that the species' habitat be listed as a critical habitat.[57] The Secretary of the Interior, if he concurs, shall implement the designation.[58]

The ESA prohibits any person from "taking any [endangered] species within the United States or the territorial sea of the United States."[59] In addition, the ESA makes it unlawful for any person "to attempt to commit, solicit another to commit, or cause to be committed, any offense defined" in the ESA.[60] The term "'take' means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."[61] "'Take' is defined…in the broadest possible manner to include every conceivable way in which a person can 'take' or attempt to 'take' any fish or wildlife."[62] The Secretary of the Interior has defined "harm" as "an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering."[63] The term "person" includes "any officer, employee, agent, department, or instrumentality…of any State, municipality, or political subdivision of a State..."[64]

The State Water Board's Desalination Amendment allows and authorizes desalination facilities to exact a taking of endangered and threatened species; and therefore, violates Section 9's prohibition against take of listed species. The State Water Board is a "person" as defined under the ESA. The authorization of a 1 mm screened intake will result in the entrainment of 99 percent of all endangered species existing in the source water body of an ocean desalination facility's open-ocean intake. The State Water Board acknowledges that critical habitat designated for federally listed species and Essential Fish Habitat

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[54] For example, the Amendment could use this interpretation of the term "mitigation" to ensure that water agencies fully exhaust opportunities to recycle wastewater or other alternative supply and demand management opportunities that would "minimize", if not eliminate, volumes of seawater withdrawn for seawater desalination.
[55] *See* 16 U.S.C. § 1531.
[56] *TVA v. Hill*, 437 U.S. 153, 180 (1978).
[57] *See* § 1533(a)(2)(A).
[58] *See* § 1533(a)(3)(A).
[59] § 1538(a)(1)(B).
[60] *See* § 1538(g).
[61] § 1532(19).
[62] S. Rep. No. 93-307, at 7 (1973); *see also Babbitt v. Sweet Home Chapter of Communities for a Great Oregon*, __U.S.__, 115 S. Ct. 2407, 2416 [25 ELR 21194] (1995) (citing Senate and House Reports indicating that "take" is to be defined broadly).
[63] *See* 50 C.F.R. § 17.3 (1994); *Sweet Home*, 115 S. Ct. at 2412-14 (upholding the regulation as a reasonable interpretation of the statutory language).
[64] 16 U.S.C. § 1532(13).

designated for fisheries management *encompass significant portions* of California's nearshore marine waters.[65] The take of listed species will be significant, and are avoidable if the Desalination Amendment required subsurface intakes as the best available technology and eliminated the broad path to open ocean intakes with screens. The Desalination Amendment will be the proximate cause of a take of endangered and threatened species because the State Water Board is authorizing third parties to use a 1 mm screened intake, which will knowingly lead to mortality of ESA species.

A. The State Water Board acknowledges that desalination operations will have adverse impacts on endangered and threatened federal and state species.

The State Water Board has concluded that desalination operations in California will lead to "significant impacts" on ESA species. There are three basic ways in which ESA-listed species are affected by open-ocean intakes: direct kill at the intake through impingement and entrainment; indirect harm through loss of prey species to the intake; acute and chronic toxicity from exposure to high salinity in the water; and habitat degradation caused by changes in flow regime, thermal discharge, and discharges of pollutants.

On page 174 of the SED, the State Water Board acknowledges that even though previously permitted facilities found insignificant impacts to endangered species, "it is unlikely that all future facilities would result in similar impacts to biological resources." The State Water Board goes on to explain that foreseeable future desalination operations will have *significant impacts* to endangered and threatened species.[66] The State Water Board acknowledges that "critical habitat designated for federally listed species and Essential Fish Habitat designated for fisheries management *encompass significant portions* of California's nearshore marine waters."[67] In addition, entrainment studies conducted for the Huntington Beach and Marin facilities indicated that fish and invertebrates are entrained by surface water intakes.[68] While these studies concluded that the observed entrainment would have a less than significant impact, it cannot be concluded that all future facilities will also result in no impact on the sustainability of local species, or the recovery and propagation of state and federally listed species.[69]

The State Water Board admits that previously permitted facilities did not attempt to evaluate potential impacts to the food web. Larval fish and eggs represent a principal component of the food web. The State Water Board acknowledges that it "cannot be assumed that impacts associated with impingement will be less than significant for all future facilities."[70] The Board goes on to conclude that it is "likely that significant impacts to biological resources may occur with implementation of a particular desalination facility."[71]

The California Ocean Plan requires the State Water Board to protect the beneficial uses of the ocean waters of the State, including: industrial water supply; "rare and endangered species; marine habitat; fish migration; fish spawning and shellfish harvesting."[72] As discussed below, the only way to protect the beneficial uses of both industrial water supplies and rare and endangered species is to require subsurface intakes, and to not allow the Desalination Amendment to be the proximate cause of an ESA take.

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[65] Supra note 13, at 174.
[66] *Id*.
[67] *Id*.
[68] *Id*.
[69] *Id*.
[70] *Id*.
[71] *Id*.
[72] State Water Resources Control Board, Water Quality Control Plan: Ocean Waters of California, pg. 3 (2012), *available at* http://www.swrcb.ca.gov/water_issues/programs/ocean/docs/cop2012.pdf.

B. The State Water Board has identified specific endangered and threatened species that will be harmed due to desalination operations in California.

The State Water Board has identified numerous ESA species that will be impacted by the Desalination Amendment. The Amendment will be the proximate cause of take of ESA listed abalone in California. Abalone have historically been overfished in California and there has been inadequate protection of their natural habitat. These factors have led to the collapse of the abalone fishery and near extinction of certain species.[73] White abalone (*Haliotis sorenseni*) and black abalone (*Haliotis cracherodii*) are both federally listed as endangered.

Abalone are primarily found in crevices along rocky shorelines that provide both shelter from predators and attached algae as a food source.[74] Black abalone are generally found at shallower depths from zero to six meters,[75] and white abalone live at depths between 25 to 50 meters.[76] In 2011, the National Marine Fisheries Service designated coastal areas along the California coast as critical habitat for endangered abalone to protection reproductive habitats.

The State Water Board acknowledges that "[o]pen water intakes and brine discharges have the potential to increase mortality of larval marine organisms."[77] This will put species like abalone at the "highest risk of entrainment" because few "gametes, and larval and juvenile organisms" have developed sufficiently to swim and avoid entrainment, "even when the intake is protected with *small slot sized intake* or mesh screens."[78] Therefore, it is reasonable to conclude that the State Water Board's allowance of a 1 mm screened intake under the Desalination Amendment will be proximate cause of a take of ESA listed abalone species.

The Desalination Amendment will also be the proximate cause of take of state and federally listed salmon. In 1995, coho salmon were listed by the California Fish and Game Commission as an endangered species within ocean waters south of San Francisco Bay.[79] In 2002 this listing was expanded to include the northern coast of California to Oregon. Both chinook and steelhead are also state and federally listed threatened species.[80] While the State Water Board disregarded an analysis of impacts to ESA listed salmon species, one can look to recent OTC studies to determine the potential impact an open-

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[73] See Hobday, A.J., M.J. Tegner and P.L. Haaker. 2001. Over-exploitation of a broadcast spawning marine invertebrate: Decline of the white abalone. Rviews in Fish Biology and Fisheries. Vol. 10: 493-514.
[74] *Id*.
[75] Morris R.H., Abbott D.L. and Haderlie E.C. 1980. Intertidal invertebrates of California. Palo Alto, CA, Stanford University Press.
[76] Lafferty, K.D., M.D. Behrens, G.E. Davis, P.L. Haaker, D.J. Kushner, D.V. Richards, I.K. Taniguchi and M.J. Tegner. 2004. Habitat of endangered white abalone, *Haliotis sorenseni*. Biological Conservation. Vol. 116: 191-194.
[77] Supra note 13, at 44; Steinbeck, J.R., J. Hedgepeth, P. Raimondi, G. Cailliet and D.L. Mayer. 2007. Assessing Power Plant Cooling Water Intake System Entrainment Impacts.
[78] Supra note 13, at 44; Tenera Environmental. 2013a. Length-Specific Probabilities of Screen Entrainment of Larval Fishes Based on Head Capsule Measurements (incorporating NFPP Site-Specific Estimates). Canyon Power Plant. Prepared for Betchel Power Corporation JUOTC Project; Tenera Environmental. 2013b. Evaluation of Fine-mesh Intake Screen System for the Diablo Canyon Power Plant. Prepared for Betchel Power Corporation JUOTC Project.
[79] Final CCC Coho Salmon ESU Recovery Plan, Pg. 52 (September 2012), *available at* http://www.westcoast.fisheries.noaa.gov/publications/recovery_planning/salmon_steelhead/domains/north_central_california_coast/central_california_coast_coho/overview_i.pdf.
[80] *See* State of California The Natural Resources Agency, DEPARTMENT OF FISH AND WILDLIFE, STATE & FEDERALLY LISTED ENDANGERED & THREATENED ANIMALS OF CALIFORNIA (March 2015), *available at* http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/TEAnimals.pdf.

ocean intake can foreseeable have on the species.

In May, 2014, NMFS and the U.S. Fish and Wildlife Service finalized its Biological Opinion on the U.S. EPA's 316(b) Rule in accordance with Section 7(a)(2) of the ESA. The Services' Biological Opinion discusses impacts from cooling water systems on numerous species in California, including salmon, whales, and sea turtles.

The Biological Opinion found that the Pittsburg and Contra Costa Plants in the San Francisco Bay Delta, for example, impinge and entrain more than 300,000 endangered and threatened species per year, including Delta smelt, Sacramento splittail, Chinook salmon, and steelhead trout.[81] NMFS also concluded that EPA's Rule impacts designated critical habitats. For example, NMFS identified 170 instances in which a cooling water intake is located in the designated critical habitat of particular salmonid species (EPA had only identified 115 such instances in its Biological Evaluation).[82] NMFS noted that all of the endangered and threatened salmonids that it protects are vulnerable to cooling water intakes in their breeding habitat because intake and discharge of cooling water from open-ocean intakes are likely to disrupt habitat and water flow rates in ways that "reduc[e] the viability of eggs and fry."[83] NMFS also identified other key features of salmonid designated critical habitats, including: "sites for spawning, rearing, and migration;" "safe passage conditions;" and "water quality, quantity, temperature, and velocity."[84]

Importantly, salmonids are anadromous species that spend some portion of their lives in the ocean and in freshwater. While salmon are mostly found in the northern regions of the State, steelhead once thrived in large number in freshwater sources statewide. And both have suffered population declines that threatened their extinction, steelhead have been extirpated to the point where it is difficult to find surviving individuals in many southern California streams – and the potential loss of a single individual in a desalination intake would be cause for extreme measures.

NMFS also details cases of indirect harm in which ESA-listed species are harmed because EPA's OTC Rule allows intakes to continue operating in a manner that reduces their food availability or habitat. Regarding marine mammals, the definition of "take" includes "harm,"[85], and "harm" includes "significant habitat modification or degradation that actually kills or injures wildlife."[86] According to NMFS's Biological Opinion, certain species of whales are injured by intake structures inasmuch as primary constituent elements of their critical habitat are adversely impacted - constituting a "take."[87] For example, NMFS discusses how the loss of endangered salmon populations to open-ocean intakes – significant in itself – has adverse effects for endangered whales.[88]

The endangered Southern resident killer whale population off the West Coast has collapsed to half of its historic population size. NMFS notes that the killer whales' recovery may be limited by prey availability because the whales have a highly specialized diet: they are heavily dependent on Chinook salmon for 80

[81] *See* United States Department of Interior, Endangered Species Act Section 7 Consultation Programmatic Biological Opinion on the U.S. Environmental Protection Agency's Issuance and Implementation of the Final Regulations Section 316(b) of the Clean Water Act, pg. 9, 39 (March 19, 2015), *available at* http://water.epa.gov/lawsregs/lawsguidance/cwa/316b/upload/Final-316b-Biological-Opinion-and-Appendices-May-19-2014.pdf.
[82] *Id*.
[83] *Id* at 41.
[84] *Id* at 42-43.
[85] 16 U.S.C. §1532(19)
[86] 50 C.F.R. §17.3.
[87] Supra note 81, at 7.
[88] *Id* at 9.

percent of total caloric intake.[89] Seawater water intakes kill about 77,000 Chinook salmon yearly, including "many from endangered or threatened Chinook populations in California."[90]

For Loggerhead sea turtles, another California species, NMFS expects that more than 2,386 turtles will continue to be taken by seawater water intakes ever year, and even more of these endangered turtles may be "harmed by *loss of prey to intakes* and other impacts."[91] NMFS explains that "[t]he North Pacific Ocean DPS [Distinct Population Segment of Loggerheads] has a small nesting population of a few thousand females that produces 7,000 to 8,000 nests annually…a small population size that is not resilient to further perturbation."[92]

Threatened and endangered species harmed by seawater intakes are also subject to many other environmental stresses. For example, the U.S. EPA reports that many of the organisms affected by the 316(b) Rule already reside in impaired [heavily polluted] waterbodies.[93] Other stresses affecting threatened and endangered species harmed by the Rule include degraded water and sediment quality, low dissolved oxygen levels, eutrophication, temperature, fishing, channel or shoreline (habitat) modification, hydrologic regime changes, invasive species, infrastructure development, construction and operation of dams along major waterways, and expansion of agricultural or grazing activities, among others.[94] Together, these impacts have a compounding effect on the health of individual endangered animals and a cumulative effect on the likelihood of survival and recovery of the species as a whole.

The Tidewater Goby is another listed ESA species that is highly at risk from the intake of an open-ocean desalination facility. The Tidewater Goby, a small fish that inhabits brackish waters along the west coast of California, is highly likely to be harmed by the intake of seawater desalination. In 2013, the U.S. Fish and Wildlife Service announced designation of 12,157 acres of revised critical habitat for the tidewater goby.[95] The proposed critical habitat includes land in portions of Del Norte, Humboldt, Mendocino, Sonoma, Marin, San Mateo, Santa Cruz, Monterey, San Luis Obispo, Santa Barbara, Ventura, and Los Angeles, Orange, and San Diego counties. Approximately 53 percent of the proposed revised critical habitat is on state lands.[96] Under the ESA, critical habitat identifies geographic areas that contain features essential to the conservation of a threatened or endangered species and which may require special management considerations. The Tidewater Goby exists in coastal wetlands – like those found around Carlsbad and Morro Bay – and it is foreseeable that the Goby would be entrained through the use of open-ocean intakes.[97]

C. Case Law dictates that state regulations – like the desalination amendment – can constitute an illegal take.

Case law emphasizes that a state regulation can be responsible for the take of ESA listed species. The ESA prohibits any person – whether a private or governmental entity – from "taking" any listed endangered species of fish or wildlife.[98] "Take" is defined to mean harass, harm, pursue, hunt, shoot,

[89] *Id*.
[90] *Id*.
[91] *Id* at 35.
[92] *Id*.
[93] *Id* at 65.
[94] *Id* at 70.
[95] U.S. Fish and Wildlife Service, Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for Tidewater Goby, Executive Summary (February 6, 2013), *available at* https://www.federalregister.gov/articles/2013/02/06/2013-02057/endangered-and-threatened-wildlife-and-plants-designation-of-critical-habitat-for-tidewater-goby#h-8.
[96] *Id*.
[97] *Id*.
[98] 16 U.S.C. § 1538(a)(1)(B).

wound, kill, trap, capture, or collect, or attempt to engage in such conduct.[99] Along with the potential for the Desalination Amendment to directly kill listed ESA species, the Amendment will also result in the harm of ESA species. "Harm" is defined to include "significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding or sheltering."[100]

Courts have held that state regulations can constitute an illegal take if the regulation is the proximate cause. In *Strahan v. Coxe*[101], the challenger claimed that by licensing gillnet and lobster pot fishing in state waters, Massachusetts was liable for illegal take of endangered northern right whales that drowned after becoming entangled in fishing gear.[102] Massachusetts asserted that merely granting a fishing license did not result in right whale takes; rather, the intervening acts of the fisherman themselves were responsible for the takes.[103]

The court rejected the state's position. Instead, the court found that the state's sanctioning of fishing gear was a proximate cause of the right whale takes; and therefore, a violation of Section 9's prohibition against take of listed species.[104] The state also argued that it could not be responsible for protecting right whales because that was the responsibility of the federal government. The court rejected this argument holding the state's liability for illegal take resulted from its action, and is different from a requirement that the state act affirmatively to conserve right whales.[105]

The *Strahan* court affirmed the district court's reasoning, in finding that Massachusetts' commercial fishing regulatory scheme likely exacted a taking in violation of the ESA, by reading two ESA provisions in conjunction.[106] The first relates to the definition of the prohibited activity of a "taking," and the second relates to the solicitation or causation by a third party of a prohibited activity, such as a taking.[107] The court viewed these provisions, when read together, "to apply to acts by third parties that allow or authorize acts that exact a taking and that, but for the permitting process, could not take place."[108]

The state attempted to argue that it was not the direct cause of the take, nor was it responsible for enforcing the provisions of the ESA. However, the court ruled that the state was not being compelled to enforce the provisions of the ESA, but rather "to end the Commonwealth's continuing *violation* of the Act."[109]

The ESA not only prohibits the acts of those parties that directly exact the taking, but as *Strahan* held, "*bans those acts of a third party that bring about the acts exacting a taking*."[110] *Strahan* affirmed the court's ruling "that a governmental third party pursuant to whose authority an actor directly exacts a taking of an endangered species may be deemed to have violated the provisions of the ESA."[111]

There are additional court decisions that have made similar holdings. In *Sierra Club v. Yeutter*,[112] the

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[99] *Id*. at § 1532(19).
[100] 50 C.F.R. § 222.102.
[101] *Strahan v. Coxe*, No. 96-2063 (127 F.3d 155) (1st Cir. October 9, 1997).
[102] *Id*.
[103] *Id*.
[104] *Id*.
[105] *Id*.
[106] *Id*.
[107] *Id*; See § 1538(g).
[108] Supra note 101.
[109] *Id*.
[110] *Id*.
[111] *Id*.
[112] *Sierra Club v. Yeutter*, 926 F.2d 429, [21 ELR 20755] (5th Cir. 1991).

court found that the Forest Service's management of timber stands was a taking of the red-cockaded woodpecker in violation of the ESA.[113] In *Defenders of Wildlife v. EPA*,[114] the court held that the EPA's registration of pesticides containing strychnine violated the ESA, both because endangered species had died from ingesting strychnine bait and because that strychnine could only be distributed pursuant to the EPA's registration scheme.[115] In *Palila v. Hawaii Dep't of Land and Nat. Res.*,[116] the court held that Hawaii's practice of maintaining feral goats and sheep in Palila's habitat constituted a taking and ordering state to remove goats and sheep.[117] *Loggerhead Turtle v. County Council of Volusia County*,[118] held that county's authorization of vehicular beach access during turtle mating season exacted a taking of the turtles in violation of the ESA.[119]

As discussed above, the State Water Board will adopt a regulation – the Desalination Amendment – that will foreseeably lead to the take of endangered and threatened species. Similar to *Strahan*, the Desalination Amendment will be the proximate cause of an illegal take because it is foreseeable that desalination facilities will be permitted to use a 1 mm open-ocean intake, resulting in the inevitable take of ESA listed species.

D. The Desalination Amendment will be the proximate cause of endangered and threatened species take.

The Desalination Amendment will be the proximate cause of endangered and threatened species take because the State Water Board acknowledges the foreseeable harm through the use of open-ocean screened intakes. On page 217 of the SED, the State Water Board admits that "[s]maller planktonic organisms including early life stages of black abalone a federally listed Threatened and Endangered species may not be protected from entrainment by [open-ocean screens]."[120] Moreover, studies conclude that open water intakes and brine discharges have the potential to increase mortality of larval marine organisms.[121] As mentioned above, gametes, and larval and juvenile organisms are at the highest risk of entrainment because few have developed sufficiently to swim and avoid entrainment, even when the intake is protected with small slot sized intake or mesh screens.[122]

The Desalination Amendment will be the proximate cause of a take of endangered and threatened species because the State Water Board provides a broad interpretation of "feasible," allowing project proponents to easily move from subsurface intakes to a 1 mm screened intake. Moreover, Section II above details the inefficiency of a 1 mm screened intake. Studies have found that a 1 mm screened intake will result in a zero reduction of entrainment for small and younger species. The State Water Board's Expert Panel has concluded that the net benefit of a 1 mm screened is only one percent. And the State Water Board has decided that a 1 mm screened intake will only result in a 1 percent reduction of entrainment – resulting in a 99 percent mortality rate. That 99 percent mortality rate includes California's federal and state endangered and threatened species. As the State Water Board acknowledges, "critical habitat designated

[113] *Sierra Club v. Yeutter*, 926 F.2d 429, 438-39 [21 ELR 20755] (5th Cir. 1991).
[114] *Defenders of Wildlife v. EPA*, 882 F.2d 1294, (8th Cir. 1989).
[115] *Defenders of Wildlife v. EPA*, 882 F.2d 1294, 1301 (8th Cir. 1989).
[116] *Palila v. Hawaii Dep't of Land and Nat. Res.*, 639 F.2d 495, [11 ELR 20446] (9th Cir. 1981).
[117] *Palila v. Hawaii Dep't of Land and Nat. Res.*, 639 F.2d 495, 497-98 [11 ELR 20446] (9th Cir. 1981).
[118] *Loggerhead Turtle v. County Council of Volusia County*, 896 F. Supp. 1170, (M.D. Fla. 1995).
[119] *Loggerhead Turtle v. County Council of Volusia County*, 896 F. Supp. 1170, 1180-81 (M.D. Fla. 1995).
[120] Supra note 13, at 217.
[121] Steinbeck, J.R., J. Hedgepeth, P. Raimondi, G. Cailliet and D.L. Mayer. 2007. Assessing Power Plant Cooling Water Intake System Entrainment Impacts.
[122] Tenera Environmental. 2013a. Length-Specific Probabilities of Screen Entrainment of Larval Fishes Based on Head Capsule Measurements (incorporating NFPP Site-Specific Estimates). Canyon Power Plant. Prepared for Betchel Power Corporation JUOTC Project; Tenera Environmental. 2013b. Evaluation of Fine-mesh Intake Screen System for the Diablo Canyon Power Plant. Prepared for Betchel Power Corporation JUOTC Project.

for federally listed species and Essential Fish Habitat designated for fisheries management *encompass significant portions* of California's nearshore marine waters".[123] With a 1 mm screened intake's 99 percent mortality rate, combined with the State Water Board's finding that critical habitat encompasses significant portions of California's nearshore marine waters, it is evident that the Desalination Amendment will be the proximate cause of a take of endangered and threatened federal and state listed species.

E. The significant harm to endangered and threatened species is avoidable.

The State Water Board incorrectly asserts that the take of endangered and threatened species is unavoidable. On page 174 of the SED, the State Water Board acknowledges that impacts to ESA listed species "could be significant and unavoidable."[124] Yet on the same page, the State Water Board also admits that alternatives exist to completely avoid impacts to endangered and threatened species. On page 217 of the SED, the State Water Board acknowledges the Desalination Amendment will lead to "more impingement and entrainment impacts compared to [the subsurface intake Alternative] because [the subsurface intake Alternative] *completely eliminates* impingement and entrainment by use of subsurface intakes.[125]

The National Marine Fisheries Service (NMFS), also known as NOAA Fisheries, is an agency of the United States Department of Commerce responsible for provisions of the Endangered Species Act with regard to threatened and endangered marine species. The NMFS 2014 comment letter explains to the State Water Board that the subsurface intake alternative (Alternative 1) is the only option that will prevent the take of listed federal and endangered species. After years of following the State Water Board's process to develop the Desalination Amendment, NMFS believes "Alternative 1 in the proposed Desalination Policy best avoids and minimizes impacts to NMFS trust resources" and "would result in reduced impacts to NMFS trust resources from facility operations due to the elimination of entrainment and impingement impacts."[126] "Alternative 1 provides a greater assurance of minimized long term impacts to NMFS trust resources."[127]

Alternatively, NMFS believes the screened open-ocean intake alternative (Alternative 2) may prevent the take of endangered species, but only if the State Water Board requires additional protections.[128] NMFS recommended a "0.33 fps as a maximum through-screen velocity in order to minimize potential entrainment and impingement impacts."[129] In addition to a slower intake velocity, NMFS asserts that a "slot opening no greater than 0.5mm is necessary to minimize the entrainment of fish eggs and larvae of many different species including several important commercial species managed under the MSA such as northern anchovy, Dover sole, English sole, and sanddabs."[130] NMFS explains that species of recreational importance would "experience a greater impact from a 1.0mm slot opening include California halibut, queenfish, California sheephead and various croakers and turbots."[131] Most importantly, NMFS admits that even "a slot size opening of 0.5mm would not prevent the entrainment of abalone larvae, which are typically smaller than this during their pelagic phases."[132]

[123] Supra note 13, at 174.
[124] *Id*.
[125] *Id* at 217.
[126] Chris Yates, National Marine Fisheries Service, 2014 Public Comment Letter (2014).
[127] *Id*.
[128] *Id*.
[129] *Id*.
[130] *Id*.
[131] *Id*.
[132] *Id*.

Rather than make changes to the Desalination Amendment based on NMFS recommendations, the State Water Board declined to strengthen the Amendment to reduce the illegal take of endangered and threatened species. Instead, the State Water Board ignores NMFS's concerns for entrainment by justifying a maximum intake velocity of 0.5 feet per second "because it has been shown to preclude [the impingement of] most small fish."[133] Again, the State Water Board is required to minimize the marine life mortality of all marine life – and that mortality includes both impingement and entrainment. And it is logical to conclude from the several studies of small mesh screens that, while they may reduce entrainment of larger organisms by some minimal amount, they may also increase impingement of those larger organisms. It is unclear in the SED why entrainment of larger organisms would slightly decrease as the mesh size gets smaller, but there wouldn't be any associated increase of those larger organisms contacting the screens in a way that results in "harm" and possible mortality impingement). Secondly, the State Water Board completely ignores the entrainment impacts to endangered and threatened species from using a .5 feet per second flow-through velocity combined with a 1 mm screened intake.

As both the State Water Board and NMFS admit, the significant take of listed endangered and threatened species is avoidable through Alternative 1 - the use of subsurface intakes. On page 204 of the SED, the State Water Board admits that Alternative 1 (subsurface intakes) is feasible. Yet the State Water Board rejects using Alternative 1 because it would constrain water agencies from developing alternative water supplies.[134] The development of alternative water supplies is not an excuse to avoid the illegal take of endangered species – and certainly does not make take unavoidable.

The Desalination Amendment will be the proximate cause of a take of endangered and threatened species because the State Water Board provides a broad interpretation of "feasible," which allows project proponents to use a 1 mm screened intake rather than a subsurface intake. The inefficiency of 1 mm screened intakes will result in the entrainment of 99 percent of all endangered species existing in the area. The State Water Board acknowledges that critical habitat designated for federally listed species and Essential Fish Habitat designated for fisheries management *encompass significant portions* of California's nearshore marine waters.[135] The take of listed species will be significant, and are avoidable if the Desalination Amendment required subsurface intakes to be required as the best available technology.

V. THE STATE WATER BOARD SHOULD UPHOLD THE PUBLIC TRUST DOCTRINE TO LIMIT THE INTAKE OF SEAWATER TO AVOID HARMS TO PUBLIC TRUST RESOURCES.

The State Water Board has a responsibility under the public trust doctrine to limit the intake of seawater to avoid harms to public resources – the seawater itself and the marine organisms living in the water. By adopting the Desalination Amendment, the State Water Board is essentially providing public and private entities with the privilege of using public trust resources. The intake of seawater is not a right – it is a privilege that comes with restrictions. Private entities should not be allowed to self-select the amount of seawater they wish to consume. In the alternative, the State Water Board has a responsibility to protect the public's interest over public trust resources by limiting the amount of seawater a particular desalination facility can take possession over. The State Water Board should limit the amount of seawater used by a desalination facility based on the quantity feasible through the use of subsurface intakes.

[133] Supra note 39, at 419.
[134] Supra note 13, at 204.
[135] *Id* at 179.

A. Case law demands the public trust doctrine places a duty upon the government to protect natural resources – including marine life.

The public trust doctrine dates back to Roman times and the Code of Justinian, which proclaimed that the shores are not understood to be property of any man.[136] Each state acquired ownership of the navigable waters, including the tidelands and submerged lands within its jurisdiction, when it joined the Union,[137] and developed its own public trust doctrine and public trust uses. The California Constitution explicitly protects the public's right to navigation; while case law expands the public trust to encompass commerce, fishing, the right to hunt, bathe or swim, and the right to preserve tidelands.[138]

The geographic scope of the public trust doctrine traditionally extends to lands under navigable waters, including rivers, streams, and lakes, as well as submerged lands and tidelands.[139] The public trust doctrine generally guarantees public rights to navigable waters, tidelands, and submerged lands for traditional uses of fishing, navigation, and commerce.[140] The public trust doctrine has evolved from permitting certain uses to protecting trust values[141] and therefore may support affirmative action to prevent harm to public trust lands and waters in a manner similar to abating a public nuisance.[142]

The public trust doctrine protects marine life. Courts have found a "growing public recognition that one of the most important public uses of the tidelands is the "preservation of those lands in their natural state, so that they may serve as ecological units for scientific study, as open space, and as environments which provide food area and habitat for birds and marine life, and which favorably affect the scenery and climate of the area."[143]

B. Case law prioritizes the protection of public trust resources over water agencies' water rights.

Desalination proponents have no right to divert seawater; but if they did, the State Water Board still has a responsibility to protect public trust interests before allowing a diversion. In *National Audubon Society v. City of Los Angeles*, the Supreme Court has explained that doctrine, the state holds the navigable waterways in "public trust" for the benefit of state residents.[144] In *Audubon Society*, the plaintiffs challenged long-standing water use permits issued by the Board that, by allowing the diversion of water from streams feeding Lake Mono, had resulted in an environmentally destructive decrease in the lake's level. In declining to reconsider the permits, the Board concluded it was required to allocate all available water for beneficial use by appropriators, notwithstanding the potential environmental harm such diversions would cause.[145] The *Audubon Society* court required the Board to reconsider the permits, taking into account the public trust doctrine.[146]

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[136] Institutes of Justinian 2.1.5 (AD 533), as translated in T. Sandars, The Institutes of Justinian, 4th Ed . 1867. Section 2.1.1 of the code also states that, "By the law of nature these things are common to all mankind –the air, running water, the sea and consequently the shores of the sea. No one, therefore, is forbidden to approach the seashore, provided that he respects habitations, monuments and the buildings, which are not, like the sea, subject only to the law of nations." Institutes of Justinian 2.1.1.
[137] Borax Consol., Ltd. v. City of Los Angeles, 296 U.S. 10, 15-16 (1935).
[138] Marks v. Whitney, 6 Cal.3d 251, 259 (Cal. 1971).
[139] *Id.*
[140] *Id.*
[141] Archer & Stone, *supra* note 21, at 91. Thus, the state as administrator and controller of the public trust has the right ―to enter upon and possess the same for the preservation and advancement of the public uses and to make such changes and improvements as may be deemed advisable for those purposes.‖ People v. Cal. Fish Co., 166 Cal. 576, 599 (Cal. 1913).
[142] Archer & Stone, *supra* note 21, at 93.
[143] National Audubon Society, 189 Cal.Rptr. 346, 434-435.
[144] *National Audubon Society v. Superior Court* (1983) 33 Cal.3d 419, 434, 437 (*Audubon Society*).)
[145] (*Id.* at p. 427.)
[146] (*Id.* at pp. 446–447.)

The Supreme Court of California held that before state agencies "approve water diversions they should consider the effect of such diversions upon interests protected by public trust, and attempt, so far as feasible, to avoid or minimize any harm to those interests."[147] The Court found that the Water Board "has an affirmative duty to take public trust into account in planning and allocating of water resources, and to protect public trust uses whenever feasible."[148] The state as sovereign retains continuing supervisory control over its navigable waters and that principle, fundamental to the concept of public trust, applies to rights in tidelands; it prevents any party from acquiring a vested right to appropriate water in a manner harmful to interests protected by public trust.[149]

Audubon Society is instructive to the State Water Board's affirmative duty to take the public trust into account when considering the need for desalination. Regardless of a potential need for desalinated water, the State Water Board has an obligation to put public trust resources before water allocations. Here, however, the State Water Board is putting the need for desalinated water ahead of public trust resources. The State Board justifies its broad definition of "feasible" by claiming that all communities should be allowed to take as much seawater as they deem appropriate due to need. This result is in direct conflict with Audubon, which dictates that public trust resources should be prioritized over the need for a community to develop a water supply that had a detrimental impact on public trust resources. By not limiting the intake capacity to that which a subsurface can accommodate, the State Water Board is allowing a private entity – with no right to the seawater – to impact public trust resources owned in trust by the state. The State Water Board has an affirmative duty to protect the public's marine resources from seawater intakes.

In defining the role of the public trust doctrine in water rights policy, *Audubon Society* recognized that "the public trust doctrine and the appropriative water rights system administered by the Water Board developed independently of each other. Each developed comprehensive rules and principles which, if applied to the full extent of their scope, would occupy the field of allocation of stream waters to the exclusion of any competing system of legal thought."[150] In bringing the two together, the court held the doctrine (1) prevents any party from acquiring a vested right to appropriated water in a manner harmful to the interests protected by the public trust; (2) "the Legislature, acting directly or through an authorized agency such as the Water Board, has the power to grant usufructuary licenses that will permit an appropriator to take water . . . , even though this taking does not promote, and may unavoidably harm, the trust uses at the source stream"; and (3) "[t]he state has an affirmative duty to take the public trust into account in the planning and allocation of water resources, and to protect public trust uses whenever feasible."[151]

Although the doctrine originally protected navigable waterways for the purposes of navigation, commerce, and fishing, *Audubon Society* extended the geographic scope of the doctrine to non-navigable streams that feed navigable waterways, and it expanded the purpose of the doctrine to the preservation of water's function as natural habitat.[152]

In a more recent case, *Light v. State Water Board*, the court held that in general terms, the Board has the authority to find unreasonable a diversion of water for frost protection if that diversion is inconsistent

[147] Id.
[148] Id.
[149] Id.
[150] *Audubon Society,* 33 Cal.3d at p. 445.
[151] *Audubon Society,* at pp. 445–446, fn. omitted.
[152] *Id.* at pp. 434–435, 437; see *Center for Biological Diversity, Inc. v. FPL Group, Inc.* (2008) 166 Cal.App.4th 1349, 1361 ["an important purpose of the public trust over bodies of water is to protect the habitat for wildlife"].

with the public trust by creating a significant risk of salmonid mortality.[153] Although the *Audubon Society* court considered the public trust doctrine only in relation to permitted appropriative water rights, subsequent decisions have assumed the doctrine applies as well in the context of riparian and pre-1914 appropriator rights.[154] *Light* reaffirmed the decision in *El Dorado* that "when the public trust doctrine clashes with the rule of priority, the rule of priority must yield."[155]

C. Desalination proponents have no right to divert seawater – it is a privilege – that comes with restrictions to avoid harms to public trust resources.

The Desalination Policy is not restricting Poseidon's use of its own property – but rather restricting the use of the people's property under the public trust doctrine. It is well established law that a taking claim cannot arise from a property right that an owner never had. This principle is known as the Background Principles Doctrine.

Background principles are restrictions on property (and the use of property) recognized by state law. While not precisely defined, these restrictions derive from nuisance law, public safety needs, preservation of navigable waterways, and other important public interests. The logic of the "background principles" doctrine is that property owners cannot lose a property right that they never had. Property ownership is confined by limitations on the use of land that "inhere in the title itself."[156] Such uses (like a use that constitutes a public nuisance) are not considered to be part of the owner's "bundle of sticks." Thus, even a "background principle" of state property law supports it.[157]

The public trust doctrine provides that tidelands, the beds of navigable waterways and other natural resources are held in trust for the public by the state.[158] Land in California located beneath navigable and tidal waterways are subject to certain public access and navigation rights. The state holds these rights in trust for the public. Thus, private property restrictions relating to these public trust rights cannot constitute a compensable taking; the owner never had the right to use the property for non-public trust uses.[159]

The Desalination Policy is only placing restrictions on Poseidon's use of public trust resources – a property right never owned by Poseidon. Thus, Poseidon does not have a viable takings claim based on the Desalination Policy restricting Poseidon's operations.

D. Since screened open-ocean intakes do not minimize marine life mortality, the State Water Board should limit the intake of seawater to that feasible with subsurface intakes.

As discussed above, screened intakes do little to nothing to reduce marine life mortality of all forms of marine life as required by the Water Code. To prevent impacts to public trust resources, the State Water Board has an affirmative duty to prevent impacts to public trust resources. To do this, the State Water Board should narrowly interpret "feasible" under Water Code Section 13142.5(b) to be defined as "capable of being accomplished." The State Water Board should also ensure public trust resources are protected by allowing seawater intakes that can only be accommodated by subsurface intakes. This will allow desalination proponents the ability to still use the privilege of the public trust resource of seawater,

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[153] *Light v. State Water Resources Control Board*, FIRST APPELLATE DISTRICT, Mendocino County Super. Ct. No. SC UK CVG 1159127, pg. 20 (2014).
[154] *Id*.; *United States, supra,* 182 Cal.App.3d at p. 106 [in *Audubon Society,* "the court determined that no one has a vested right to use water in a manner harmful to the state's waters"]; *El Dorado, supra,* 142 Cal.App.4th at p. 966.
[155] *Id*.; *El Dorado, supra,* 142 Cal.App.4th at p. 966.
[156] *Id*.
[157] *Lucas. v. South Carolina Coastal Council,* 505 U.S. 1003, 1030 (1992).
[158] *Illinois Central Railroad Co. v. Illinois,* 146 U.S. 387, 452-4 (1892).
[159] *See National Audubon Society v. Superior Court,* 33 Cal. 3d 419, 440 (1983).

while still ensuring protection of marine life public trust resources. Any intake beyond which subsurface intakes can accommodate would be a violation of the public trust doctrine.

The National Marine Fisheries Service agrees that subsurface intakes should be the only option provided project proponents wishing to use the public trust privilege the state is bestowing upon private entities. In NMFS comment letter, they state they have "been following this SWRCB process for many years and believes Alternative 1 in the proposed Desalination Policy best avoids and minimizes impacts to NMFS trust resources." Alternative 1, which requires the use of subsurface intakes for water supply, would result in reduced impacts to NMFS trust resources from facility operations due to the elimination of entrainment and impingement impacts. "Alternative 1 provides a greater assurance of minimized long term impacts to NMFS trust resources."

However, the State Water Board's Response to Comments rebuffs NMFS's recommendation[160] and justifies not requiring subsurface intakes because Alternative 1 would not meet the project goals of "providing desalination as an alternative to traditional water supplies.[161] As explained in Audubon, and reinforced in Light, the protection of public trust resources should come before the need to develop alternative water supplies. It is the State Water Board's affirmative duty to protect public trust resources above and beyond any interest in developing new water supplies.

The State Water Board should ensure public trust resources are protected by only allowing seawater intakes up to the feasible quantity accommodated by subsurface intakes.

VI. THE STATE WATER BOARD SHOULD REQUIRE THE BEST AVAILABLE MITIGATION FEASIBLE TO MITIGATE FOR ALL FORMS OF MARINE LIFE.

The State Water Board has a legal obligation to require the best available mitigation that minimizes marine life mortality for all forms of marine life. We reiterate our objection to defining "mitigation" as "after-the-fact" restorative measures. The flaws in the Amendment on mitigation serve to highlight that not only has the State Water Board misinterpreted the law, after the fact restorative measures are flawed in practice.

Nonetheless, assuming mitigation is determined to include restorative measures, we agree that defining "mitigation" as "replacement" is the proper context and goal for the Amendment. However, we disagree with the application of the definition, as well as the over-reliance on mitigation to minimize the intake and mortality of all forms of marine life in the first place.

Moreover, the treatment of "conditionally approved" facilities is not adequate to ensure full replacement once those facilities are required to come into compliance with the Amendment. In fact, ironically, the Amendment allows the project proponents to avoid full enforcement of the conditions in the temporary permits requiring a new and thorough 13142.5(b) analysis when the event occurs.

Finally, we think the mitigation provisions need clarity to ensure full replacement from both the intake and discharge, both individually and in combination. To the extent future improvements to discharge alternatives may require modifications to the intake, they are not precluded by the narrow application of section 13142.5(b) to only new or expanded facilities. In other words, should a project proposal include some use of the intake for brine dilution and/or discharge, the intake should be considered part of a discharge under the Clean Water Act and Porter-Cologne Act.

[160] Supra Note 39, at 419.
[161] Supra note 13, at 204.

A. The State Water Board should not define "mitigation" as "after-the-fact restorative measures.

The Amendment states that: "Mitigation… [i]s the *replacement of all forms of marine life* or habitat that is lost due to the construction and operation of a desalination facility…" We agree that, assuming after-the-fact restorative measures are allowed – which we continue to oppose – "mitigation" should be defined as full "replacement" of marine life lost due to construction and operation of a facility. However, that is the last time the term "replacement of all forms of marine life" is found in the Amendment, and the rule is constructed in a way that provides no assurances that all forms of marine life will actually be "replaced" by the "mitigation" measures. In fact, the Amendment allows out-of-kind restorative measures that have little to no relationship with the habitat and species impacted.

The State Board seems to be narrowly distinguishing the Clean Water Act from Porter-Cologne by highlighting that Porter-Cologne includes the term "mitigation" and consequently allows attempted restorative measures. We disagree. The term "mitigation" in the context of Water Code Section 13142.5(b) should be interpreted to mean "any other means beyond 'best site, design and technology' that minimizes the intake and mortality of marine life."

Also, the argument that the *Riverkeeper I* decision is inapplicable is too narrow a read of that holding. The Court went beyond a narrow interpretation of the language in Section 316(b) and included a practical concern over whether or not restorative measures should be allowed to replace the clear intent to minimize intake and mortality of marine life in the first place. The Court found that:

> *Restoration measures resemble the pre-1972 approach to water pollution, which regulated point sources based on their effect on the surrounding water and allowed sources to discharge pollutants provided the discharge did not cause water quality to dip below an acceptable level. See CPC Int'l, Inc. v. Train, 515 F.2d 1032, 1034-35 (8th Cir.1975). Similarly, restoration measures would allow a facility, at least in theory, to impinge and entrain unlimited numbers of organisms provided that other steps maintained acceptable water quality, here measured by wildlife levels as opposed to pollutant concentration. But "[i]t was ... dissatisfaction with water quality standards as a method of pollution control that led to the proposal that they be replaced or supplemented with `effluent limitations.'" Bethlehem Steel Corp. v. EPA, 538 F.2d 513, 515 (2d Cir.1976). A plaintiff attempting to prove a violation of the Clean Water Act faced "a virtually unbridgeable causal gap," CPC, 515 F.2d. at 1035, for "the burden of proving that a particular polluter had caused the water quality to dip below the standards was all but impossible to satisfy," Bethlehem Steel, 538 F.2d at 515. Allowing compliance through restoration measures would involve exactly the same hurdles. As the EPA itself recognized in the preamble to the Rule,* [B]ecause of the complexity of biological studies, it is very difficult to assess the cause and effect of cooling water intake structures on ecosystems or on important species within an ecosystem.... [U]nlike in the laboratory, where conditions are controlled, a multitude of confounding factors make biological studies very difficult to perform *and make causation, in particular, difficult to determine.*[162]

In brief, the court's opinion verified what marine scientists know – the marine ecological system is inherently complex, and the notion that restoration of out-of-kind habitat will "mitigate" the intake and mortality of all forms of marine life is, at best, oversimplified and unsupported in the Amendment. More importantly, the notion that wetlands restoration will "[replace] all forms of marine life lost in the construction and operation of a desalination facility" – as identified in the Amendment as the goal of mitigation – has even less support. Without more explanation of the nexus between wetland restoration

[162] *See Riverkeeper I* 358 F3d 174.

and the replacement value to all forms of marine organisms lost in the construction and operation of a desalination facility, the Amendment is fundamentally flawed.

Similarly, another important distinction not mentioned in the State's argument against applying the logic in the *Riverkeeper* decision is that the Clean Water Act Section 316(b) protects against "adverse environmental impacts", where the Porter-Cologne Act more clearly protects "all forms of marine life." As stated above, the State Water Board and our organizations read Water Code Section 13142.5(b) to be more restrictive that Water Code Section 316(b).[163] Restorative measures that simply improve "biomass" productivity have no inherent relation to protection of all forms of marine life.

"Marine life" means species that inhabit the marine environment, and is distinct from the broader category of "aquatic life." And "biomass" is simply the weight or quantity of all organisms in a particular habitat. For example, the increase of biomass in a wetland resulting from a restoration project may include numerous aquatic organisms, avian species, reptiles and mammals which provide little to no benefit for restoring the marine organisms lost to the construction and operation of desalination facilities. Even if the weight or quantity of "biomass" was limited to aquatic species, the Amendment fails to identify how the increased productivity of those freshwater or estuarine species benefits, or "replaces" the intake and mortality of all forms of marine life. Unless the State can show some replacement value for marine species, whether through in-kind or out-of-kind restoration projects, the Amendment fails to enforce the clear intent of the law to minimize the intake and mortality of all forms of marine life.

The Amendment must document how alternative out-of-kind restoration projects, like creation of artificial reefs to replace the loss of marine life residing in sandy habitat, has any relation to replacing the loss of "all forms of marine life." The Amendment should identify how these "out-of-kind" restorative measures in the marine environment can result in ecological complications. For example, if rocky reef creation is used to mitigate the loss of species inhabiting the water column or sandy habitat, the Amendment should clarify that this measure will further reduce sandy bottom habitat and compound the loss of those species impacted by the intake and mortality of those species.

B. The State Water Board should not rely on the Surfrider decision when interpreting available mitigation.

The State Water Board should not selectively and arbitrarily rely on parts of the *Surfrider v. SD Regional Board* decision to justify provisions of the Amendment that clearly undermine the intent of the Porter-Cologne Act. The *Surfrider* case was decided in the context of a temporary permit issued for operation of the Poseidon-Carlsbad facility while the co-located power plant discharge continued supplying source water for the desalination facility. The court was careful to note that once the power plant ceased withdrawing seawater, the permit and decision would be reconsidered under present day circumstances. That time is now and those present day circumstances give reason for modifying the Carlsbad permit, or at very least, modifying the draft Amendment. If the Amendment is not modified, the rationale for approving the Carlsbad permit will be codified and the opportunity for clarification lost.

The court decision relied heavily on the discretion allowed the agency in interpreting the law. As we have noted in past comments, that very same discretion allows the State Water Board to change course. And a change in course is necessary if the State is to successfully enforce the letter and intent of the Porter-Cologne Act.

The facts relied on in *Surfrider* have clearly changed. Nothing in the Amendment, or SED, supports the conclusion in *Surfrider* that "scrubbing balls" will minimize the intake and mortality of all forms of

[163] Supra note 22, at 49.

marine life. In fact, there is nothing in the Amendment that contemplates marine life mortality resulting from cleaning the conduits for an open ocean intake. That is a technological disadvantage of open ocean intakes that was not addressed at all in the Amendment. Likewise, the use of variable speed intake pumps is not considered in the Amendment as a technology for minimizing intake and mortality, and rightly so. Variable speed pumps do nothing to minimize the intake and mortality of marine life from a given volume of water. Finally, the Amendment's contradictions regarding the purpose of mitigation to "replace marine life", and reliance on the increased biomass in out-of-kind habitat to meet that goal, require a modification of the rule that may not be consistent with the *Surfrider* decision. These factual and legal findings in the *Surfrider* case are cause for the State Water Board to distinguish the decision and change course here.

And the State Water Board has the discretion to change course from the argument made in *Surfrider* so long as it is based on a reasoned analysis. And modifying the rule to ensure enforcement of the letter and intent of the Porter-Cologne Act is clearly needed and is clearly based on a reasoned analysis. Based on the draft Amendment, the mitigation required in the Poseidon-Carlsbad decision was inadequate because of flaws in converting the APF to wetlands restoration acreage (eg, it was not based on a 95 percent confidence interval) and the fact the wetlands restoration did not "replace" marine organisms. While the State argued in *Surfrider* that the mitigation plan was adequate to replace the marine life lost to the operation of the facility, and not "in lieu" of best available site, design and technology, it is clear now that the State's defense was factually and legally flawed.

By not distinguishing the *Surfrider* decision, and changing the Amendment to fully enforce the Porter-Cologne mandates, the State Water Board will be codifying the decision and precluding future enforcement powers delegated to regional water boards. While it appears the Amendment is intended to strengthen enforcement to ensure future facilities are not permitted using the legal standards and logic used in a temporary permit for Poseidon-Carlsbad, it is difficult to see how the Carlsbad permit will not be the standard for all future seawater desalination facilities.

The State Water Board has a critical decision to make. It is, in effect, a decision whether the Poseidon-Carlsbad facility constitutes the best available site, design, technology and mitigation feasible to minimize the intake and mortality of marine life. There are only 2 distinctions between the Poseidon-Carlsbad permit and what is allowed in the Amendment: the weak requirement to implement 1mm screens and the change in the APF confidence interval, accompanied by a provision to offset the mitigation by 1 percent to account for the unsupported value of the screens to minimize intake and mortality. Adopting the Amendment as currently drafted, with documented reliance on the *Surfider* decision, will effectively preclude the discretion the Amendment purports to grant regional water boards in future decisions.

C. The State Water Board's application of best available mitigation does not replace all forms of marine life.

The mitigation application is inadequate for both the impacts resulting from inferior intake site, design and technology, as well as for avoidable impacts from the chosen discharge technology. In both the intake and discharge, the Amendment inadequately explains the "replacement" value of out-of-kind mitigation projects. As noted above, there is no evidence in the SED that restoring freshwater or estuarine wetlands will result in replacement of benthic marine habitat or habitat values in the water column. And the Amendment compounds this error by allowing a 1:10 "mitigation ratio" based on production of wetland biomass.

As discussed above, the volume or weight of biomass production in wetlands habitat, and its nexus to "replacement" of marine organisms or habitat, is not adequately explained in the Amendment or the supporting SED. Allowing a project proponent "replacement" credit that discounts the APF for marine

species through restoration of out-of-kind habitat not only lacks any connection to the loss of habitat values and species that are affected, it exacerbates the problem.

For example, anchovies are a species that spends much of its life migrating in the water column, and squid spend their lives in the benthos. Both anchovies and squid are commercially valuable species – and both play a key role in the marine ecosystem. Anchovies are exposed to harm from the intake, and squid are exposed to harm from brine accumulating on or near the seafloor. But neither directly benefits from restoration of wetlands habitat. Whatever indirect benefits they may experience from wetlands restoration are certainly not sufficient to discount the APF calculation. Any "indirect benefits" of wetlands restoration projects (eg, water quality benefits to marine environments, improved prey species populations that enter the marine environment, etc) would argue for a multiplier in the wetlands area, not a discount.

Further, once a determination is made for the intake, there is not enough on-going authority to ensure that the restoration project meets the productivity goals of "replacement" of marine species. The Amendment's definitions of "existing", "new" or "expanded" seem to suggest that any adopted mitigation plan for a defined intake volume is no longer open to improvements – including the Carlsbad and Huntington facilities, which were clearly miscalculated.

Further, the Amendment does not ensure that the 2ppt limit at the edge of the mixing zone will not result in brine deposition on or near the seafloor, and migration beyond the zone of initial dilution (ZID) or "near field." The SED on page 85 explains:

> *A facility's mitigation plan should capture the effects of Table 1 constituents. Additionally, brine discharges can result in anoxic or hypoxic zones, resulting in additional marine life mortality. Although the proposed Desalination Amendment requires consideration that brine discharges re designed to prevent the formation of dense outfalls that cause anoxia or hypoxia when feasible, careful monitoring should be done to determine whether such anoxic or hypoxic events occur; any deaths resulting from anoxia should be fully compensated for to comply with Water Code sections 13142.5(b) and 13142.5(d).*

There is no explanation why the SED was modified to strike the language that the Desal Amendment would "specifically prohibit" seafloor deposition. It is reasonable to assume that, because the 2ppt salinity limit at the edge of the mixing zone is still denser than ambient water salinity, it will continue to settle on the seafloor. Worse, if this seafloor deposition migrates beyond the area of initial dilution and the "near field" and goes unmonitored, it is almost certain that the mitigation project will be insufficient to replace the permanent habitat and species losses. Marine benthic habitat cannot be replaced by wetlands restoration.

The expert panel recommended monitoring in the "near field" and the "far field" in recognition of this potential impact. Yet, the Amendment does not contain sufficient protections, nor mitigation, to ensure against on-going habitat degradation and cumulative losses of benthic species and migratory species inhabiting the water column outside the mixing zone.

In contrast to the Amendment, the SED shows numerous examples of other countries requiring strict discharge limits. The SED cites countries that limit the discharge to 1ppt at the edge of the mixing zone.[164] Further review of the regulations in these other countries highlights strict monitoring of brine accumulation and requirements to immediately remedy the problem – not weak attempts to "mitigate" the impact through unproven and clearly inadequate out-of-kind mitigation. California should employ the "best" approach to minimize the intake and mortality of marine life, as well as impacts from inadequate

[164] *See* Supra note 13, at 117.

brine dilution, rather than relying on restorative measures without any clear replacement value.

As noted in our 2014 comments on "site, design and technology", the discretion allowed the regional water boards in determining the best combination of "site, design and technology" available, coupled with the broad and unacceptable definition of "feasible", allow project proponents to easily argue for screened open water intakes at a given site and capacity – and reliance on mitigation for all but one percent of the ETM/APF calculation. That is illegal "in lieu" mitigation.

Decreasing the acreage of mitigation by one percent to compensate for any questionable benefits from intake screens is simply limiting the restoration area and replacement value in a way that undermines the increase in the confidence interval proposed in the Amendment. One percent is well within the margin of error in the APF calculation – which means the reduction of intake and mortality from employing screens is statistically insignificant, and meaningless in practice.

More importantly, an adjustment to the APF of one percent, especially given the combination of habitat types in calculating the APF, effectively ensures no replacement of some species and habitats. This is especially true when the mitigation is "out-of-kind" for the habitat and species affected.

The "APF" referred to in the mitigation section is the result of calculating several "species specific" APFs in the source water body, and then combining them to arrive at an "average" APF for all species and habitats. Averaging has the effect of discounting some species-specific habitats and increasing other species-specific habitats.

The Amendment makes a distinction of what habitats should be mitigated by "in-kind" or "out-of-kind" restoration. However, it is not clear whether those will be based on the "species-specific APFs" or some other way to define and calculate the distinct habitats affected and the preferred restorative measures. It should be noted that "creating" in-kind habitat in the marine environment has the perverse effect of eliminating other habitats. For example, if a project proponent offers to build artificial reefs to replace the species lost from that habitat type, they will bury soft sandy habitat and compound the loss of species residing or recruiting into adulthood from that habitat type. If artificial reefs are created to replace any marine species, the creation of wetlands habitat would arguably have to increase beyond what is calculated in the APF if it is to fully compensate for the additional loss of soft habitat for mitigating the impacts inherent in creating artificial reefs. Again, if the wetlands acreage is discounted for increased biomass production (rather than multiplied to account for minimal indirect benefits), then the restorative measures fail to replace "all forms of marine life."

These complicated and inexact calculations for restorative measures highlight the reasoning behind the *Riverkeeper* court's decision that after-the-fact restorative measures are not only legally flawed, they are unreliable and ineffective in practice.

D. The State Water Board must ensure mitigation applies to Conditionally Approved Permits.

It is our understanding that currently there are two conditionally approved permits; each are proposed to be co-located with coastal power plants. And both are permitted to withdraw specific volumes of water (approximately 300mgd and 127mgd respectively) for "source water" and "in-plant dilution" -- regardless of the volume withdrawn or discharged by the co-located power plant. Both permits require the owner-operator to submit an application for a new permit, requiring a new 13142.5(b) analysis, when the power plant quits withdrawing seawater. The Carlsbad permit included mitigation that was calculated for the entire 300mgd and that wetland restoration project is, at least, in the planning process. The Huntington Beach permit includes mitigation allowances granted to the co-located power plant by the California Energy Commission. Neither of these mitigation projects meet the standards in the Amendment.

In regards to the mitigation provisions, the draft rule, at section 2 (e)(7), provides that:

> *For conditionally permitted facilities or expanded facilities, the regional water boards may:*
> *(a) Account for previously-approved mitigation projects associated with a facility when making a new Water Code section 13142.5(b) determination.*
> *(b) Require additional mitigation when making a new Water Code section 13142.5(b) determination for any additional mortality of all forms of marine life resulting from the occurrence of the conditional event or the expansion of the facility. The additional mitigation must be to compensate for any additional construction, discharge, or other increases in intake or impacts or an increase in intake and mortality of all forms of marine life.*

Therefore, the Amendment carves out an exemption for expanded facilities in the mitigation requirements. That exemption allows that: the Regional Board "may …account for previously-approved mitigation projects." In the two Poseidon permits, that previously-approved mitigation would cover the total volume of product water and additional water withdrawn for in-plant dilution – regardless of any power plant withdrawal of seawater.

Or, the Regional Board "may" add to the mitigation for additional intake and mortality resulting from the occurrence of the conditional event or from expansion. But the additional mitigation "must be to compensate for any additional construction, discharge or other increases in intake or impacts or an increase in intake and mortality of marine life." Certainly in the case of Carlsbad, the Regional Water Board would arguably be precluded from requiring additional mitigation because at the time of the occurrence of the conditional event, the construction impacts will have already occurred and the volume of seawater withdrawn will not increase from what was already contemplated and approved in the NPDES permit. Similarly, the Huntington Beach[165] mitigation provisions in the conditional permit would already cover all but the construction impacts.

The State Water Board defines these facilities as "conditionally-approved and expanded", but then eliminates the conditions in the permit requiring a new and through 13142.5 review and approval once the power plant ceases withdrawing seawater. That is, if there is no possible review of alternative sites and designs because of the already completed construction, and review of alternative intake technologies at that site, and with that design capacity, have already been determined to be not feasible under the *Surfrider* decision, then the only thing left to review in accord with the permit conditions is the mitigation provision – and that is not required in the draft Amendment provisions for mitigation.

E. The State Water Board must clarify the connection of mitigation and the Intake/Discharge connection.

Amendment Section III.L.2 (e) is written to describe mitigation in the context of one of the elements to minimize the intake and mortality of all forms of marine life enumerated in Water Code 13142.5(b). However, it includes provisions for mitigating or replacing loss of marine life or habitat from poorly functioning brine disposal.

Water Code 13142.5(b) has been read to apply only to "new and expanded facilities" withdrawing seawater for cooling and other industrial facilities, and is therefore not enforceable for facilities that are "existing" – that is, facilities that have been permitted and constructed without conditions. However, the discharge is regulated under separate and distinct provisions in the Clean Water Act and Porter-Cologne

[165] Poseidon cannot argue that the Poseidon-Huntington proposal even has a "conditionally-approved" permit until the appeal pending at the State Water Resources Control Board is resolved.

Act.

The State Water Board confirms that the term "best technology available" in the Clean Water Act is read to implement a "technology forcing" policy. That is, as technologies are developed to improve the goal of protecting the environment, the facilities must be modified to include those technologies. However, the State Water Board argues that the Water Code cannot be read to implement a "technology forcing" policy because enforcement is limited to "new" facilities (the implication is that "expanded" facilities can be required to update technology when it is available). However, the Amendment contemplates "augmented intake for in-plant dilution" – a provision that blurs the distinction between when a facility must be updated to comply with the "technology forcing" policy in the law, and when it is not required to update because it is not "new or expanded."

The Amendment needs to clearly state that any site, design and technology determinations for a project that employs the intake as part of the discharge technology is subject to regulation under the relevant authority in the Clean Water Act and Porter-Cologne Act for protecting the marine environment from water quality degradation.

F. The best available mitigation should reflect the proper guidance for calculating a desalination facility's impacts.

It is critical that the mitigation fee calculation be done accurately given the State Water Board's over-reliance on the use of a mitigation. The Amendment states that:

> *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 all forms of marine life* associated with the facility.*

The State Water Board goes on to state that the mitigation acreage should be determined using a ETM/APF analysis. It is important that the mitigation requirements:

- Provide incentives to reduce impingement and entrainment;
- Pursue scaled compensation to address losses;
- Provide a clear compensation story;
- Define the nature of the impingement and entrainment losses over time;
- Define the benefits of different restoration actions;
- Scale so benefits offset losses; and
- Require additional restoration for uncertainty.

There are multiple potential sources of uncertainty in the ETM-APF approach including:

- Information used to calculate APF
- Knowledge of habitat composition in the Source Water Body
- Performance of restored habitats to complete scaling

There are some options for responding to uncertainty including: Evaluating the confidence limits in selecting ETM/APF data inputs; establishing a limited number of consistent habitat categories to help characterize for source water bodies and restoration opportunities; Ensuring monitoring is sufficient to provide the information needed to better inform decisions; considering cumulative uncertainty adjustments (e.g., a APF scaling factor from 1-5) and incorporating the nature, extent, and timing of impacts from impingement and entrainment measured as APF; and restoration performance to determine required the restoration scale.

In practice, even with well-defined habitat categories, it is possible that restoring habitats could produce a mix of species that is different from those originally lost. Multiple factors could affect how closely production from a restored habitat matches estimated I&E losses (e.g., proximity of restored and affected habitats). Monitoring of the restored habitat would provide the information needed to inform such comparisons. Habitat Equivalency Analyses (HEA) or Resource Equivalency Analyses (REAs) needs to be done for proposed mitigation analysis.[166] Project proponents should be required to develop restoration scaling scenarios using the results of the Habitat Equivalency Analysis framework based on the impact of the impingement and entrainment and the impact of the proposed restoration. The scaling should assume differences in periods for restorations to meet maturity and that benefits will accrue over different periods. Different combinations of service ramp ups, final service levels, and years assumed for the benefits accrual from a typical unit of effort for a restoration project (e.g. a restored acre) can result in very different estimates of the required restoration acreage to address calculated impacts. Restoration costs need to be comprehensive and account for:

- Design
- Permitting
- Land acquisition
- Construction
- Operations and Maintenance
- Supervision and Oversight

Available cost estimates rarely cover all these areas. Adjusting costs to a common base year is standard economic practice. Results are then adjusted to form the base using annual values from the Consumer Price Index. Alternative indices are available that provide a more local/regional assessment of general price trends or trends for specific markets or goods and services. Depending on the year of the original estimates, this adjustment to a common year can have a significant impact on results.

Amendment Section III.L.2 (e) is clearly flawed and needs significant modification to meet the goal of ensuring minimization of all forms of marine life. However, more importantly, these flaws highlight the importance of minimizing the harm in the first place before resorting to nearly impossible attempts to replace species in a complex and poorly understood marine ecosystem. Unfortunately, we now know from experience that if the elements of site, design and technology are not combined with the very strict intent to minimize intake and mortality, facilities will continue to be permitted with nearly complete reliance on unreliable mitigation projects that fail to restore "all forms of marine life" lost to poorly sited and designed facilities using far "less than best" intake and discharge technologies.

Inexplicably, with the benefit of experience from flawed conditional approvals for the Poseidon-Carlsbad and Poseidon-Huntington project proposals, the Amendment has not corrected the mistakes of the past, but nearly ensured those mistakes will be repeated.

VII. THE STATE WATER BOARD SHOULD RE- DEFINE "NEED" TO ENSURE THE USE OF BEST SITE, DESIGN AND TECHNOLOGY TO MINIMIZE THE INTAKE AND MORTALITY OF ALL FORMS OF MARINE LIFE.

The Amendment provides guidance on how an agency shows "need" for the volume of water produced by the proposed facility. We disagree with the placement of this guidance in the sub-section on "site." Further, we disagree with the reliance on the list of water planning documents that are used to show "consistency" with the proposed desalination production capacity. Finally, we offer a seawater

[166] *See* http://www.darrp.noaa.gov/economics/papers.html

desalination project currently under consideration as an example of how "need" is used to ensure a desalination facility is designed to minimize the intake and mortality of marine life.

A. 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.

In the initial Desalination Amendment, the policy stated in Section L.2(c) that 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." There is no legitimate reason for deleting that language, and without inclusion of that language, the entire consideration of "need" in determining how best to minimize the intake and mortality of marine life is undermined. The language should be re-inserted in the Amendment Section L.2(c) ["design'].

We appreciate that the State Board feels constrained from dictating water supply management decisions made by local agencies. However, as discussed above in Section V, the State Board cannot sacrifice the duty to ensure proposed facilities are "designed" to minimize the intake and mortality of marine life. Unfortunately, the definition of "need" in the Amendment fails to clearly link water supply alternatives in a way that ensures desalination facilities are the best site, design and technology to minimize intake and mortality. The flawed logic in allowing need to dictate feasibility is: neither has anything to do with Water Code enforcement; and, need can be easily manipulated to meet a project proponent's "wants" not their "needs."

The Amendment places the consideration of "need" in the sub-section on best "site" available to minimize the intake and mortality of all forms of marine life. It is unclear how the need for a facility has anything to do with the site chosen. In fact, given the abundance of infrastructure for moving potable water around regions of the State, and the abundance of law allowing transfer of water from jurisdiction to jurisdiction, the "site" of a desalination facility to provide water supply benefits to a local area can be well beyond the boundaries of that service area.

But more importantly, the Amendment has been amended to clarify that the "design" of a facility includes the size and intake capacity. We thank and applaud the State Water Board for the change. The Amendment and SED clearly identify subsurface intakes as the best technology, the remaining questions only require determining the best site and design capacity that are consistent with the output of sub-surface intakes.

B. Adopted Water management plans are inadequate for defining "need" under Water Code 13142.5(b).

County general plans, urban water management plans and integrated regional water management plans are adopted without any consideration of minimizing the intake and mortality of all forms of marine life. The revised Amendment's allowance of "other water planning documents" if these plans are unavailable just exacerbates the problem and allows project proponents to create some nondescript planning document to justify unlimited reliance on desalination facilities.

These planning documents are inadequate for consideration of alternative desalination design production capacities that, in combination with best site and best technology, will minimize the intake and mortality of marine life. As briefly noted above, to the extent a local planning document may identify a "need" for a desalination facility, it is not necessarily determinative of a site that is best for minimizing intake and mortality of marine life – sites for desalination facilities outside the jurisdiction of a local agency may be feasible for supplementing a local water supply portfolio.

Describing the "need" for a desalination facility by consistency with an adopted water supply planning document is resorting to an analysis that has little or nothing to do with minimizing the intake and mortality of marine life. The Amendment effectively delegates the State Water Board's duty to enforce the Porter-Cologne Act to local water agencies.

C. The State Water Board should look at California examples of how best to determine need for a desalination facility that is consistent with Water Code section 13142.5 (b).

It is not necessary for the State Water Board to consider the Amendment in the abstract. The California Public Utilities Commission is currently considering certification of the CalAm Monterey desalination facility proposal. In contrast to the consideration of "need" in the Poseidon-Carlsbad proposal, the CPUC is weighing different design capacities for the desalination proposal in consideration of whether part of the "need" can be met with expanded recycled wastewater. And this consideration is independent of a county general plan or any water planning document.

In Carlsbad, the Regional Board approved a project that resulted in construction of a facility reliant on a surface intake of 300 million gallons of seawater for combined "source water" and augmented intake for in-plant dilution. That the decision was allowed by the courts because the Regional Board was allowed broad discretion to enforce Water Code section 13142.5(b). The Amendment not only allows similar decisions in the future, it makes the decision a likely outcome of other desalination projects on the horizon.

In contrast, the CPUC is awaiting confirmation of whether recycled water will be added to the water supply portfolio before certifying a production capacity. And the design capacity is limited to relatively strict projections of future demand – in fact it is the result of down-sizing the local portfolio in order to restore flow volume in the Carmel River.

In brief, the Poseidon-Carlsbad facility was permitted to use the worst possible technology for minimizing the intake and mortality of all forms of marine life based in large part on reliance on the "need" identified in the goals of water planning documents. In contrast, the CalAm Monterey project will likely be approved for a design capacity and site that are consistent with subsurface intakes and a co-mingled wastewater discharge of brine diffusers if the wastewater is used for recycling.

It is ironic that the result of planning and certification of the CalAm Monterey project to ensure against unnecessary rate increases is resulting in a project that fully enforces the Water Code, while a decision by a regional water quality control board resulted in approval of a project that clearly doesn't minimize intake and mortality of marine life – all based in how the supposed "need" precludes otherwise feasible alternatives. We request the State Water Board use the CalAm example as a model for putting limits on the use of "need", to ensure project proponents do not evade the requirements of best available site, design, and technology.

VIII. THE STATE WATER BOARD SHOULD REQUIRE THE BEST AVAILABLE SITE TO ENSURE THE GREATEST MINIMIZATION OF MARINE LIFE AND ENSURE NO IMPACTS TO MARINE PROTECTED AREAS.

A. The best available site is one that accommodates subsurface intakes.

The Amendment should state that the "site" of a facility is "best" if it is compatible with the installation of a subsurface intake. Infiltration galleries can be sited in areas where there is enough open sandy-bottom habitat to accommodate the size of a gallery or multiple galleries. And while some places are preferable for reducing potential maintenance and repairs, areas where a gallery can be constructed are readily

available statewide, and any gallery (regardless of maintenance and repairs) is the "best" for minimizing the intake and mortality of all forms of marine life. What is optimally "feasible" is the best for minimizing the intake and mortality of all forms of marine life, and any unavoidable maintenance and repairs does not render a site infeasible.

To be consistent with the Amendment's directive that the elements of section 13142.5(b) be considered individually and in combination, the best technology needs to be considered in combination with the best available site. And if that combination is to collectively achieve the goal of minimizing the intake and mortality of all marine life, these elements need to be compatible – they must work together to achieve the goal.

B. The best available site should ensure no subsurface intake associated impacts to Marine Protected Areas or Areas of Special Biological Significance.

In 2012, California finalized the nation's first science-based network of marine protected areas (MPAs). These areas, which cover 16 percent of state waters, were created to safeguard marine life and habitats, improve educational and recreational opportunities, and preserve California's natural marine heritage for generations to come. The state's MPA network is a result of significant social and financial investment by a broad and diverse constituency including state agencies, local communities, fishermen, researchers, tribes, philanthropic foundations and environmental organizations. Lasting success of these protected areas depends on successful implementation and management, including an ongoing commitment by state agencies to protect MPA resources in their policy and decision-making.

The goals of the MPA network are closely aligned with the State Water Board's mandate to protect beneficial uses of ocean waters, including recreation, aesthetic enjoyment, preservation and enhancement of designated Areas of Biological Significance (ASBS), marine habitat and fish spawning. Adopting a Desalination Amendment that protects important marine ecosystems within MPAs and State Water Quality Protected Areas (SWQPAs) will have a dual benefit of helping realize the full potential of the state's MPA network and assisting the State Water Board in better meeting its mission to preserve, enhance and restore California's water quality for present and future generations.

To that end, we were generally pleased with the protective language in the previous version of the initial Amendment as it related to siting intake and discharge structures in or near MPAs. However, we have several concerns about the revisions made to Section L.2.b.7 regarding siting of subsurface intake structures in MPAs and discharge impacts to MPAs, as described below.

The revised Amendment includes new language that allows the installation of intake structures within MPAs or SWQPAs if such structures will not result in any "associated construction-related marine life mortality (e.g. slant wells)." We understand the intent of this language and believe that MPA/SWQPA designations should not preclude the use of subsurface technologies that will avoid *all* impacts to marine life and habitats, such as slant wells, if there are no other feasible locations for subsurface intakes available.

However, the language as written, does not prohibit construction-related impacts to marine *habitats* in MPAs or SWQPA, nor does it prohibit the use of surface technology that could impact marine life as a result of ongoing *operation* (versus construction). The Amendment requires projects to "[e]nsure that the intake and discharge structures are not located within a MPA or SWQPA.* with the exception of *intake structures* without associated construction-related marine life mortality (e.g. slant wells)." The State Water Board needs to be explicit that the exception only relates to subsurface intakes. As written, the Amendment could theoretically allow for an open-ocean intake to be lowered into the water column and suspended above the seafloor, avoiding all construction-related marine life mortality while causing

significant *operational* impacts to marine life through impingement and entrainment. Future technology may also have the potential to meet the criteria of avoiding construction-related impacts but still result in adverse effects to MPA resources from continued intake operation.

To avoid what we believe are unintended consequences of the language as written and to ensure protection of marine habitats within MPAs, we suggest the first portion of section L.2.b.7 be revised to read: "Ensure that the intake and discharge structures are not located within an MPA or SWQPA. *Subsurface* intake structures shall only be allowed within an MPA or SWQPA if no other locations are feasible for subsurface intakes and all construction, operation, and maintenance-related marine life mortality and marine habitat impacts are avoided."

C. The best available site should ensure no discharge associated impacts to Marine Protected Areas or Areas of Special Biological Significance.

The initial Amendment included precautionary language requiring that discharges be sited at "a sufficient distance from an MPA or SWQPA *so that there are no impacts from the discharge on an MPA or SWQPA* and so that salinity within the boundaries of an MPA or SWQPA does not exceed natural background salinity (*emphasis added*)." The revised policy language removes the prohibition of *any* discharge impacts on MPAs or SWQPAs and limits the criteria for avoiding impacts from discharges to salinity only. While salinity and brine dilution levels are a primary concern, impacts of chemicals used in the desalination process as well as thermal effects from co-located discharges also need to be evaluated and harmful impacts to MPA resources avoided.

As noted on pages 137 – 139 of the SED, a variety of chemicals including coagulants, biocides, and cleaning in place (CIP) liquids, are used to pretreat seawater and de-foul reverse osmosis membranes as part of the desalination process. [167] When discharged to the ocean, these chemicals can be toxic to marine organisms, even at low concentrations.[168] Furthermore, the temperature of discharge waters may result in thermal impacts, with brine that is warmer *or* cooler than receiving waters depending on the method of salt extraction and water source for brine dilution.[169]

We understand that the State Water Board believes the Ocean Plan's toxicity requirements are sufficient to adequately address impacts of chemical discharges from desalination facilities.[170] However, given the toxicity of desalination chemicals to marine life and potential effects from thermal differences between discharge and source waters, we believe the desalination amendment should explicitly prohibit *any* discharge-related impacts in protected areas, not just those resulting from changes in salinity.

We urge the State Water Board to revert to the originally proposed language in section L.2.b.7 that states: "Discharges shall be sited at a sufficient distance from a MPA or SWQPA so that there are no impacts from the discharge on an MPA or SWQPA and so the salinity within the boundaries of a MPA or SWQPA does not exceed natural background salinity." Furthermore, the State Water Board should establish thresholds for temperature and chemicals such as coagulants and anti-foulants, which can be used to determine whether discharges are having any impact on protected areas.

Long before the passage of the Marine Life Protection Act, the State Water Board took a leadership role

[167] State Water Resources Control Board. Draft Staff Report including the Draft Substitute Environmental Documentation (SED), Amendment to the Water Quality Control Plan for Ocean Waters of California, Addressing Desalination Facility Intakes, Brine Discharges, and the Incorporation of Other Non-Substantive Changes. March 20, 2014.
[168] Heather Cooley et al., Pacific Institute, Key issues for Desalination in California: Marine impacts 3 (2013), *available at* http://www.pacinst.org/publication/desal-marine-impacts.
[169] *Ibid*
[170] Supra note 13, at 130.

to safeguard areas in the ocean that required special protection through the designation and management of ASBSs. Many of the state's ASBSs overlap with or are adjacent to MPAs and will soon be complimented by new designations of State Water Quality Protected Areas (General Protection). Because degraded water quality has the potential to threaten marine life and impede the recovery of ecosystems in areas set aside for protection, we urge the State Water Board to adopt a Desalination Amendment that includes clear requirements for avoiding intake and discharge-related impacts in MPAs and SWQPAs.

IX. THE STATE WATER BOARD SHOULD ENSURE THE BEST AVAILABLE TECHNOLOGY PREVENTS WASTE DISCHARGE IMPACTS TO MARINE HABITAT AND MARINE LIFE.

A. The Best Available Site should prevent waste discharge impacts to marine habitat and marine life.

Reverse osmosis is the only seawater desalination technology being considered in California at this time. It uses high pressure to force water across a semi-permeable membrane to separate seawater into two parts; potable water and hypersaline brine. Because brine retains all the salt from both parts, elevated salinity levels result. Desalination plants are tasked with managing brine, which can be expensive and burdensome - it is common for plants to discharge it back into the sea. When brine is poorly managed and discharged offshore into conditions unsuitable for oceanic mixing, it sinks and settles over the bottom. There, it can persist over long periods of time.[171] Nowhere in the Desalination Amendment are site-specific conditions suitable for mixing referenced or even mentioned. Conditions which influence oceanic mixing need to be identified in the Desalination Amendment. Large volumes of brine discharged into coastal waters with poor circulation will create a worst-case scenario in the marine environment; these scenarios need to be identified and eliminated.

Site selection for desalination facilities and their brine discharge locations are influenced heavily by existing infrastructure, such as co-locating with wastewater treatment facilities. Currently constructed offshore discharge locations once used by coastal power plants and wastewater treatment plants are believed to be adequate sites for brine disposal, even though oceanic conditions are not known to be suitable for brine mixing and dispersal. For example, in Monterey Bay a single wastewater treatment facilities discharge location, 2 miles offshore, is being considered by at least two competing desalination facilities. According to one project's environmental impact report, "[n]o ocean current velocity data have been identified in the immediate vicinity of the diffuser."[172] Thus brine behavior upon discharge cannot be realistically modeled. Furthermore, suggestions during public meetings that the outfall be modified by adding high velocity diffusers has been strongly challenged by those who voice great concern against any further added costs.

When siting desalination facilities, it is important to consider all facility impacts. Co-locating with existing infrastructure should not overlook sound scientific justification for facility location. As identified above, further study is necessary to identify in sites with existing infrastructure are capable of supporting desalination facilities intakes and discharges.

The Desalination Amendment states that "[f]or each potential site, in order to determine whether a proposed facility site is the best available site feasible to minimize intake and mortality of all forms of marine life, the regional water board shall require the owner or operator to…". Although the Desalination Amendment requires owners or operators to analyze seven conditions to identify sites most suitable for

[171] Hodges, B.R., J.E. Furnans and P.S. Kulis. 2011. Thin-Layer Gravity Current with Implications for Desalination Brine Disposal. Journal of Hydraulic Engineering 137:356-371.
[172] California American Water Company, "Coastal Water Project Final Environmental Impact Report" prepared for California Public Utilities Commission, October 30, 2009.

desalination facilities, it fails to identify how facilities will make these determinations. In addition, it fails to identify resources to aid facilities in making these decisions. The State Water Board and regional water boards need to work with desalination facilities and stakeholders to help identify locations that will minimize marine impacts. For example, the Desalination Amendment includes: "Consider whether subsurface intakes are feasible" and "analyze the feasibility of placing intake, discharge, and other facility infrastructure in a location that avoid impacts to sensitive habitats and sensitive species". The State Water Board and/or regional water boards with the help of resource protection agencies, stakeholders, and academia need to collaborate to identify locations throughout the state that are suitable for subsurface intakes as well as locations that are not suitable because of sensitive habitats and species. Without collaboration between State Water Board, regional water boards, stakeholders, etc., determination of sites which minimize intake and mortality of all forms of marine life are interpreted differently at each site and subjective to facility interpretations. Furthermore, most information required for site-specific limitations, geology, habitat, and species composition, is readily available and would not require extensive resource requirements to create. For the Desalination Amendment to be most protective of marine organisms while simultaneously creating water supply benefits, collaboration between all stakeholders and agencies on site location needs to take place.

B. The State Water Board should protect economically valuable species from brine toxicity.

California's market squid, Doryteuthus opalescens, are an economically valuable species for fishers and are ecologically important to the ocean ecosystem. Not only is this species one of California's most valuable fisheries, it is also a foundation species in the offshore food chain.[173] Market squid use the sandy seafloor for egg nurseries. Thus, the potential for brine to settle over these nurseries is of great concern.

In the Monterey Bay, squid comprise a commercial fishery. It is known that elevated salinity has its greatest effect on embryos and early life stages. Unfortunately, brine toxicity studies on growth, development, and reproduction of D. opalescens have not been done. In addition, baseline spatial surveys of squid nurseries near proposed brine outfalls have not been completed. Brine discharges from desalination facilities have the potential to significantly alter squid nurseries not only the initial zone of dilution, but also near- and far-fields. However, these significant environmental and economic impacts are not being addressed and desalination facilities are moving forward towards construction. Proper siting of desalination facilities is essential to protect not only the coastal ecosystems, but also industries which rely upon them.

C. The State Water Board should consider policy implications when regulating brine disposal.

Clearly the best method for dilution of the brine discharge to ensure against impacts to marine life, marine habitat and water quality degradation is to comingle the desalination waste with wastewater treatment plant effluent prior to discharge. However, from a policy perspective, it makes little sense to use wastewater to dilute brine prior to discharge. Recycled water is a precious resource that needs to be exploited whenever feasible – using treated wastewater to mix with brine does not offset regional potable water supplies. In fact, mixing treated wastewater with brine may actually decrease potable water supplies if indirect potable re-use or direct potable re-use planning is taking place. Desalination facilities which use treated wastewater may disincentive future direct and in-direct potable re-use opportunities and implementation. If the intent of seawater desalination is to create a new, reliable source of potable water, using treated wastewater to dilute brine should be avoided. Water Code Section 13142.5 (e)(1)[174] clearly

[173] California Department of Fish and Game. 2006. Status of the Fisheries Report. California Market Squid. Pages 1-1 to 1-11.

[174] Water Code section 13142.5 (e)(1) - Adequately treated recycled water should, where feasible, be made available to supplement existing surface and underground supplies and to assist in meeting future water requirements of the coastal zone, and

identifies recycled water as an important resource to supplement potable water supplies. Brine mixing should not rely on freshwater supplies, no matter what the freshwater chemistry. Thus, using treated wastewater to mix with desalination brine is not an appropriate use for recycled water, and we request that it not be identified as a discharge option in the Desalination Amendment.

As discussed in the Desalination Amendment, augmented intake flow for in-plant dilution may be a feasible option for brine dilution to meet salinity effluent limitations. However, this approach should be pursued with extreme caution. Relying on increased intake volumes to meet effluent limitations can significantly increase entrainment and impinge of marine life when surface intakes are used. In addition, the shock to species who remain in seawater mixing influent once brine is introduced further exacerbated marine life impacts. If the intent of the Desalination Amendment is to create new potable water supplies while simultaneously taking precautionary measures to protect and preserve coastal marine communities, augmented intake flow for in-plant dilution should only occur when subsurface intakes are being used and no marine life impacts are observed during dilution.

Spray brine diffusers are shown to be effective at rapid dilution after discharge. Although diffusers can reduce marine life impacts in areas of discharge, their use does not eliminate acute and chronic toxicity impacts to marine in the zone of dilution as discussed by the Brine Expert Panel.[175] In addition, the use of diffusers does not eliminate the potential for brine accumulation and migration to near- and far-fields resulting in permanent and ever-growing loss of benthic habitat and species reliant on these habitats. In short, there are clear benefits of both high-pressure diffuser and freshwater dilution of brine prior to discharge. However, each dilution alternative has the potential to negate these benefits over time. We believe that dilution alternatives can be regulated in a way that can avoid negating the benefits. In addition, while spray diffusers have some unavoidable adverse impacts in the zone of initial dilution, stricter provisions for their implementation may minimize the water column impacts and ensure against adverse impacts to benthic habitat. With this in mind, we recommend the following modification to the Desalination Amendment to ensure brine disposal protects water quality, marine life and marine habitat while taking into consideration policy implications.

<u>Preference One: Co-location with wastewater treatment facilities</u>

Brine will be mixed with treated wastewater effluent, with appropriate water chemistries, to meet ambient water salinities prior to discharge. Seawater desalination plants may only be co-located with wastewater treatment plants, or designed, constructed and connected to off-site locations, with the understanding that once indirect and direct potable re-use opportunities are identified and available, the desalination plant shall be retrofitted to meet the goals of Water Code section 13142.5(e) and the State Water Board's "Recycled Water Policy." In no event shall desalination facilities' use of treated wastewater replace or supplement the use of recycled water for water supply augmentation projects.

<u>Preference Two: In-plant dilution using subsurface intake</u>

Augmented intake for in-plant dilution shall only be allowed for facilities which rely solely upon subsurface intakes for source water volumes. Augmented intake volumes for in-plant dilution are prohibited unless the applicant can prove, prior to issuance of the permit, the adverse impact of diffusers is greater than the adverse impacts of augmented intake volumes.

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consideration, in statewide programs of financial assistance for water pollution or water quality control, shall be given to providing optimum water recycling and use of recycled water.

[175] See Management of Brine Discharges to Coastal Waters Recommendations of a Science Advisory Panel Expert Report on Brine, *available at* http://www.waterboards.ca.gov/water_issues/programs/ocean/desalination/docs/dpr.pdf.

Third Preference: Zone of initial dilution

If in-plant dilution cannot be accomplished through Preferences One and/or Two (above), diffusers will be designed to ensure no greater than 1ppt of salinity above ambient at the edge of the zone of dilution. In addition, adequate monitoring in the near-field and far-field are necessary to detect any accumulation of brine. In the event that ambient salinity levels and/or accumulation of brine thresholds are exceeded, the NPDES permit must include strict provisions requiring immediate cessation of discharge until remedial action is identified which will eliminate water quality, marine life and marine habitat impacts.

X. THE STATE WATER BOARD SHOULD ENSURE THAT THE RECEIVING WATER LIMITATION PREVENTS BRINE TOXICITY AND HYPOXIA.

A. The Receiving Water Limitation for Salinity should ensure protection of all forms of marine life.

The Desalination Amendment outlines steps to establish a receiving water limitation for salinity based upon site specific conditions. The equation in the Desalination Amendment Ce = (2ppt + Cs) + Dm(2 ppt), in which Ce-effluent concentration limit, Cs-natural background salinity, and Dm-dilution factor will be used to develop salinity effluent limitations within the brine mixing zone using applicable water quality models that have been approved by regional water boards in consultation with State Water Board. In this equation, it is unclear how site specific conditions that influence mixing such as water depth, currents, wave activity, etc. influence salinity effluent limits. Are these conditions being accounted for in the Desalination Amendment? In addition it is unclear how the Dm relates to what the Expert Brine Panel suggested in their report. For example, using Monterey Bay (see below) as an example with a typical brine salinity requirements of 62ppt for the area, the equation shows a 12 parts seawater to 1 part brine dilution ratio. According to the Expert Brine Panel's report (Jenkins et al. 2010, pg 45), salinity reductions that met water quality objectives at the edge of the regulatory mixing zone could be achieved with an overall dilution of no less than 20 parts seawater : 1 brine. It appears that the equation may be relaxing the dilution ratios that were recommended by the Expert Brine Panel's recommendations. Mixing conditions will vary significantly based upon site specifics, however the equation does not account for site variability. A 12:1 dilution ratio may be a protective salinity effluent limits in some areas, but not others. More explanation regarding Brine Expert Panel's dilution ratio recommendation and what will be permitted for desalination facilities needs to be included in the Desalination Amendment.

For Monterey Bay: Cs = 34ppt.
A typical desalination brine salinity for this region is 62ppt.
Therefore, the equation for Monterey Bay can be solved as follows:

$$62 = (2ppt + 34) + Dm(2\ ppt);$$
$$62-36 = Dm(2ppt);$$
$$24/2 = Dm$$

Dm = 12 parts seawater: 1 part brine.

B. *The State Water Board should consider species sensitivity, brine toxicity and hypoxia when adopting a receiving water limitation for salinity.*

Salinity is known to be one of the main environmental factors exerting a selective pressure on aquatic organisms.[176] Therefore, it is vital that brine discharges are located in areas capable of dispersing salt loading. Some species sensitivities to elevated salts can result in immediate and prolonged signs of toxic

[176] *See* Varsamos et al., Influence of salinity on the localization and expression of the CFTR chloride channel in the ionocytes of *Dicentrarchus labrax* during ontogeny (2005), *available at* http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2673783/.

responses resulting in acute and chronic impacts. In addition to toxicity, rising ambient salt concentrations can cause organisms to lose water to their saltier environment. In effect, animals in a world of water can ironically begin to dehydrate. Unlike most fish, marine invertebrates (e.g. squid) cannot osmoregulate[177] to maintain cellular water balance. Thus, invertebrates are considered to be most vulnerable (sensitive) to brine concentration fluctuations, yet it is unclear if they have been identified in the Desalination Amendment as species most vulnerable to brine discharges.

In terms of community impacts, overcoming dehydration forces organisms to spend energy. This leaves less energy left for growth, development, and reproduction. Overtime, this may result in a decline in species abundance. Benthic community structure could also shift[178] and biodiversity could be altered. In addition, salt-tolerant species transported to California from other parts of the world on the hulls of ships or in ballast water may have the ability to colonize and outcompete native species in brine outfall zones, especially if brine is discharged in areas with poor water circulation. Brine discharges can also result in extensive oxygen depletion in the discharge zone as well as surrounding areas. It is well known that the layering of brine, even a few units (ppt) above natural levels, can create hypoxia on the seafloor.[179] Given ocean desalination facilities lifespans will likely extend several decades, brine outfalls located in areas incapable of properly mixing brine loads have a great potential to grow and severely impact and even change community structures. Thus, brine discharges not only have the capacity to degrade ocean water quality and damage marine habitats but also can jeopardize the benefits these waters provide to people and the coastal ecosystem.

C. The State Water Board should require toxicity testing in areas with proposed alternative salinity receiving water limitations.

In the event that plant operators wish to obtain alternative salinity effluent limitations, baseline biological conditions and toxicity studies need to be conducted to show proposed facility specific salinity limits are adequately protective of beneficial uses. Whole Effluent Toxicity (WET) tests are required to be conducted for a variety of organisms and the facility-specific alternative receiving water limitation shall be based upon the lowest observed effect concentration (LOEC) observed in WET tests. It is unclear why the Desalination Amendment changed the facility-specific alternative receiving water limitation from no observed effects concentration (NOEC) to LOEC. What is the reasoning for this change? The LOEC approach is less stringent than the NOEC and the LOEC allows for marine life impacts. This approach is not protective of marine organisms and essentially allows degradation to occur outside of the initial zone of dilution. At no point should the Desalination Amendment allow for toxic effects to marine communities aside from what cannot be avoided in the initial zone of dilution.

In addition to allowing some degradation outside the initial zone of dilution, NOEC and LOEC statistical approaches are heavily criticized due to their misleading nature and validity of statistical methods.[180] The Los Angeles Regional Water Quality Control Board began replacing the NOEC/LOEC statistic approach with a more robust USEPA approved statistical method, Test of Significant Toxicity (TST)[181]. The TST method is superior to previous WET methods as it is a more powerful statistical approach resulting in greater confidence for WET conclusions. The USEPA TST approach does not result in any changes to the USEPA's WET test methods. Already these new approaches have proven more sensitive at detecting

[177] *See* Bradley (2009).
[178] See Del Pilar Ruso et al. (2007).
[179] *See* Hodges et al. (2011).
[180] Warne and van Dam, *NOEC and LOEC data should no longer be generated or used*, Australa.Asian Journal of Ecotoxicology (14) pp.1-5. 2008.
[181] National Pollutant Discharge Elimination System Test of Significant Toxicity Implementation Document (EPA 833-R-10-003, June 2010)

toxic effects in a wider range of species.[182] Thus, the Desalination Amendment should include the TST statistical method instead of LOEC when deriving facility-specific alternative receiving water limitations for salinity. In addition, we believe the Desalination Amendment should include language that allows for the expansions of WET test species, not only species listed in Section 3.c.1.b, but also market squid, Dungeness crabs, protected rockfish species, and other vulnerable and important species, which are valuable to the ocean waters of California. Ecotoxicology testing methods are growing and becoming more robust; the State Desalination Policy needs to include these methods to ensure that beneficial uses are being protected at all times.

XI. THE STATE WATER BOARD SHOULD ENSURE EXPANDED AND CONDITIONALLY APPROVED FACILITIES MEET THE DESALINATION AMENDMENT'S REQUIREMENTS IN A TIMELY MANNER.

A. The State Water Board should be explicit that "expanded" facilities cannot be "existing" facilities.

The State Water Board needs to be explicit that a facility that is "expanded" cannot be an existing facility. The State Water Board proposes to define an "expanded" facility to mean a facility that either:

> *Increase[s] intake or mortality of all forms of marine life beyond that which was originally approved in any NPDES permit or Water Code section 13142.5(b) determination: 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."*

We agree with the State Water Board's definition of an "expanded" facility, and believe it is an appropriate interpretation under the California Water Code.

The State Water Board also defines an "existing" facility, which may have the potential to conflict with an expanded facility. The Desalination Amendment defines an existing facility to be a:

> *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)).*

While we agree with the intended language defining existing, we believe the language needs to be clear that an existing facility cannot also be an expanded facility. For example, the owner or operator of the Carlsbad facility should be considered an expanded facility under the Desalination Amendment when the Encina Power Facility comes into compliance with the OTC Policy. At that point, the Carlsbad facility will be increasing the mortality of all forms of marine life beyond that which was originally approved in its NPDES permit. Also, because the Carlsbad facility is co-located with Encina, when Encina reduces the volume of water withdrawn to a level less than Carlsbad's volume of water withdrawn, the facility

[182] See Hook et al. (2014).

will be considered "expanded."

However, the case can be made, under the proposed Desalination Amendment, that the Carlsbad facility may be interpreted as an "existing" facility – something we do not believe the State Water Board intends. The Carlsbad facility – at the point where it would be considered expanded – would also be a facility with an NPDES permit and all other permits and approvals necessary to commence construction, and has relied on those permits to commence construction beyond site grading. Therefore, we believe a conflict exists between the two definitions of "expanded" and "existing."

To clear up any ambiguity between the two definitions of "expanded" and "existing", we request the State Water Board add a clause to the definition of "existing" as follows: "A desalination facility is only an existing facility if it does not meet the definitions of new or expanded."

B. The State Water Board should not allow an expanded facility an additional five years to comply with the Desalination Amendment once it has expanded.

The State Water Board should not allow an expanded facility to have an additional five years to comply with the Desalination Amendment unless there is truly just cause. The Desalination Amendment originally allowed an owner or operator up to five years to come into compliance if the region water board found that "any water supply interruption resulting from the facility modifications requires additional time for water users to obtain a *temporary* replacement supply." In our August 2014 comments, we did not object to this provision because of the usage of the term "temporary." It should not take five years to find a temporary replacement of water. Only in a drought situation could it possibly take a full five years to come up with replacement water, which we realized in 2014 was the current situation. However, that should be the limit to why a five year extension is granted.

The revised Desalination Amendment provides an additional reason to allow an expanded facility an additional five years to comply. The revised Amendment now allows an extension of time if it is "in the public interest and reasonably required for modification of the facility to comply with the determination." The term "in the public interest" has no definition, no guidelines, or boundaries. It is a nebulous open-ended term that will allow any project proponent to receive an extension.

Extensions should not be given to facilities that are "expanded" because a co-located OTC facility is reducing its seawater intake. Owners or operators of desalination facilities have been on notice for years – if not a decade – that OTC facilities would be required to stop the intake of seawater. Such facilities that ignored the State Water Board's OTC Policy and continued to co-locate with OTC facilities should not be given a windfall.

The OTC Policy was adopted in 2010. If a desalination project proponent wasn't on notice during the development of the OTC Policy, it certainly was put on notice in May 2010 when the OTC Policy was adopted with an implementation schedule. This implementation schedule clearly outlined when each OTC power facility would have to stop its seawater intake. Therefore, co-located desalination facilities have been on notice for five years that they would not be able to use OTC water for their desalination process. They should not be given an additional five years if and when the OTC facilities stop their intake.

Moreover, it takes several years for an OTC facility to construct cooling towers, re-power, and come into compliance with the OTC Policy. Given the co-located desalination facility is located in close proximity to the OTC facility, the owner or operator should be well aware that the OTC facility is coming into compliance with the OTC Policy, and will shortly be stopping its seawater intake.

A regional water board should begin the extension at the point where a desalination owner or operator is put on notice. For desalination facilities co-located with an OTC facility, that notice should have begun in May 2010. At the very least, desalination facilities that are co-located with an OTC facility should be put on notice the date the Desalination Amendment is adopted, and only be given a maximum extension of five years past that date. For any facility that becomes an expanded facility after the five year extension window has elapsed, regional water boards should only be allowed to provide a one year extension to comply with the new NPDES Permit.

C. Expanded facilities should not be given an additional eight years to comply with the Desalination Amendment for proposing to use "alternative technologies."

The State Water Board should not allow expanded facilities to have eight years to comply with the Desalination Amendment when they are proposing to use an "alternative technology." As discussed above, an expanded facility can be given an additional five years to comply with the policy simply for the extension being "in the public interest" – whatever that means. Additionally, the State Water Board has allowed project proponents to develop "alternative technologies" from the preferred technologies in the Amendment. The Amendment requires these alternative technologies be studied, with a report due to the Regional Board in three years, to determine whether the technology reduces marine life mortality to the equivalent of the second best available technology – screened intakes with augmented flows for in-plant dilution.

As discussed in our 2014 comment letter, we disagree with the ability to use an "alternative technology" to meet the inappropriate standard of a screened open-intake. In the revised Amendment, that alternative technology will now be allowed for eight years after the facility becomes expanded. There is nowhere in the record that justifies why an eight year extension is warranted. While we disagree with a five year extension for expanded facilities, at least, the facility should be required to conduct its study during the five year extension.

We oppose the option to use alternative technologies that are only required to minimize marine life mortality to the level of open-ocean screens, which as we discuss above, could mean zero reduction of entrainment for some species and a net reduction of only one percent. But if the State Water Board continues to allow for alternative technologies that only meet a sub-par standard, then facilities that already have their NPDES permit, but will likely be defined as "expanded" in the future, should be required to begin studies immediately. An 8-year delay to require any technology for minimizing marine life mortality cannot constitute the best available technology.

XII. THE STATE WATER BOARD SHOULD REQUIRE ALL OWNERS OR OPERATORS TO HIRE A NEUTRAL THIRD PARTY TO REVIEW STUDIES AND MODELS AND MAKE RECOMMENDATIONS TO THE REGIONAL WATER BOARD.

The State Water Board should require an owner or operator to hire a neutral third party to conduct any studies regarding feasibility of the best available site, design, and technology – including both intake and discharge. In the revised Amendment, the State Water Board provides the regional water boards with the ability to "require an owner or operator to hire a neutral third party entity to review studies and models and make recommendations to the regional water board." Without a neutral third party to evaluate feasibility studies, how will regional water boards be able to evaluate project proposals accurately?

Desalination proponents are already given a broad definition of "feasible" to evade using subsurface intakes as the best available technology. Furthermore, the State Water Board provides proponents a "second bite at the apple" of arguing subsurface intakes are infeasible within the best available technology's feasibility criteria. And now, the State Water Board is not requiring a neutral third party to

evaluate the feasibility study. There comes a point where project proponents must be held to a standard, and truly required to show a subsurface intake is infeasible. Regional water boards do not have the technical expertise to evaluate whether a feasibility study was done properly and transparently.

We understand that regional water boards will consult with the State Water Board regarding the approval of a project, but we question whether the State Water Board has the technical expertise to determine whether a feasibility study was properly done. The State Water Board contracted out several "expert panels" to help guide the Desalination Amendment. And yet, in numerous instances, the State Water Board did not hold true to the expert panels' recommendations on how to properly minimize marine life mortality, reduce brine impacts, analyze the true impact from a facility, or how to calculate the mitigation fee. Throughout the Desalination Amendment process, the State Water Board has been presented with questionable science.[183] Yet rather than dismiss these questionable studies, the State Water Board has allowed loopholes and exceptions to accommodate them. Why now does that State Water Board believe it will reject improperly done feasibility studies done by the project proponents themselves?

To ensure a more transparent process to determine feasibility under the Desalination Amendment, we request the State Water Board make the following change to Chapter L.2.a.1: "The regional water board ~~may~~ shall require an owner or operator to hire a neutral third party entity to review studies and models and make recommendations to the regional water board."

XIII. THE STATE WATER BOARD SHOULD BE EXPLICIT THAT FLOW AUGMENTATION FOR BRINE DILUTION IS ILLEGAL.

A. Allowing flow augmentation as an alternative discharge technology is illegal.

As discussed above, flow augmentation, is illegal and should not be an allowable technology or practice for discharging brine. As the State Water Board admits, withdrawing "additional seawater through surface intakes for the purpose of diluting brine effluent to meet water quality standards (referred to as "flow augmentation") can significantly increase entrainment and impingement." Moreover, even if a technology can reduce entrainment through "low turbulence intakes" "[a]dditional mortality may occur through brine exposure in the mixing process and through predation in conveyance pipes."[184]

Experts in the field of brine discharges have found flow augmentation leads to significant increases in marine life mortality. Studies have demonstrated that 100 percent of entrained organisms die,[185] and that entrainment impacts on individual populations and the ecosystem can be significant.[186] Withdrawing additional source water with traditional pumps to dilute brine would result in significantly increased marine life mortality compared to discharging through multiport diffusers.[187]

Flow augmentation with open-ocean intakes does not prevent marine life mortality at the mixing zone. The State Board acknowledges that "[o]rganisms entrained in the flow augmented dilution water may experience turbulence and shearing stress, osmotic stress or shock, or thermal stress as brine and dilution

[183] See Expert Report 3, Attachment Poseidon's study on entrainment from high pressure diffusers. "The recommendations in Jenkins and the modified design should be undertaken with considerable caution." Even with the Expert Report, the State Water Board, in response to the Jenkins Report, provided project proponents with the ability to use flow augmentation instead of spray brine diffusers.
[184] *Id*. at 46.
[185] Pankratz, T. 2004. An overview of Seawater Intake Facilities for Seawater Desalination, The Future of Desalination in Texas. CH2M Hill, Inc. Vol 2: Biennial Report on Water Desalination, Texas Water Development Board.
[186] Raimondi, P. 2011. Variation in Entrainment Impact Based on Different Measures of Acceptable Uncertainty. Prepared for California Energy Commission, Public Interest Energy Research Program.
[187] Supra note 13, at 88.

water are mixed prior to discharge."[188] Flow augmentation results in a net loss of marine life mortality, and no data exists to prove that low-turbulence screw pumps reduce entrainment. There is nothing to suggest that flow augmentation can demonstrate equivalent protections as that of dilution with wastewater.

Despite the lack of evidence, the State Water Board is allowing a project proponent to invest in "alternative technologies" and operate them for up to three years before demonstrating equivalent protections as dilution with wastewater. This is bad public policy, and allows regional boards to kick the proverbial compliance can down the road. Regulatory flexibility is important, but perverting regulations to "accommodate" every project is inappropriate. At some point, California needs to stand up for its marine environment – and the laws intended to protect it – by requiring facilities to meet their legal requirements. Allowing three years to build and then try to demonstrate compliance with self-assessed studies is unjustifiable. How will regional boards have the resources or expertise to know whether the empirical studies were done correctly? The proponent of low-turbulence pumps has already submitted questionable studies disputed by industry experts. Does anyone believe a regional board will require a facility to shut down a water supply facility once it is in the local portfolio, rip-out their low-turbulence pumps, and install the proper discharge technologies once they fail to meet the performance standard? It's untenable and unworkable from a practical perspective.

In order to prevent flow augmentation from undermining the best available intake and discharge technologies, we request the State Board *explicitly prohibit flow augmentation under Chapter III.L.2.d.2. by deleting all of Chapter III.L.2.d.2.(e).*

B. Proponents of flow augmentation failing to demonstrate equivalent protections as the preferred discharge technology should not be given additional opportunities to re-design their system.

Project proponents that install low-turbulence intakes and fail to meet the required intake and discharge performance standards should not be allowed to continue operations. Instead, the State Board allows project proponents that are not meeting the required performance standards "re-design the flow augmentation system to minimize intake and mortality of marine life to a level that is comparable with wastewater dilution or multiport diffusers…" As discussed above, it is already inappropriate to allow a project proponent to operate for three years with flow augmentation technology that is assumed to increase marine life mortality rather than minimizing it. Allowing proponents to continue using flow augmentation after failing to demonstrate compliance just perpetuates the impacts to marine life. How many opportunities does a project proponent get at re-designing their flow augmentation technology? How many years after a re-design does the proponent get to prove the new design is in compliance?

In order to minimize the damage of allowing flow augmentation as an alternative discharge technology, we request the State Water Board *delete the option for project proponents to re-design their low-turbulence intakes after failing to demonstrate such technology meets the required performance standards*. We offer the following revisions to Chapter L.2.d.2.d.iii.:

> *If the empirical study shows that flow augmentation* is less protective of marine life than a facility using wastewater dilution or multiport diffusers,* then the facility must ~~either (1)~~ cease using flow augmentation* technology and install and use wastewater dilution or multiport diffusers* to discharge brine waste~~, or (2) re-design the flow augmentation system to minimize intake and mortality of marine life to a level that is comparable with wastewater dilution or multiport diffusers, subject to regional water board approval~~.*

[188] *Id.*

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The undersigned groups want to see a Desalination Amendment adopted that requires the best available site, design, technology and mitigation feasible to minimize all forms of marine life mortality. No one person or entity has the right to take intake seawater at the expense of public resources. The intake of seawater is a privilege, and one California should not just give away without the use of the very best technology to minimize marine life impacts. We look forward to working with you to ensure sufficient clean water for California.

Sincerely,

Sean Bothwell
Staff Attorney
California Coastkeeper Alliance

Joe Geever
Consultant

Sarah Sikich
Vice President
Heal the Bay

Jenn Eckerle
Ocean Policy Consultant
Natural Resources Defense Council

Stefanie Sekich-Quinn
California Policy Manager
Surfrider Foundation

Kyle Jones
Policy Advocate
Sierra Club California

Susan Jordan
Executive Director
California Coastal Protection Network

Emily Jeffers
Staff Attorney
Center for Biological Diversity

Livia Borak
Associate Attorney
Coastal Environmental Rights Foundation

Dan Silver
Executive Director
Endangered Habitats League

Jonas Minton
Water Policy Advisor
Planning & Conservation League

Elizabeth Doherty
Executive Director
Wholly H20

Amy Trainer
Executive Director
Environmental Action Committee of West Marin

Merle Moshiri
President
Residents for Responsible Desalination

Conner Everts
Executive Director
Southern California Watershed Alliance
Co-Chair, Desal Response Group
Environmental Water Caucus

Leslie Tamminen
Director
7th Generation Advisors