Public Comment
Desalination Amendments
Deadline: 8/19/14 by 12:00 noon

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Heal the Bay

August 19, 2014

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, and Heal the Bay, we appreciate the opportunity to provide comments on the State Water Resources Control Board's ("State Board") July 2014 draft 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 ("Desal Amendment").

Our organizations have 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" technology for coastal power plants.[1] Regulations adopted in 2010, and the associated environmental analyses, by the State Board documented the significant impact to marine ecosystems from these intake structures, 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] Seawater desalination proponents are now seeking to continue using the very same intakes regulated and intended to be phased-out under the Once-Through Cooling (OTC) Policy, thus undermining the Policy's objective of minimizing marine life mortality from entrainment and impingement.

Currently proposed desalination facilities will have a detrimental impact on the chemical, physical, and biological integrity of California's waters. Today, California's desalination facilities have a combined design capacity of approximately 6.1 MGD.[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.

Our organizations have comprehensively reviewed California's water supply options and have determined ocean desalination should be pursued with caution and only after conservation, stormwater capture, water use efficiency, and wastewater recycling has all been fully implemented. As discussed in Section 22 below, these preferred alternatives are not only less expensive; they have additional benefits of preventing pollution, contributing to habitat restoration, and reducing energy usage. While we understand local water supply agencies have the authority and discretion whether to develop seawater desalination facilities in their portfolio, it is the State Board's charge to ensure those facilities meet the mandates of State and Federal law.

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

Given the expected push for desalination in the near future—and the likely availability of environmentally preferable alternatives—it is critical that the State Board develop statewide standards to minimize the intake and mortality of all forms of marine life. However, substantial changes need to be made to the Amendment in order to achieve the intent of the CWA and Porter-Cologne Act, uphold the OTC Policy, and protect and restore California's marine ecosystems. As described in detail below, we request the State Board make the following revisions to the Desal Amendment and the accompanying Substitute Environmental Document (SED):

1) Include guidance on how regional boards shall combine all 13142.5(b) elements;
2) Be explicit that the "best available" standard is required for each 13142.5(b) element;
3) Determine subsurface infiltration galleries are the best available technology;
4) Remove cost from the best available technology feasibility criteria;
5) Define when subsurface intakes are "not feasible";
6) Be explicit that open-ocean intakes with fine mesh screens are not the best available technology;
7) Include design capacity into the best available design analysis;
8) Reconsider the currently proposed best available design criteria;
9) Ensure the best available site accommodates the best available technology;
10) Minimize impacts to Marine Protected Areas and other Special Protected Areas;
11) Exempt expanded facilities from the best available site analysis;
12) Prohibit after-the-fact restoration as in-lieu mitigation for the best available technology;
13) Revise the mitigation fee calculation;
14) Spend fees on the best available mitigation to minimize the intake and mortality of marine life;
15) Determine spray-brine diffusers are the best available discharge technology;
16) Conduct proper toxicity monitoring;
17) Hold alternative technologies to the "best available" standard;
18) Prohibit flow augmentation for brine dilution;
19) Monitor for harmful algae blooms;
20) Narrowly define the emergency exemption;
21) Ensure co-located desalination facilities meet the standards under CWA §316(b);
22) Consider cheaper, less energy intensive water supply options.

1. REQUIRE A PROPER 13142.5(B) ANALYSIS AND PROVIDE GUIDANCE ON HOW TO COMBINE ALL 13142.5(B) ELEMENTS TO BEST MINIMIZE THE INTAKE AND MORTALITY OF MARINE LIFE.

A. Provide clear guidance on conducting a 13142.5(b) analysis.

Generally speaking, we agree with the intent of the Amendment to enforce each element under Water Code §13142.5(b). We agree with the approach of identifying the "best site", "best design" and "best technology" available for "minimizing the intake and mortality of all forms of marine life." These three elements should be fully enforced before turning to mitigation. And mitigation, to the extent it includes after-the-fact restoration, is still required to be "best."

It is also a reasonable interpretation of the language to include an analysis of all the three primary elements in combination to ensure that, collectively those elements of a facility meet the standard of "best" and "minimization" of the intake and mortality of all forms of marine life. However, it would undermine the letter and intent of the law if a combination of the elements resulted in less than one element could achieve. For example, choosing a site or design that would effectively preclude the use of the best technology is not a combination that collectively minimizes the intake and mortality of all forms of marine life. The site and design may be the "best" for some other purpose, but clearly not for the purpose of the law.

Therefore, the Amendment needs clear definitions and explanations for how the combination of terms are considered, to ensure the process results in full realization of collectively minimizing the intake and mortality of all forms of marine life – rather than leaving ambiguity that would allow a lesser standard.

Best is not "some" advantage, and minimize is not "some" reduction – it is the optimum possible. Further, the intent of the Amendment should not be to minimize the intake of "some" species at "some" life stage – instead, it should be to minimize the intake and mortality of "all" forms of marine life.[5] Consequently, technologies like open-ocean screens as part of a collection of technologies must be shown to be superior at minimizing the intake of all forms of marine life – inclusive of all species of all sizes and life stages. To the extent restoration is part of mitigation, it must ensure replacement of all species lost to the intake – not just replacement of the weight of what is lost (it is not a replacement of general biomass, it is replacement of biomass of "all forms of marine life" lost to intake and mortality).

We request the State Board incorporate the following definitions into Appendix 1:

"Best" most advantageous, suitable, or desirable: 'the best way.
"Minimize" to reduce to the smallest possible amount or degree.
"All forms of marine life" all individual species in all different life stages.

B. The State Board needs to provide clear guidance on how a regional board shall combine all of the 13142.5(b) elements.

The amendment should clarify the intent of combining the site location, facility design, and technology elements: *"[t]he combination of elements shall collectively be the best combination to minimize the intake and mortality of all forms of marine life."* Adopting a "tech neutral" and "site specific" approach to best technology, as suggested by project proponents (See Appendix 1), would undermine the clear intent to minimize intake and mortality of all forms of marine life through a combination of the elements. As we have seen in the past, this approach allows a "site" selection that has little to no advantages for minimizing intake and mortality, and results in "site specific" technologies that are not the "best." The State Board should be careful not to adopt a policy that does not follow the intent of the Water Code language and does not ensure the best minimization of the intake and mortality of marine life – whether it is through each individual element or the combination of elements.

In *Surfrider Foundation v. California Regional Water Quality Control Board, San Diego Region ("Carlsbad"* decision)[6], the court allowed broad discretion to the Regional Board in its adoption of the Carlsbad permit – finding that a narrow selection of alternative sites with little or no connection to minimizing intake and mortality was acceptable. The court allowed the same discretion in finding that the design of the facility to produce 50 MGD was allowable – again with little or no connection to the ultimate goal of minimizing the intake and mortality of all forms of marine life. Then, given the selection

[5] California Water Code § 13142.5(b).
[6] *Surfrider Foundation v. California Regional Water Quality Control Board*, San Diego Region, Super. Ct. No. 37-2010-90436-CU-WM-OTL (2010).

of the site, the discussion of best technology feasible at that site was dramatically constrained if not eliminated. Because the design of the facility did not include alternatives that would make the site compatible with the best technology, the entire purpose of combining site, design and technology to minimize the intake and mortality of all forms of marine life unraveled and the clearly preferable combination was precluded. How the combination was reviewed resulted in far less than the "best" that would be possible with a different process of combining the elements. The process for combining the separate elements clearly did not collectively minimize the intake and mortality of marine life. While the court allowed broad discretion to the Regional Board in combining the elements, the process effectively precluded a combination of elements that were compatible and collectively minimized the intake and mortality of marine life.[7]

As discussed below, the *Carlsbad* decision serves as a practical example of how ambiguity in the Ocean Plan can result in undermining its intent. It is not sufficient to simply state that the Water Code envisions a combination of the elements, it is imperative to describe the process for considering the combination in a way that ensures a collective minimization of the intake and mortality of all forms of marine life. Further, comments by industry representatives including newly fabricated terminology like "site specific" best technology, and taking a "tech neutral" approach are clear evidence of recommended modifications to the Amendment that will result in less than "the best" elements or combination of elements, and consequently less than "minimizing" (reducing to the smallest possible amount or degree) the intake and mortality of marine life by combining the separate but interconnected elements.

The Amendment should be modified to clarify that combining the elements does not undermine the intent of best reduction of intake and mortality possible. Without clarifying language and instructions for combining the elements, the Amendment will not result in full enforcement of the intent. As written, the Amendment does little to assert the authority and duty of the State Board to ensure the regional boards enforce the law in a way that is consistent. In practice, the Amendment would still allow similar discretion to the regional boards as they have today, and effectively codify the process that allowed a co-located facility in Carlsbad as the future model for stand-alone facilities statewide.

Given the Amendment's clear directive to combine all 13142.5(b) elements, we request the State Board <u>*include a "combination section" to provide regional board guidance on the proper way of combining all 13142.5(b) elements*</u>.

To ensure the Amendment properly combines the 13142.5(b) elements, we request the following revisions to Chapter III.L.2.a.(2):

> *The regional water board shall conduct a Water Code section 13142.5(b) analysis of all new and expanded desalination facilities.* A Water Code section 13142.5(b) analysis may include future expansions at the facility. The regional water board shall first analyze separately as independent considerations a range of feasible alternatives for the best site, the best design, the best technology, and the best mitigation measures to minimize intake and mortality of marine life. Then, the regional water board shall consider all four factors collectively, and <u>the combination of elements shall collectively be the best combination to minimize the intake and mortality of all forms of marine life</u> ~~include the best combination of alternatives that in combination minimize intake and mortality of marine life~~. The best combination of alternatives may not always include the best alternative under each individual factor because some alternatives may be mutually exclusive, redundant, or infeasible in combination.*

[7] *See id.*

2. THE STATE BOARD NEEDS TO BE EXPLICIT THAT THE "BEST AVAILABLE" STANDARD IS REQUIRED.

A. The "Carlsbad decision" does not restrict the State Board's authority to interpret 13142.5(b).

The "*Carlsbad* decision" is factually distinguishable from the Amendment, and does not limit the discretion of the State Board to ensure enforcement of the law. First, it is abundantly clear that the court was analyzing the permit for "temporary" operation of the facility while the co-located power plant was discharging heated wastewater for use as "source water" for the desalination facility. Consequently, the factual basis for the decision is not the same as the facts applicable for a stand-alone facility; nor to the adoption of statewide rules for new and expanded facilities.

The benefit of using the discharge wastewater from the power plant in Carlsbad has all but evaporated – we predict that source water will cease nearly simultaneously with completion of construction of the facility. And the technology proposed for co-location and co-operation is irrelevant for a stand-alone facility. For example, surely the State Board will not consider "scrubbing bubbles" as a technology for minimizing intake and mortality for a new stand-alone facility. And similarly, the best site, design, technology and mitigation required for the co-located project is not the best for a stand-alone facility.

While we agree that the court's interpretation of the law provides important guidance for this Amendment, it does not limit the State Board's discretion to interpret the law and establish regulations for enforcement of the law. "Agency deference" afforded to the Regional Board's issuance of the temporary permit does not limit the State Board's discretion to establish statewide standards for stand-alone facilities.

Further, courts have found that when an agency "reverses direction" in their regulatory standards, they must include a reasoned analysis for the change. The Amendment already does that in several ways, and those changes are supported by a reasoned analysis. For example, the Amendment clarifies that "best available mitigation", or "after the fact restoration", is not weighted the same as "best available site, design and technology" when combining the elements of section 13142.5(b). After-the-fact restoration is only allowed for the remainder of what marine life is lost to the intake after the best available site, design and technology has been implemented – it is not a co-equal element in the combination of elements. While we disagree that "mitigation" includes "after the fact restoration", we agree that the rule should exhaust every alternative for minimizing the intake and mortality in the first place before attempting to "replace" the species lost. Therefore, the Amendment has already distinguished *Carlsbad*, and done so within the State Board's discretion, by articulating a reasoned analysis for the change. And we support the reasoned analysis – it is effectively impossible to restore or construct habitat that ensures replacement of all forms of marine life lost to the intake. Similarly, the Amendment changes direction in the interpretation of the term "feasible" in the statute. While we disagree with the Amendment's treatment of determining what is and is not "feasible", we agree that changing direction by not relying on the CEQA definition is within the State Board's retained discretion, given a reasoned analysis for the change.

In conclusion, the State Board's discretion in adopting the Amendment is not strictly constrained by *Carlsbad*. And it is now apparent that the decision, if it were to constrain the development of this Amendment, would not result in full enforcement of both the letter and intent of the law.

B. What is "Best Available?"

Through past regulatory decisions and judicial review, the definition of "best available" has evolved to mean not only what is available today. The term has been interpreted to incorporate a "technology forcing" policy to ensure that future innovations be adopted as they become "available." Therefore, when applying a "best available" standard to "site", "design" and "mitigation" (elements other than "technology") the term might logically be interpreted as enforcing an "innovation forcing" policy.

As State Board staff discussed at the August 9, 2014 Board Workshop, this interpretation is in conflict with limits in the Water Code in that section 13142.5(b) only applies to "new or expanded facilities." We agree that there is an apparent, yet likely unintended, contradiction in the Water Code language. The Amendment must include a reconciliation of the contradiction within the discretion of the State Board's authority to interpret the law. And within that discretion, we think it is appropriate to distinguish that the contradiction is centered on interpreting "available" to establish an "innovation forcing" policy in the Amendment. That is, if it is impractical to compel future changes as innovation evolves, it does not preclude imposing the "best" or the "best available" at the time a facility is first permitted – in fact, it compels more scrutiny to ensure that "less than best" is not enshrined in a proposed facility site, design or technology once it is considered "existing."

An exception to the requirements above arises when facilities have been constructed and are operational. The principle that "available" includes an "innovation forcing policy" is, from a practical perspective, unenforceable for changing "sites" once a facility is constructed and operating. Arguably, this may affect the selection of a technology that is "available" in the future at an existing facility's site. That is, the standard interpretation of "available" (which embodies a policy to adapt as innovations provide better alternatives} will not be practical for better "sites" once a facility is built and operating. However, that does not preclude requiring "better" technologies at an existing site as innovative alternatives are developed – even if a future "best" is impractical at the existing site. In other words, enforcing the "innovation forcing policy" for technologies developed in the future is not completely eliminated after a site is chosen and a facility is constructed – it merely limits what is "available" at the site.

We agree with the State Board that the literal interpretation of the language creates a conflict between the policy to compel innovation and the limited enforceability on "new and existing facilities." The conflict is, from a practical perspective, primarily a limit on changing the site as innovative new technologies and designs become available. However, the conflict between an innovation forcing policy and the limited authority to regulate new or expanded facilities is largely, if not completely avoidable by ensuring the absolute best in the first place. In fact, it is hard to imagine how a project proponent would be compelled to modify a facility that was designed and sited to be compatible with sub-surface intakes in the first place.

Further, it does not preclude requiring the best available technology at the time future project proposals are considered for a permit. It should *be clear that if alternatives to a SIG – that are better or equivalent at minimizing intake and mortality of marine life, but more "available" – are developed in the future, the identification of what is "best" may change for new or expanded facilities*.

C. *The concept of Best Available needs to be distributed throughout each of the elements under 13142.5(b).*

As noted above, we agree that the separate elements of section 13142.5(b) need to be considered individually and in combination. Nonetheless, each element – site, design, and technology - needs numerical or qualitative standards to ensure the "best available" mandate is enforced, and the combination needs guidance to ensure that all the elements collectively result in the "best available" scenario to achieve the intent of minimizing the intake and mortality of marine life.

The analysis starts with the "best available technology." It is undisputed that sub-surface wells eliminate the intake and mortality by a measurable degree. Subsurface infiltration galleries (SIG) effectively minimize intake and mortality of marine life to the same degree. The difference in minimizing marine life mortality between a subsurface well and a SIG is the potential mortality associated with construction and maintenance of a SIG. An open-ocean intake, whether screened or not, is not equal to a sub-surface intake and should not be considered "best available technology."

Next, the "best design" is one that is compatible with the best available technology—a sub-surface intake. A SIG can be constructed in modules or different configurations to safely supply much larger volumes of "source water" than a well. The "site" of a facility is "best" if it is compatible with the availability of a sub-surface intake. The currently considers other ancillary issues for what may be the "best site" for a facility – for example consolidating industrial facilities, avoiding special terrestrial habitats and species, co-locating with a sewage treatment plant for dilution water – but achieving the legislative intent of minimizing the intake and mortality of all forms of marine life mandates that the best site available is the site that is compatible with the best technology available.

Finally, the "best available mitigation" should also be considered within the context of the intent to minimize the intake and mortality of "all forms of marine life." "All forms of marine life" lost to the intake from a seawater desalination facility using an open intake with screens will likely include a diversity of species and life-stages that inhabit every marine habitat – from deep and shallow rocky reef, to deep and shallow sandy areas, to the water column itself. To the extent the entrainment and impingement of organisms includes those that inhabit estuarine or other inland waters, the scope of "replacement habitat" is virtually all habitat. This is why minimizing the intake and mortality of all forms of marine life in the first place must be enforced to the fullest extent – replacement of all these species is extremely difficult to ensure.

To ensure each 13142.5(b) element is the "best available", we offer the following revisions to the Amendment:

> *Chapter III.L.2.b.: The Regional Board shall require the best available site. Site is the general onshore and offshore location of a new or expanded facility. There may be multiple potential facility design configurations within any given site.*
>
> *Chapter III.L.2.c.: The Regional Board shall require the best available design. Design is the layout, form, and function of a facility, including the configuration and type of infrastructure, including intake and outfall structures.*
>
> *Chapter III.L.2.d.: The regional Board shall require the best available technology. Technology is the type of equipment, materials,* and methods that are used to construct and operate the design components of the desalination facility.**
>
> *Chapter III.L.2.e.: The Regional Board shall require the best available mitigation. Mitigation for the purposes of this section is the replacement of marine life or habitat that is lost due to the construction and operation of a desalination facility* after minimizing marine life mortality through the best available site, best available design, and best available technology measures.*

3. SUBSURFACE INTAKES ARE THE BEST AVAILABLE TECHNOLOGY.

A. *The State Board needs to be explicit that subsurface galleries are the best available technology.*

Subsurface intakes are not only the "preferred alternative" for minimizing the intake and mortality of marine life – but the best available technology for minimizing the intake and mortality of all forms of marine life. The Amendment implements Section 13142.5(b) by stating that when the regional board conducts a 13142.5(b) analysis, the board shall first analyze "…the best technology…to minimize intake and morality of marine life." This is where the terms "best available technology" end. Instead, Chapter III.L.2.d., states that the regional board "shall apply the following considerations in determining whether a proposed technology best minimizes intake and mortality of marine life." The SED also falls short of establishing subsurface intakes as the best available technology. Instead, SED Section 8.3.5., the State Board recommends Option 3, which would "establish subsurface intakes as the *preferred technology* for seawater intakes."

The State Board needs to be explicit that subsurface intakes are the best available technology for minimizing the intake and mortality of marine life. As the Board admits "[s]ubsurface intakes draw water from below the ground or seafloor using the sediment as a natural filter, *resulting in null impingement and entrainment* at the intake."[8] The Board goes on to state that a subsurface intake's elimination of impingement and entrainment "gives subsurface intakes a *significant environmental advantage* over surface water intakes…"[9] It is evident that the State Board believes subsurface intakes to be the superior technology for minimizing intake and mortality of marine life, yet fails to designate subsurface intakes as the best available technology in the Amendment.

The science community agrees with the State Board that subsurface intakes are a superior technology for minimizing the intake and mortality of marine life. Studies come to the same conclusion that subsurface intakes *eliminate* impingement and entrainment.[10] Similarly, subsurface intakes provide a natural barrier to suspended sediments, algal toxins, pathogens, dissolved or suspended organic compounds, harmful algal blooms, kelp, sea jellies, debris, or oil or chemical spills, and adult and juvenile marine organisms.[11]

The international community finds subsurface intakes to be the superior technology – beyond the benefit of nearly eliminating the intake and mortality of all forms of marine life. A 2013 survey led by international experts summarized important findings arguing strongly in favor of subsurface intakes:

> "The use of subsurface intake systems for seawater reverse osmosis (SWRO) desalination plants significantly improves raw water quality, reduces chemical usage and environmental impacts, decreases the carbon footprint, and reduces cost of treated water to consumers. Recent investigations of the improvement in water quality made by subsurface intakes show lowering of the silt density index by 75 to 90%, removal of nearly all algae, removal of over 90% of bacteria, reduction in the concentrations of [total and dissolved organic carbon], and virtual elimination of biopolymers and polysaccharides that cause organic biofouling of membranes. Economic analyses show that overall SWRO operating costs can be reduced by 5 to 30% by using subsurface intake systems. Although capital costs can be slightly to significantly higher compared to open-ocean intake system costs, a preliminary life-cycle cost analysis shows significant cost saving over operating periods of 10 to 30 years."[12]

There is no question that subsurface intakes are the best available technology. As such, the State Board should *be explicit that subsurface intakes – and specifically, subsurface infiltration galleries (as discussed below) – are the best available technology*.

B. There is a difference between subsurface wells and infiltration galleries.

Not all subsurface intakes are created equally. Subsurface wells and subsurface infiltration galleries are often grouped together under the umbrella of subsurface intakes. And while subsurface intakes collectively have the same operational benefits of eliminating impingement and entrainment, different types of subsurface intakes may have different construction and maintenance impacts resulting in the potential for marine life mortality or temporary displacement.

Subsurface wells (vertical beach wells, slant wells, and horizontal directionally drilled (HDD) wells) should be considered the ultimate technology for minimizing marine life mortality because there is no marine life mortality – both operational and during construction. Vertical beach wells consist of a series

[8] Supra note 3 at 58.
[9] Supra note 3 at 54.
[10] Missimer, T.M., N. Ghaffour, A.H.A. Dehwah, R. Rachman, R.G. Malvia and G. Amy. 2013. Subsurface intakes for seawater reverse osmosis facilities: Capacity, limitation, water quality improvement, and economics. Desalination. Vol. 322: 37 – 51.
[11] Supra note 3 at 54.
[12] Thomas M. Missimer et al., *Subsurface intakes for seawater reverse osmosis facilities: Capacity limitation, water quality improvement, and economics*, 322 Desalination 37 (2013).

of shallow wells near the shoreline that use beach sand or other geologic deposits to filter water.[13] Vertical wells are also a proven feasible technology for large-scale desalination facilities internationally. The Sur plant, in the country of Oman, is one of the largest desalination plants in the world with a pumping capacity of up to 21.2 MGD. The Sur plant is an example of a facility that uses subsurface intakes to successfully provide large volumes of water for desalination.[14]

HDD wells are a combination of vertical wells before moving horizontal underneath the seafloor. HDD well technology is used extensively by the oil exploration industry and has been used in desalination plants.[15] The 34 MGD San Pedro del Pinatar (Cartagena) plant in Spain, has been operational for several years, and is the largest desalination plant using HDD technology.[16]

Slant wells are drilled at an angle such that the wellhead and related infrastructure may be onshore, while the well extends below ocean sediments and draws seawater through the seabed. With this technology, the wellhead can be located some distance from the beach to minimize "loss of shoreline habitat, recreation access, and aesthetic value".[17] While this is a new and growing technology, the potential for slant wells is increasing and evidence of the advancement of slant wells and the minimization of the intake and mortality of all forms of marine life is already proven by the "Dana Point Pilot Project" under operation by the Municipal Water District of Orange County.

Subsurface wells have no construction impacts to marine life. All well construction begins at the beach, and then either goes directly down, goes down and then horizontally under the seafloor, or goes offshore at an angle. But regardless of what type of subsurface well is used the benefits of subsurface wells are the same – no marine life mortality during both construction and operation – making subsurface wells the ultimate technology for minimizing marine life mortality.

Subsurface infiltration galleries are different – they have construction and maintenance impacts possibly leading to marine life mortality. Infiltration galleries are typically constructed by removing soil or rock, placing a screen or network of screens within the excavated area, and then backfilling the area with a porous media to form an artificial filter around the screens. Infiltration galleries are usually located within the intertidal zone of the beach or in the seabed, thus leading to potential construction impacts on marine life. While galleries have the same operational impacts of subsurface wells – zero marine life mortality – galleries do have some construction and maintenance impacts making that technology the secondary alternative technology for minimizing marine life mortality.

Subsurface infiltration galleries offer flexibility to desalination proponents. Since galleries are designed to replace the natural substrate, they are considered to be "highly feasible."[18] The only drawback to galleries is they cannot be located in areas of "significant concentrations of mud and sediment, commonly associated with locations near the mouth of a river or stream" without planning for maintenance to ensure the galleries do not clog up and lose performance. [19] Galleries have proven feasible at the Fukuoka desalination plant in Japan.[20] The gallery has an intake flow of 27 MGD and has been operational since 2006.[21] Since the facility has become operational, the gallery system has not required cleaning, and the

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[13] Pacific Institute, Key Issues in Seawater Desalination in California: Marine Impacts, pg. 9 (2013).
[14] David, B., J. Pinot and M. Morrillon. 2009. Beach Wells for Large-Scale Reverse Osmosis Plants: The Sur Case Study. IDA World Congress at Atlantis, The Palm. Dubai, UAE. (7-12 Nov. 2009), available at http://www.cacoastkeeper.org/document/beach-wells-for-large-scale-reverse-osmosis-plants.pdf.
[15] Supra note 13, at 10.
[16] *Id*.
[17] Mackey, E.D., N. Pozos, J. Wendle, T. Seacord, H. Hunt, and D.L. Mayer. (2011). *Assessing Seawater Intake Systems for Desalination Plants*. Denver, Colorado: Water Research Foundation.
[18] Supra note 10.
[19] *Id*.
[20] Supra note 13, at 10.
[21] Pankratz, T. (2008). "Global Overview of Seawater Desalination Intake Issues." Presented at the Desalination Intake Solutions Workshop, October 16-17, Alden Research Laboratory, Holden, Massachusetts.

filter membranes have required only minimal maintenance.[22] The City of Long Beach, California has also been operating a pilot seabed infiltration gallery for several years. And several other systems around the world are in design, have been proposed for development, or are in operation. Interestingly, the Long Beach pilot gallery is located near the mouths of the Los Angeles River and San Gabriel River, and behind a long breakwater eliminating wave action. Despite the fact this location violates all the industry recommendations for where to construct a gallery to ensure performance and avoid maintenance, the pilot gallery appears to be operating without problem.

The State Board should *consider galleries and wells as two separate technologies with different performance standards*.

C. The feasibility of subsurface intakes should not preclude the State Board from determining that subsurface intakes are the best available technology for setting a performance standard.

Absolute feasibility should not preclude the State Board from making a determination that subsurface intakes are the best available technology. When determining that wet-cycle cooling towers were the best technology available for minimizing marine life mortality under the OTC Policy, the State Board did not find that wet-cooling technology were feasible everywhere. During the development of the OTC Policy, the State Board hired Tetra Tech Consultants to evaluate the technical and logistical feasibility of retrofitting 15 of the State's coastal OTC facilities with wet cooling systems.[23] The report developed conceptual retrofit designs based on each facility's design parameters and evaluated feasibility in terms of logistics (e.g., available space, interference with other critical systems or nearby infrastructure), operations (e.g., energy penalty), local use restrictions (e.g., noise or building codes) and aesthetic or environmental restrictions (e.g., conflicts with conservation plans, impacts to threatened and endangered species). The Tetra Tech report found that wet cooling was technically and logistically feasible at 12 of the 15 facilities.[24] Although wet-cooling towers were not believed to be feasible for all facilities, the State Board adopted that technology as the best technology available – setting a standard for OTC facilities to meet through either the Track 1 or Track 2 approach.

Setting the best available technology for desalination facilities is analogous to setting BTA under the OTC Policy. Subsurface wells may offer limited feasibility due to geological conditions; however, infiltration galleries are designed to work in most geological conditions. Beach galleries specifically have design potential for large scale facilities, and have been demonstrated to be able handle large volumes of water.[25] Therefore, beach galleries are analogous to wet-cycle cooling towers, they may not work in 100 percent of the locations, but they are feasible in the majority of sites along the California coast.

Like the OTC Policy, the State Board should *determine subsurface intakes to be the best available technology despite the possibility of infeasibility at some locations*.

D. Subsurface infiltration galleries should be the best available technology.

While subsurface wells are the ultimate technology for minimizing marine life mortality, subsurface galleries should be considered the best available technology for determining the performance standard. Notably, the OTC Policy did "not require a facility to adopt closed-cycle cooling [dry cooling towers] in order to comply, but instead contains a two track approach that acknowledges the ability of different technology options to achieve reductions that are *substantially similar* to closed-cycle wet cooling [wet cooling towers]."[26] The State Board did not set a OTC Policy performance standard of dry cooling towers

[22] Supra note 10.
[23] 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. 162 (May 2010), *available at* http://www.waterboards.ca.gov/water_issues/programs/ocean/cwa316/docs/final_sed_otc.pdf.
[24] *Id*.
[25] Supra note 3, at 55.
[26] Supra note 23, at 10.

because that technology was shown not to be feasible at many "existing" power plants – and hence not readily "available" for existing facilities. Dry cooling is analogous to subsurface wells because both result in a performance standard of zero marine life mortality but may not be feasible everywhere.

Alternatively, wet cooling towers is analogous to SIGs because both would result in minimal marine life mortality, but both establish a performance standard to be met by different technologies that achieve reductions that are *substantially similar*, or "functionally equivalent" to the ultimate technology. Moreover, galleries are similar to wet cooling towers because both technologies are feasible in most locations.

The same conclusions made in the OTC Policy should be drawn here for the Desalination Policy. First, the State Board should *be explicit that SIGs are the best available technology* for minimizing intake and mortality of all forms of marine life, and for their nearly universal "availability" compared to sub-surface wells. Further, the "performance standard" for a SIG is similar to a "wet cooling tower" in that the SIG can be assumed to have some mortality associated with the construction and maintenance – a minimally less protective performance standard than the absolute best (dry cooling towers in the case of power plants – and subsurface wells in the case of seawater desalination).

To ensure that the best available technology is being implemented to reduce the intake and mortality of marine life, we offer the following revisions to the draft Amendment Section L.2.d:

> *The regional Board shall require the best available technology. Technology is the type of equipment, materials,* and methods that are used to construct and operate the design components of the desalination facility.* The regional water board shall apply the following considerations in determining whether a proposed technology best minimizes intake and mortality of marine life:*
>
> *(1) Considerations for Intake Technology:*
>
> *(a) The best available intake technology for minimizing the intake and mortality of all forms of marine life is subsurface infiltration galleries. Subject to Section L.2.a.(2), the regional water board shall require subsurface* intakes, either subsurface wells or galleries, unless it determines that subsurface* intakes are "not feasible" based upon an analysis of the criteria listed below, in consultation with State Water Board staff.*

4. COST SHOULD NOT BE A FACTOR IN DETERMINING FEASIBILITY.

A. Performing a cost-analysis under a feasibility determination is illegal.

When determining the feasibility of the best available technology, cost should not be a factor. In *Entergy Corp. v. Riverkeeper, Inc*. (*Riverkeeper II*),[27] the Supreme Court found that § 316(b) authorizes the U.S. EPA to compare costs that are reasonably borne by the industry in determining the best technology available for minimizing environmental impact at cooling water structures. Importantly, however, U.S. EPA is not required to consider costs in conducting this analysis.[28] *Riverkeeper II* court held that the use of the term "Best Technology Available" prevents the use of inferior technologies, or what the court referred to as "second best."[29]

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[27] *Entergy Corp. v. Riverkeeper, Inc*.,[27] 129 S.Ct. 1498 (2009) ("*Riverkeeper II*").

[28] *Id*.

[29] *Id.* at 108. Congress's use of the superlative "best" in the statute cannot be read to mean that a facility that achieves the lower end of the ranges, but could do better, has complied with the law. The statutory directive requiring facilities to adopt the *best* technology cannot be construed to permit a facility to take measures that produce second-best results, especially given the technology-forcing imperative behind the Act. *Natural Res. Def. Council v. U.S. Envtl. Prot. Agency,* 822 F.2d 104, 123 (D.C. Cir. 1987). Insofar as U.S. EPA establishes performance standards instead of requiring facilities to adopt particular technologies,

The *Riverkeeper II* decision held that "the EPA's determination of BTA, cost-benefit analysis is not consistent with the requirement of § 316(b) that cooling water intake structures "reflect the best technology available for minimizing adverse environmental impact."[30] Most importantly, the court determined that "the statutory language requires that the EPA's selection of BTA be driven by technology, not cost."[31] "The Agency is therefore precluded from undertaking such cost-benefit analysis because the BTA standard represents Congress's conclusion that the costs imposed on industry in adopting the best cooling water intake structure technology available (i.e., the best-performing technology that can be reasonably borne by the industry) are worth the benefits in reducing adverse environmental impacts."[32] Therefore, the State Board cannot use a cost-benefit analysis to determine the BTA under 316(b). That is already adopted in the OTC Policy, and as discussed below, we believe the same conclusion should be upheld for desalination facilities under 13142.5(b). In brief, there is no legislative intent to include a cost-benefit analysis in the Clean Water Act section 316(b), nor is there any such intent evident in the Porter-Cologne Act §13142.5(b). They are similar and must be enforced similarly.

The State Board cannot authorize a site-specific determination of whether BTA is feasible using a cost-benefit analysis. In the Amendment, the State Board allows a cost-benefit analysis to determine whether subsurface intakes are infeasible. However, the *Riverkeeper* decision was clear that "[j]ust as the Agency cannot determine BTA on the basis of cost-benefit analysis; *it cannot authorize site-specific determinations of BTA based on cost-benefit analysis*."[33]

Riverkeeper II is explicit—an individual project's analysis of whether BTA is feasible cannot be based on a cost-benefit analysis. Therefore, we request the State Board ***remove any cost-benefit analysis in the best available technology "feasibility criteria."***

B. California's common law interpretation of statutes requires cost to not be a factor in determining feasibility of the best available technology.

California case law on an agency's statutory interpretation also suggests that the State Board should not allow cost to be a factor when determining feasibility for the desalination policy. When determining whether the State Board properly interpreted §13142.5(b) a court will "`take into account matters such as context, the object in view, the evils to be remedied, the history of the times and of legislation upon the same subject, public policy, and contemporaneous construction.'"[34] The State Board developed the OTC Policy with the intent to eliminate the unnecessary mortality of marine life from seawater intake; the same "evils to be remedied" are also present in the need for a desalination policy. Without a strong desalination policy that remedies the evils of marine life mortality, the OTC Policy is undermined. "`Consistent administrative construction of a statute over many years, particularly when it originated with those charged with putting the statutory machinery into effect, is entitled to great weight....'"[35]

The State Board's adoption of the OTC Policy set a precedent to not consider cost for the feasibility of minimizing the mortality of marine life. OTC facilities are currently expending great financial resources to implement and comply with the OTC Policy. This shows the OTC Policy was not the harbinger of economic collapse predicted by power plant operators. But maybe more importantly, if desalination facilities are allowed to continue withdrawing seawater in a way that replaces, if not exceeds, the intake and mortality of retired once-through-cooling – the entire investment will be offset and wasted.

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it must require facilities to choose the technology that permits them to achieve as much reduction of adverse environmental impacts as is technologically possible. *Riverkeeper II*, 475 F.3d at 108.

[30] *Id*.

[31] *Id*.

[32] *Id*.

[33] *Id*.

[34] *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.

[35] (*Gay Law Students Assn.* v. *Pacific Tel. & Tel. Co.* (1979) 24 Cal.3d 458, 491 [156 Cal. Rptr. 14, 595 P.2d 592], quoting *DiGiorgio Fruit Corp.* v. *Dept. of Employment* (1961) 56 Cal.2d 54, 61-62 [13 Cal. Rptr. 663, 362 P.2d 487].)

Finally, a court gives deference to the precedent of not allowing cost to be a factor in determining feasibility. "Lawmakers are presumed to be aware of long-standing administrative practice and, thus, the reenactment of a provision, or the failure to substantially modify a provision, is a strong indication the administrative practice was consistent with underlying legislative intent."[36] The California Legislature has not enacted any legislation that would require the State Board to use cost as a factor for determining feasibility under the OTC Policy, thus providing a strong legislative indication that cost should not be a factor, and the State Board should continue interpreting §13142.5(b) to not require cost to be a factor for feasibility under the desalination policy.

C. The Supreme Court's interpretation of federal statutes strictly limiting the inclusion of a cost analysis should be considered.

The Supreme Court interprets statutes narrowly when determining whether a cost-benefit analysis is necessary. A statutory canon provides that, unless a cost-benefit analysis is clearly authorized by a legislative body, agencies may not use it.[37] Instead, regulatory statutes should be read to require avoidance of environmental and other harm to the extent possible or feasible.[38]

Legislative bodies do not hide elephants in mouseholes. In *Whitman v. American Trucking Associations, Inc.*,[39] the Supreme Court held that section 109 of the Clean Air Act ("CAA") precluded consideration of the costs of implementation in setting National Ambient Air Quality Standards ("NAAQS"). Justice Scalia concluded that the consideration of cost to be authorized "in vague terms or ancillary provisions" is inappropriate—Congress "does not, one might say, hide elephants in mouseholes."[40] The burden was on industry to "show a [clear] textual commitment of authority to the EPA to consider costs in setting NAAQS," and industry failed to carry that burden.[41] In the absence of clear authority, the U.S. EPA is not only not compelled to consider costs; it has no authority to do so.[42] *American Textile* held that when a legislative body intends for an agency to use cost-benefit analysis it makes that clear in the statute.

D. The State Board's about-face change in existing policy to not consider cost when determining feasibility of best available technology is illegal.

Given *Riverkeeper II's* holding that a cost-benefit analysis is illegal, the State Board decided to not allow cost to be a factor in the OTC Policy's feasibility analysis. The State Board justified its position because it is "not appropriate to equate the substantial mortality of marine life associated with OTC to monetary costs of compliance." The only monetary value associated with impacts to marine life is based on commercial values of fish, which is completely inadequate to characterize the ecological effects of OTC."[43] As discussed above, similarities between the OTC Policy and the proposed Amendment justify applying this same reasoning to not allow cost to be a factor when determining feasibility.

If the Amendment allows cost to be considered in determining the feasibility of subsurface intakes, then it will be considered an illegal about-face change in existing policy. The State Board is given deference when interpreting the California Water Code, but the Board is bound the rule that an agency's statutory interpretation cannot be "arbitrary, capricious, or entirely lacking in evidentiary support, or contrary to

[36] *DeYoung v. City of San Diego* (1983) 147 Cal. App. 3d. 11; *quoting Horn* v. *Swoap* (1974) 41 Cal. App.3d 375, 382 [116 Cal. Rptr. 113]; 58 Cal.Jur.3d, Statutes, § 111, pp. 496-497.)
[37] Jonathan Cannon, The Sounds of Silence: Cost-Benefit Canons in *Entergy v. Riverkeepe*r, Inc., pg. 433 (2008), *available at* http://www.law.harvard.edu/students/orgs/elr/vol34_2/425-460.pdf.
[38] *See* William N. Eskridge, Jr. & Lauren E. Baer, *The Continuum of Deference: Supreme Court Treatment of Agency Statutory Interpretations from* Chevron *to* Hamdan, 96 GEO. L.J. 1083, 1201–02 (2008).
[39] *Whitman v. American Trucking Associations, Inc.*, 531 U.S. 457 (2001).
[40] *Id*. at 468.
[41] *Id.* at 468–71.
[42] *Id*.
[43] OTC Policy Final Response to Comments, pg. 66, *available at* http://www.waterboards.ca.gov/water_issues/programs/ocean/cwa316/docs/cwa316may2010/sed_final_g.pdf.

required legal procedures."[44] Courts apply an even higher standard to the required justification for changes such as the Amendment in question, where an agency revokes its previous rule or makes an about-face change in an existing policy. The level of deference afforded an administrative agency's rulemaking decision is defined in *Chevron v. Natural Resources Defense Council,* 467 U.S. 837 (1984) ("*Chevron*"). *Chevron* requires that when the State Board is implementing the Clean Water Act pursuant to its delegated authority, it must first ensure that its implementation decisions are not contrary to the clear language of the law. To the extent there is any ambiguity in the statute, the agency must interpret the law in a way that is not arbitrary and capricious or otherwise abuses the discretion afforded agencies by the Legislature:

> [I]f the statute is silent or ambiguous with respect to the specific issue, the question for the court is whether the agency's answer is based on a permissible construction of the statute.[45]
>
> [I]f, however, the court determines Congress has not directly addressed the precise question at issue, the court does not simply impose its own construction on the statute, as would be necessary in the absence of an administrative interpretation. Rather, if the statute is silent or ambiguous with respect to the specific issue, the question for the court is whether the agency's answer is based on a permissible construction of the statute. Id. If Congress has explicitly left a gap for the agency to fill, there is an express delegation of authority to the agency to elucidate a specific provision of the statute by regulation. Such legislative regulations are given controlling weight unless they are arbitrary, capricious, or manifestly contrary to the statute."[46]

The State Board has already decided that cost should not be a factor in determining the feasibility of the best available technology. The State Board decided in its OTC Policy that it "does not believe cost-benefit is appropriate at the programmatic level."[47] *Motor Vehicles Manufacturers Association v. State Farm*[48]explains that the State Board cannot reverse its decision that cost is not appropriate to determine feasibility. In State Farm, the Supreme Court held that:

> "revocation constitutes a reversal of the agency's former views as to the proper course. A settled course of behavior embodies the agency's informed judgment that, by pursuing that course, it will carry out the policies committed to it by Congress. There is, then, at least a presumption that those policies will be carried out best if the settled rule is adhered to." Accordingly, an agency changing its course by rescinding a rule is obligated to supply a reasoned analysis for the change beyond that which may be required when an agency does not act in the first instance."[49]

The State Board has decided that cost should not be a factor in determining feasibility of the best technology available. Reversing that course of action without a reasoned analysis will violate the "arbitrary and capricious" standard.

The State Board should remove "cost", including "lifetime cost", from the feasibility analysis for determining best available technology. The same reasoning applied in the OTC Policy is applicable here – that being the cost of compliance is easy to calculate, while the benefits of compliance are un-

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[44] *Stauffer Chemical Co. v. Air Resources Control Board,* 128 Cal.App.3d 789, 796 (1982); *see also City of Arcadia v. State Water Resources Control Board* 135 Cal.App.4th 1392, 1409 (2006) (applying writ of mandate standard under Cal. Civil Code §1085); *see also* 5 U.S.C. § 706(2)(A); *see also Se. Alaska Conservation Council v. Army Corps of Eng'rs (SEACC)*, 486 F.3d 638, 643 (9th Cir. 2007).
[45] *Id.* at 843.
[46] *Id.* at 843-844.
[47] Supra note 13, at 63.
[48] *Motor Vehicles Manufacturers Association v. State Farm*, 463 U.S. 29 (1983).
[49] *State Farm,* 463 U.S. at 41-42 (emphasis added).

calculable. California's statutory interpretation of Water Code Section 13142.5(b) demands that cost be removed from the feasibility determination. The Supreme Court's statutory interpretation of similar federal statutes further explains why cost should not be a factor. And if the State Board reverses its decision to consider cost as a factor, it would be considered an arbitrary and capricious interpretation of the law.

In order to uphold the OTC Policy and comply with the law, we request the State Board *remove cost from the feasibility analysis for the best available intake technology*.

5. THE FEASIBILITY DETERMINATION FOR SUBSURFACE INTAKES SHOULD BE NARROWLY DEFINED.

A. The OTC Policy should guide the development of the Desalination Policy.

The OTC policy should be used as guidance for the desalination policy because: (1) Section 13142.5(b) in the Water Code does not distinguish between withdrawals for cooling water and any other industrial withdrawal of seawater; (2) the impacts are comparable; (3) ensuring consistent treatment of similar environmental impacts is good policy; and (4) the desalination policy has the potential to undermine ecosystem protections gained by the OTC policy and other efforts to protect marine life, including the Marine Life Protection Act.

Impacts from OTC and desalination facilities are both immense and comparable, and both the OTC Policy and the Desal Policy should set similar standards to prevent undermining one another. For over thirty years, power plants in California have used open seawater intakes for OTC.[50] Several state agencies, including the California Energy Commission, State Lands Commission, Ocean Protection Council and State Board, have recognized that intake systems for once-through cooling have caused significant damage to California's marine ecosystems.[51] The ecological losses from open seawater intakes used for once-through cooling are estimated in the millions of dollars, and there are additional market losses of commercially and recreationally important species.[52] The concentration of open ocean intakes in a given area can also factor into the magnitude of environmental destruction. The cumulative impact of multiple open seawater intakes in bays could increase environmental damage when they are located in highly biologically productive regions that serve as nurseries for marine life.[53] It is particularly important that cumulative impact evaluations address all seawater intakes (OTC and desalination) in the zone where impacts may be actualized and incorporate research on the performance of Track 2 technologies for OTC alternatives. Finally, it is not uncommon for existing intakes to impact prey species that are not targeted by fisheries nor easily "monetized", but nonetheless serve a critical ecological function in the rebuilding and sustainable populations of our fisheries.

Currently, the proposed Track 2 of the desalination policy would allow open ocean intakes – the very same type of intakes addressed by the OTC policy (and in the cases where the desalination plants are co-located with the OTC power plants, it could be literally the very same pipe), and section L.2.d.1.c seems to imply that screens are an equivalent technology for minimizing the intake and mortality of marine life – including a provision that requires and equivalency test for screens rather than an equivalency test for sub-surface intakes.

The entrainment and impingement impacts of withdrawing large volumes of water is the same whether the seawater is ultimately used to cool a power plant or as source water for a desalination plant.[54] The

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[50]*See* CAL. STATE WATER RES. CONTROL BD., SCOPING DOCUMENT: WATER QUALITY CONTROL POLICY ON THE USE COASTAL AND ESTUARINE WATERS FOR POWER PLANT COOLING 78 (2008) [hereinafter 2008 SCOPING DOCUMENT].
[51]*See generally* CAL. OCEAN PROT. COUNCIL, RESOLUTION REGARDING THE USE OF ONCE-THROUGH COOLING TECHNOLOGIES IN COASTAL WATERS (April 20, 2006); FINAL SED, *supra* note 4, at 1.
[52]CAL. ENERGY COMM'N, ISSUES AND ENVIRONMENTAL IMPACTS ASSOCIATED WITH ONCE-THROUGH COOLING AT CALIFORNIA'S COASTAL POWER PLANTS: STAFF REPORT 31 (CEC-700-2005-013) (2005).
[53]*See id.* at 30-31.
[54] *See,* HEATHER COOLEY, PETER H. GLEICK & GARY WOLFF, DESALINATION, WITH A GRAIN OF SALT, A CALIFORNIA PERSPECTIVE

State Board already considered the efficacy of screened intakes in the OTC Policy and found that they were sub-par – and they are still sub-par regardless of the mesh size.

Further, the average volume of water withdrawn per day at once-through-cooled power plants is comparable to the anticipated volume of the proposed large-scale desalination plants in California.[55] Therefore, given entrainment and impingement impacts are potentially comparable – and possibly even greater – than OTC and would be regulated under the same California Water Code provision, *the legal interpretations of section CWA § 316(b) should be used to instruct how the State Board regulates desalination*.[56]

B. The Once-Through Cooling Policy and Clean Water Act §316(b) should be used to guide the State Board's definition of "infeasible."

Given the California Water Code does not define "feasible", the State Board should use the OTC Policy and CWA Section 316(b) as guidance. California Water Code § 13142.5(b) mandates desalination facilities use "the best available site, design, technology, and mitigation measures *feasible*…to minimize the intake and mortality of all forms of marine life." The Water Code does not define "feasible," and case law does not provide appropriate guidance. Likewise, the Clean Water Act does not provide a definition of "feasible" in relevant contexts, but the U.S. EPA has provided guidance as discussed below. Given the lack of a statutory definition of "feasible," the State Board has the administrative discretion to define "feasible" by referring to an appropriate analog. The statutory provision most directly analogous and appropriate for reference is Clean Water Act (CWA) § 316(b), because it addresses the same harmful open seawater intakes that certain project proponents propose to use for their coastal desalination facilities, and if a "new or expanded" power plant were proposed, the Porter-Cologne Act would be enforceable and therefore not only analogous, but rather exactly the same. The Once-Through Cooling Policy (OTC Policy) and associated 316(b) Guidance should be used to craft an appropriate definition of "not feasible" in the desalination policy.

California courts have stated that where a state and federal statutory scheme have the same "objectives and relevant wording", as they do here, California courts look to federal precedent for guidance.[57] The OTC Policy is based on federal CWA § 316(b), which has similar requirements as State Water Code § 13142.5(b), which applies to seawater withdrawals for "cooling water" and desalination facilities' "source water". For the OTC Policy the State Board developed a two-track approach, with Track 1 setting the best technology available standard, while Track 2 provided an alternative – but substantially the same – compliance track that could be pursued when an existing facility demonstrates to the State Water Board's satisfaction that Track 1 is "not feasible." The Desalination Amendment proposes a similar structure for the best available intake technology section. Section L.2.d.1.a. 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."

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1 (2006), *available at* www.pacinst.org/reports/ desalination/desalination_report.pdf.

[55] *See id.* at 31, tbl.4 (listing the capacity of proposed desalination plants); FINAL SED, *supra* note 12, at 33, tbl.2 (listing the average flow rate of water withdrawn from existing power plants).

[56] *See,* ANGELA HAREN KELLEY, *A Call For Consistency: Desalination, Open Ocean Intakes & the California Water Code,* 4 GOLDEN GATE U. ENVTL. L. J. 277 (2011). *Available at:* http://digitalcommons.law.ggu.edu/cgi/viewcontent.cgi?article=1062&context=gguelj

[57] *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.

In order to adequately protect our marine ecosystems from entrainment and impingement impacts and to ensure that any gains made through the OTC Policy and the MLPA are not undermined, the State Water Board should *use the 316(b) judicial guidance as guidance for the desalination policy – as the State has already done in the OTC Policy*.

C. CEQA's definition of "feasible" is not an appropriate definition for a State Board Policy aimed to minimize the mortality of marine life.

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."[58] 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.'"[59] "Because the EIR must be certified or rejected by public officials, it is a document of accountability."[60]

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."[61] Porter-Cologne expects sources of pollution, like desalination facilities, to "be regulated to attain the highest water quality which is reasonable."[62] CEQA and Porter-Cologne are not analogous statutes; their definitions are not analogous. Therefore, the State Board should not interpret "feasible" by using CEQA's definition. Rather, statutory interpretation, case law, and responsible public policy suggests the State Board *use the Clean Water Act, EPA and judicial guidance on 316(b), and the State Board's analogous OTC Policy to define "feasible" for the desalination policy*.

It is critical to articulate the reasons for defining "not feasible" consistent with the OTC Policy definition and not the CEQA definition as any deviation from the CEQA definition will be a change in course from what the State previously argued in *Surfrider Foundation v California Regional Water Quality Control Board*[63].

D. In-plant dilution should not be a factor in determining the feasibility of subsurface intakes.

"Augmented flow" for "in-plant dilution" is the intake of additional seawater for the purpose of in-plant dilution during the discharge of a desalination facility's brine waste. The Policy mistakenly includes in-plant dilution under the definition of augmentation flow, but they are two separate terms. "In-plant dilution" is the commingling of another source of water, typically treated wastewater, to dilute brine as it is discharged into the ocean. The distinction between "flow augmentation" ("additional intake volume") and other sources of water for in-plant dilution is, "flow augmentation" dilution water was pulled out of the ocean for the purpose of diluting brine, while other waters for in-plant dilution were already put to another use before being used for dilution, and these wastewaters do not add to the intake and mortality of all forms of marine life. This difference is critical because "augmented intake" (or "additional intake volume") severely increases the intake and mortality of marine life, causing a net negative benefit to marine life, while wastewater used for "in-plant dilution" results in no marine life mortality and results in a net benefit given its ability to dilute brine to natural levels.

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[58] *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].)
[59] *Id*.
[60] *Id*.
[61] *See* Cal. Water Code §§ 13000 *et seq.*
[62] *See* Cal. Water Code §§ 13000 *et seq.*
[63] Supra note 6.

It is already known that seawater intakes can be devastating to marine life, with the exception of sub-surface intakes. Taking additional seawater through surface intakes to dilute brine can result in a three-fold increase in the amount of marine life mortality. Take the Carlsbad facility as an example since they are currently permitted to conduct augmented flow for in-plant dilution. Carlsbad is a 50 MGD facility requiring about 105 MGDs of source water, but its NPDES permit allows for a 304 MGD seawater withdrawal due to in-plant dilution. The San Diego Regional Board set a dilution ratio for Carlsbad at 15.5:1, resulting in 199 MGDs [64] of additional seawater intake flow just to dilute the brine. Once Carlsbad becomes a stand-alone facility, if similar additional intake volumes were necessary to meet the dilution ratio in the draft, it would result in triple the amount of marine life mortality. And screens may provide some reduction in entrainment, but likely very little – and certainly not a reduced intake and mortality of "all forms of marine life."

Allowing additional intake volumes simply for in-plant dilution is illegal. Interpreting §13142.5(b) to allow flow augmentation for brine dilution is not wise policy and would lead to "mischief and absurdity." A court determining whether flow augmentation is permitted under §13142.5(b) would first "ascertain the intent of the Legislature so as to effectuate the purpose of the law."[65] The Legislature's intent is clear — it wants the best available technology to minimize the intake and mortality of all forms of marine life. In-plant dilution does not minimize the mortality of marine life if it requires increasing the intake volume; it exacerbates impingement and entrainment to dilute brine. A court also needs to interpret §13142.5(b) to give "a reasonable and common sense interpretation consistent with the apparent purpose and intention of the lawmakers, practical rather than technical in nature, which upon application will result in wise policy rather than mischief or absurdity."[66] Statutes should be interpreted to produce reasonable results and words should be interpreted to "promote rather than defeat" the law's purpose and policy.[67] Allowing a project proponent to increase its intake of seawater – impinging and entraining marine life in the process – to dilute brine is not a common sense approach to minimizing mortality; and allowing this dilution alternative to be a factor for determining feasibility would lead to mischief and create an absurd policy position.

The State Board has already acknowledged that increased flow volumes for dilution of the discharge is illegal. The State Board's 2010 Triennial Review stated that "with regard to intake impacts, the Ocean Plan does not authorize flow augmentation for dilution purposes."[68] The State Board goes on to explain that the Triennial Review "identified plans for a limitation on in-plant dilution of brine prior to discharge."[69] As the State Board admits "diluting brine prior to discharge by taking in additional source water from a surface intake may reduce discharge mortality; however, there would be increased intake mortality that might offset any benefit of diluting the brine prior to discharge."[70] It is clear from the expert reports that the potential increased mortality through screened intakes will be far greater than any potential entrainment mortality from diluting brine with properly designed diffusers. And compared to comingling with wastewater for in-plant dilution, the additional intake and mortality would <u>**not**</u> be offsetting any intake and mortality. Therefore, augmented intake (additional intake flow volume) for the purpose of in-plant dilution should be explicitly prohibited in the Desalination Policy to prevent backsliding from the Ocean Plan's current prohibition.

Subsurface intakes for additional flow volume may be considered in determining practices for rapid dilution, so long as the additional volume from the subsurface intake is not a factor in determining

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[64] Regional Water Quality Control Board, San Diego, Carlsbad Desalination NPDES Permit, pg. 6.
[65] *Select Base Materials* v. *Board of Equal.* (1959) 51 Cal.2d 640, 645 [335 P.2d 672]; *California Teachers Assn.* v. *San Diego Community College Dist., supra,* 28 Cal.3d 692, 698; *Moyer* v. *Workmen's Comp. Appeals Bd.* (1973) 10 Cal.3d 222, 230 [110 Cal. Rptr. 144, 514 P.2d 1224].
[66] *United Business Com.* v. *City of San Diego* (1979) 91 Cal. App.3d 156, 170 [154 Cal. Rptr. 263]; *City of Costa Mesa* v. *McKenzie* (1973) 30 Cal. App.3d 763, 770 [106 Cal. Rptr. 569].
[67] *Granberry* v. *Islay Investments* (1984) 161 Cal. App.3d 382, 388 [207 Cal. Rptr. 652].
[68] State Water Resources Control Board, Triennial review, pg. 6 (2010).
[69] Supra note 23, at 22.
[70] *Id*. at 83.

whether subsurface intakes are "not feasible." For example, if a plant is designed to produce a volume of product water that is feasible using subsurface intakes, but not feasible if the additional "dilution water" is added to the plant design – the facility should be mandated to utilize best available technology for the "source water" and alternative discharge technologies and practices to ensure rapid dilution of the brine discharge. To consider sub-seafloor intakes "not feasible" due to the volume of water necessary to properly dilute the brine discharge, above what is necessary for "product water", would amount to a violation of the Water Code's mandate to "site and design" the intake to minimize the intake and mortality of all forms of marine life.

"Augmented intake volume" for "in-plant dilution" from open or screened surface intakes should be prohibited. This additional volume of intake water volume exacerbates the marine life mortality – in contradiction of §13142.5(b)'s clear read to minimize the intake and mortality of all forms of marine life. Further, as shown in the report provided to the State Board by the expert panel on brine discharges, there are alternative technologies and practices that provide rapid dilution of brine discharges without the need for "augmented intakes" and the additional marine life mortality from this proposed practice. Therefore, *increased intake volume for "in-plant dilution" should be expressly prohibited, and expressly prohibited as a consideration in determining whether subsurface intakes are feasible.*

E. Co-location with a wastewater treatment facility should not be used to demonstrate infeasibility.

As with nearly all of the criteria in L.2.d.1.a.1, whether a facility is sited next to a wastewater treatment facility should have no bearing on whether subsurface intakes are a feasible means of minimizing the intake and mortality of marine life. However, the State Board states in Section L.2.d.1.a.i. that a factor to be considered in the analysis of whether meeting the preferred alternative of sub-surface intakes is feasible is "co-location with sources of dilution water." How does co-location with sources of dilution water the best available technology any more or less feasible? The State Board explains that:

> "Siting a desalination facility in close proximity to a wastewater dilution source can prevent a facility from discharging toxic concentrations of brine into ocean waters and reduce the cost of constructing conveyance pipes to transport the brine to the wastewater facility or vice versa."[71]

We agree with this statement, but it has nothing to do with whether the best available technology to "minimize the intake and mortality of all forms of marine life" is feasible. First and foremost, it is critical that the best available technology be implemented to reduce marine life mortality. The ability to co-mingle treated wastewater with brine discharge should not take precedent over requiring the best available technology to minimize intake and mortality. Regardless, a facility's proximity to a wastewater treatment facility has no bearing on whether the best available technology is feasible to achieve the purpose of section 13142.5(b). Therefore, we request the State Board *remove from consideration "co-location with sources of dilution water" as a factor to be considered in whether subsurface intakes are feasible*.

As explained further in sub-section 6 below, any other criteria unrelated to the directive to "minimize the intake and mortality of all forms of marine life" is equally irrelevant for determining whether an alternative can feasibly attain that goal. And as discussed below, cost should not be a factor in determining "not feasible." *It is critical for clarity and consistent enforcement that the Amendment include a definition of "not feasible."*

F. The Desalination Policy needs a feasibility definition, not a list of criteria project proponents can use to explain why they cannot achieve the best available technology standard.

The proposed Desalination Policy does not contain a definition of "infeasible", but rather a laundry list of criteria to be evaluated by regional boards. Section L.2.1.a. states that subsurface intakes are required

[71] *Id*. at 64.

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

> (1) Hydrologic and oceanographic conditions;
> (2) Presence of sensitive habitats and species;
> (3) Energy use;
> (4) Impact on aquifers, local water supply, and existing users;
> (5) Desalinated water conveyance, existing infrastructure, co-locations with sources of dilution water;
> (6) Design constraints;
> (7) Project life cycle cost; and
> (8) Other site specific and facility factors.

These eight factors are not only vague and open-ended, allowing project proponents to excuse themselves from the best available technology standard, but they do not provide an actual definition of feasible under Water Code Section 13142.5(b). Black's Law Dictionary defines feasible as "capable of being accomplished."[72] Other than criteria number one – hydrologic and oceanographic conditions – how do any of the other criteria determine whether subsurface intakes are feasible? All of the other criteria may or may not be appropriate to determine the best available design, or the best available site -- but criteria two through seven do nothing to determine whether the best available "technology" is feasible for minimizing the intake and mortality of marine life. Each of these elements should be removed from Section L.2.d.1.a.i., and replaced with a proper definition of "not feasible" consistent with the definition in the OTC Policy.

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

First, the State Board defined the term "available" in regards to "best technology available." The State Board determined that "the technology must be "available" in the sense that it is *technically* and *logistically* feasible at *most facilities* subject to the proposed Policy…"[73] 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."[74]

For the reasons discussed above, the State Board should use the OTC Policy's definition of "not feasible" as a starting place for a similar definition in the Desalination Policy. In order to provide an accurate definition of "infeasible", we suggest the following revisions to Chapter III.L.2.d.(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*

[72] Black's Law Dictionary, available at http://thelawdictionary.org/feasible/.
[73] Supra note 23, at 67.
[74] Supra note 2, at 19.

local regulations, etc. Cost is not a factor to be considered when determining feasibility. Flow Augmentation for brine dilution is not a factor to be considered when determining feasibility. ~~*, presence of sensitive habitats,* presence of sensitive species, energy use; impact on freshwater aquifers, local water supply, and existing water users; desalinated* water conveyance, existing infrastructure, co-location with sources of dilution water, design constraints (engineering, constructability), and project life cycle cost. Project life cycle cost shall be determined by evaluating the total cost of planning, design, land acquisition, construction, operations, maintenance, mitigation, equipment replacement and disposal over the lifetime of the facility, in addition to the cost of decommissioning the facility. In addition, the regional water board may evaluate other site- and facility-specific factors.*~~

Furthermore, we suggest the following addition to Chapter III.L.2.d.(1)(a):

iii. If subsurface wells or galleries are determined to be "not feasible," then the regional board shall allow an alternative technology, or suite of technologies and other measures other than after-the-fact restoration, which achieves a minimization of the intake and mortality of all forms of marine life that is equivalent to the performance of subsurface infiltration galleries.

6. SCREENS ARE NOT THE BEST AVAILABLE TECHNOLOGY AND WILL UNDERMINE THE OTC POLICY.

A. General Considerations

As noted throughout these comments, the draft raises concerns about screened surface intakes. The draft Amendment section on "Technology", section L.2.d., is vague and needs to clarify that screens of any slot size are not the best technology for minimizing the intake and mortality of all forms of marine life. The draft should identify Seafloor Infiltration Galleries (SIG) as the best technology available, and use that determination to establish a reasonable "performance standard."

Further, section L.2.d. should remove any language that implies screens are the standard for an "equivalency test." An equivalency test, as used in the OTC Policy and the *Riverkeeper* case law, is to ensure that any alternative to the "best technology" meets a reasonable range of performance based on the performance of the "best technology." The State Water Board considered the efficacy of screened intakes for minimizing the intake and mortality of marine life during the OTC Policy creation and found them inferior. In fact, the OTC Policy only allowed the use of screens if, in combination with other measures, they could meet the performance standards established by the "best available technology." Since the adoption of the OTC Policy, there has not been any new technological advances or scientific studies to suggest that intake screens are best available technology. If anything, recent studies have only confirmed that the efficacy of screened surface intakes is still questionable and likely less than what was assumed when the OTC Policy was adopted.[75]

This amendment to the Ocean Plan for desalination needs to be consistent in the consideration of screen efficacy as the adopted approach in the OTC Policy.

B. Fine Mesh Screens Are Not Best Technology Available.

As the State Board previously concluded in the OTC Policy that establishing statewide standards for best technology available" to minimize intake and mortality from seawater intakes not only ensures enforcement of the California State Water Code, but that it is also the best way to ensure uniform application of the law by the Regional Boards and statewide protection of marine ecosystems. While it is

[75] *See* discussion of scientific studies CAL. STATE WATER RES. CONTROL BD.,, DRAFT STAFF REPORT INCLUDING THE DRAFT SUBSTITUTE ENVIRONMENTAL DOCUMENTATION 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, 52 (2014) [hereinafter "SED"] *available at:* http://www.swrcb.ca.gov/water_issues/programs/ocean/desalination/docs/draft_desal_sed_070314.pdf (accessed August 13, 2014).

appropriate for Regional Boards to review individual desalination permit applications, the State Board should provide a clear a set of standards for the Regional Boards in order to ensure statewide consistently. As discussed above in Section E, the draft Desal Policy does not establish BTA and instead leaves interpretation as to what constitutes BTA up to individual Regional Boards. This type of piecemeal approach could certainly lead to vastly different types of technology used as well as inconsistent levels of protection of marine life.

Perhaps the most obvious example is the potential for the Desal Policy to allow surface intakes with fine-mesh screens. Despite the fact that the Substitute Environmental Document ("SED") concludes "[s]ubsurface intakes are more protective of marine life than surface water intakes"[76] the draft Desal Policy fails to designate subsurface intakes as BTA and instead leaves open the possibility of a new desalination plant receiving permits to use surface intakes with screens of a yet-to-be determined slot size.

Fine mesh screens have not been proven to be a reliably effective method of reducing entrainment and impingement and should not be considered best technology available for minimizing intake and mortality of all forms of marine life. While wedgewire screens may potentially reduce impingement mortality and entrainment loss of juvenile and adult fish to a certain degree, it's important to recognize that "intake-related mortality will be site and species-specific."[77] Further, as the SED noted in a report cited by the US EPA[78], the efficacy of minimizing impingement mortality is conditional: "0.05 mm screens have been used on traveling screen and single entry, double exit screens. These systems are successful if the facilities apply a safe return of impinged organisms." There is nothing in the draft Amendment speaking to, much less requiring the safe return of impinged organisms and the data collected in recent screen studies is evidence that impingement is occurring and may be a function of both mesh size and/or intake velocity. The State Board should *include an analysis in the SED describing the relationship between mesh size and intake velocity to the efficacy of minimizing the intake and mortality of all forms of marine life – whether through entrainment and/or impingement mortality***.**

The efficacy of screening technology remains uncertain and thus should not be considered BTA. As the SED notes "(s)ome studies on screen efficacy are contradictory. The majority of studies that examine the efficacy of wedgewire screens only looked at impacts on ichthyoplankton; yet there are many other organisms that are abundant in the water."[79] California's marine ecosystems are complex and support incredibly diverse species that are "extremely valuable from an ecosystem standpoint as well as being a key contributor to California's economy."[80] Allowing new desalination plants to build or continue the use of surface intakes with fine mesh screens is not the best way to achieve the directive of the Water Code to protect all forms of marine life.

In setting BTA for ocean open intakes for OTC Policy, the State Board had the particular challenge of evaluating technology for plants that already existed. And even in that case, fine mesh screens were not determined to be BTA. Here, the State Board has the opportunity to set BTA for desalination plants that have not yet been built. As described in Section E above, subsurface intakes have not been scientifically proven to protect against both entrainment and impingement, and thus subsurface technology should be determined to be BTA.

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[76] CAL. STATE WATER RES. CONTROL BD.,, DRAFT STAFF REPORT INCLUDING THE DRAFT SUBSTITUTE ENVIRONMENTAL DOCUMENTATION 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, 52 (2014) [hereinafter "SED"] *available at:* http://www.swrcb.ca.gov/water_issues/programs/ocean/desalination/docs/draft_desal_sed_070314.pdf (accessed August 13, 2014).

[77] *Id* at 52.

[78] See Desal amendment Staff Report at p 49, "Recent Developments in Techniques to Protect Aquatic Organisms at the Intakes of Steam-Electric Power Plants."

[79] Supra note 3, at 52.

[80] *Id*. at 36.

C. If Fine Mesh Screens Are Used, Screen Size Should be .5 mm or Smaller (if they are shown not to exacerbate impingement mortality).

The Amendment currently has a placeholder for the recommended screen size and the State Water Board is seeking input on whether the screen size should be designated as .5mm, .75mm, or 1.0mm.[81] Although the State Water Board is seeking comment on screen size, it's own conclusions in the SED seem to give the answer. The SED states: "Section 13142.5(b) requires that the Ocean Plan consider all forms of marine life, regardless of size. Subsurface intakes are more protective of marine life than surface water intakes. However, when subsurface intakes are proven to be infeasible, small slot-sized screens will protect larger juvenile and adult organisms (particularly fishes) from entrainment."[82] But that is not the end of the question. There may still be impingement of organisms that result in mortality, and the impingement rate may be dependent on slot size and intake velocity. Therefore, we think that the reduction in entrainment may not equate to a reduction in mortality.

While studies have concluded that "effectiveness of both fine-mesh screens and wedgewire screens in reducing entrainment is a function of the screen slot size" and that "(e)ntrainment decreases as the screen slot size decreases and the size of the fish increases"[83] the size of the fish is not the only factor. The effectiveness of a given screen in preventing entrainment is largely dependent on the species, and specifically on their head capsule dimensions.[84] Different species have different morphology that play an important role in whether a given screen size will protect against entrainment. For example, fish such as anchovies and flatfish that are laterally compressed have higher entrainment rates than fish such as sculpines and rockfishes of the same length because anchovies and flatfish have smaller head capsule dimensions.[85] Thus the State Water Board should be cautious when presented with arguments that larger screen sizes have proven effective in preventing entrainment of a certain species and should remember the Water Code charge to reduce intake and mortality "all forms of marine life."

The velocity control is also an important factor to consider when evaluating whether mesh and wedgewire screens are effective at reducing impingement. We are concerned that the draft Amendment sets intake velocity at 0.5 foot per second for screened surface intakes. That is an intake velocity set by EPA to minimize the impingement of marine life that have developed swimming capability. Tests have shown that most fish can swim away from that velocity and avoid impingement on the screen. However, that isn't the case for developing organisms who are exposed to entrainment; "(m)ost larval and juvenile organisms are not developed enough to swim and avoid entrainment and may be susceptible to entrainment through even small slot sized intake screens"[86] Because of this reduced mobility, we are concerned that the proposed 0.5 foot per second intake velocity limit will not protect larval and juvenile marine life from impingement. Because of this reduced mobility, we are concerned that the proposed 0.5 foot per second intake velocity limit will not protect larval and juvenile marine life from impingement. Further, the efficacy of "cylindrical" screen housings is in large part a function of the difference between "approach velocity" and "intake velocity." That is, if the approach velocity is significantly greater than the intake velocity, the organisms may be swept of the screen housing. But it would seem extremely rare

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[81] *See* Draft Desal Policy Section I.2. (d)(1)(c)ii.
[82] *Id*. at 52.
[83] *Id*. at 50 *quoting* ELECTRICAL POWER RESEARCH INSTITUTUE, FIELD EVALUATION OF WEDGEWIRE SCREESN FOR PORTECTING EARLY LIFE STAGES OF FISH AT COOLING WATER INTAKES, REPORT NO.1010112 (2005); TENERA ENVIRONMENTAL, EVALUATION OF FINE-MESH INTAKE SCREEN SYSTEM FOR THE DIABLO CANYON POWER PLANT, PREPARED FOR BETCHEL POWER CORPORATION JUOTC PROJECT (2013); Weisberg, S.B. et al. *Reductions in Ichthyoplankton Entrainment with Fin-Mesh, Medge-Wire Screens*, 7 NORTH AMERICAN JOURNAL OF FISHERIES MANAGEMENT, 386-393 (Issue 3).
[84] EVALUATION OF FINE-MESH INTAKE SCREEN SYSTEM FOR THE DIABLO CANYON POWER PLANT, PREPARED FOR BETCHEL POWER CORPORATION JUOTC PROJECT (2013).
[85] *Id*.
[86] CAL. STATE WATER RES. CONTROL BD., DRAFT STAFF REPORT INCLUDING THE DRAFT SUBSTITUTE ENVIRONMENTAL DOCUMENTATION 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, 36 (2014) [hereinafter "SED"] *available at:* http://www.swrcb.ca.gov/water_issues/programs/ocean/desalination/docs/draft_desal_sed_070314.pdf (accessed August 13, 2014).

to find a circumstance in the ocean where the approach velocity would be faster than the intake velocity.

California's diverse marine species and habitats support complex ecosystems with high diversity. "These biologically diverse species are extremely valuable from an ecosystem standpoint as well as being a key contributor to California's economy."[87] *If the State Board decides to allow screened surface intakes, then a slot screen size of .5 mm or smaller should be required after a showing that they can be designed to safely return impinged organisms.*

7. DESIGN CAPACITY NEEDS TO BE THE BEST AVAILABLE DESIGN.

A. Design capacity is a critical consideration for minimizing the intake and mortality of marine life.

It is critical that the State Board include design capacity as a factor to be considered under the best available design analysis. The State Board must interpret every factor in §13142.5(b) and harmonize each factor. Statutory interpretation dictates that "[s]ignificance should be attributed to every word, phrase, sentence and part of an act in pursuance of the legislative purpose, as 'the various parts of a statutory enactment must be harmonized by considering the particular clause or section in the context of the statutory framework as a whole.'"[88] Again, Section 13142.5(b) requires the best available design be used to minimize the intake and mortality of marine life — designing a facility with a production design capacity to accommodate subsurface intakes is the best available design.

In interpreting § 316(b), the U.S. EPA has determined that the technology, design, location, and capacity, must be assessed in conjunction with the other factors. The State Board agrees with the U.S. EPA's statutory interpretation, and finds the same reading is appropriate under Section 13142.5(b).[89] Chapter III.L.2.a.(2). states that "the regional water board shall consider all four factors collectively, and include the *best combination* of alternatives that in combination minimize intake and mortality of marine life."

To understand how each of the four factors should best be combined, the State Board should look to the U.S. EPA for guidance. The U.S. EPA General Counsel has provided guidance to the State Board on using design capacity to minimize the intake and mortality of marine life:

> "Since the magnitude of entrainment damage is frequently a function of the amount of water withdrawn, the only way that massive entrainment damage can be minimized in many circumstances is by *restricting the volume of water withdrawn*..."[90]

The EPA has determined that restricting the volume of water withdrawn by a facility is one appropriate way to meet the BTA standard of CWA § 316(b).[91] The State Board should make the same determination and incorporate design capacity as the best available design.

The technical feasibility of subsurface intakes and infiltration galleries has already been demonstrated internationally– including in nations with standards similar to the Clean Water Act's BAT standard.[92] As the State Board has already concluded: "[b]each galleries specifically have design potential for *large*

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[87] Supra note 3, at 36.
[88] *Moyer* v. *Workmen's Comp. Appeals Bd., supra,* 10 Cal.3d 222, 230.
[89] See Draft Policy, Chapter III.L.2.a.(2). "Then the regional water board shall consider all four factors collectively, and include the best combination of alternatives that in combination minimize intake and mortality of marine life."
[90] Accord Decision of the General Counsel No. 63, at p. 381, n. 10; In re Public Service Company of New Hampshire, 10 ERC at 1262 (Decision of Administrator of EPA). See also Supplement to Background Paper No. 3 (September 3, 1996), p. A-3; Background Paper No. 3(April 4, 1994), p. 2-3; EPA 1976 Development Document, p. 153.
[91] *See* also In re Public Service Company of New Hampshire, 10 ERC at 1264 (Decision of Administrator of EPA); EPA 1976 Development Document, p. 178; EPA Draft CWA § 316(b) Guidance (May 1, 1977), p. 13 ("Reducing cooling water flow is generally an effective means for minimizing potential entrainment impact . . . [and i]n fact, . . . may be the only feasible means . . .where potentially involved organisms are in relatively large concentration and uniformly distributed in the water column").
[92] *See* David Boris, Beach Wells for Large-Scale Reverse Osmosis Plants: The Sur Case Study, IDA World Congress (2009).

scale facilities, and have been demonstrated to be able handle large volumes of water."[93] With infiltration galleries demonstrated to be technically feasible, the State Board should require flow restrictions to a facility's design capacity to achieve BAT. In fact, designing a facility to produce a certain amount of freshwater, and consequently withdrawing a certain amount of seawater, may be the only "design" consideration with any relevance to the goal of minimizing the intake and mortality of all forms of marine life.

Statutes relating to the same subject matter should be read together in a manner that harmonizes them whenever possible.[94] Therefore, the State Board should *include design capacity as the best available design for minimizing the intake and mortality of marine life*.

B. The Best Available Design accommodates the Best Available Technology.

The best design capacity should be defined as the maximum amount of produced water achieved using the best available technology at the best available site – because that will best minimize the intake and mortality of marine life. Statutory interpretation requires the State Board to interpret and harmonize every factor in §13142.5(b).

Zero design capacity is not the best available design. There is an argument to be made that if design capacity was included under the best available design analysis, then the best available design would be a zero MGD desalination facility. We agree this would be an absurd result, but disagree that the best available design is a zero design capacity. Instead, the best available design is that which is compatible with a feasible output from subsurface intakes -- thus establishing a design performance standard of zero marine life mortality but not zero production. As noted before, "minimize" does not necessarily mean reduce to zero – bu reducing to zero, or close to it, is certainly "minimizing." This standard can be met by implementing the best available technology, which would not result in a zero MGD capacity facility. As illustrated in facilities elsewhere, subsurface intakes can supply relatively large desalination facilities. And recent discussions over the feasibility of a SIG for the proposed Huntington-Poseidon facility have concluded that a "Fukuoka-style" SIG can be replicated in modules to produce more source water than a single SIG.

As discussed above, subsurface wells and subsurface infiltration galleries have both been demonstrated to be feasible technologies for "large scale" desalination facilities. To ensure the best available design does not achieve absurd results, we request the State Board *define design capacity as the maximum amount of capacity achieved using the best available intake technology at the best available site for that technology*.

C. Regulating the design capacity of a facility does not impose limits on local water supplies.

Requiring project proponents to consider design capacity as the best available design does not limit local jurisdictions in their selection water supplies. Water supply agencies are granted the authority to develop water projects – but not water projects that violate State or federal law. For example, a water agency could not argue that enforcement of the Endangered Species Act, if it interfered with a water development project in any way, would constitute an intrusion on their sole authority[95]. The only difference here is that the Porter-Cologne Act, as codified in the Water Code section 13142.5(b), specifically mandates the regulation of seawater withdrawals for these facilities. The Ocean Plan amendment is simply enforcing State law, and to the extent it may require modification of a water development project, it is not an intrusion on a water agencies sole authority. As drafted, and even with our requested edits, the water agency still has the opportunity to develop a seawater desalination facility and is only constrained by the mandates of State law – if they are constrained at all.

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[93] Supra note 3, at 55.

[94] *Dyna-Med, Inc.* v. *Fair Employment & Housing Com.* (1987) 43 Cal.3d 1379, 1386-1387 [241 Cal. Rptr. 67, 743 P.2d 1323].

[95] See eg; "Bay Delta Conservation Plan"

Further, as discussed in the introduction to this comment letter, California has ample alternative water supplies to be implemented before desalination is necessary. Furthermore, a plain reading of Section 13142.5(b) finds the Legislature did not intend water supply concerns to be considered when conducting the "best available" analysis. And finally, a desalination facility's ability to take seawater is not a right, but rather a privilege that the public provides. The public trust doctrine provides that tidelands, the beds of navigable waterways and other natural resources are held in trust for the public by the state.[96] The state holds these rights in trust for the public. Thus, design capacity restrictions relating to public trust rights of seawater cannot conflict with a local government's authority over water supplies, because the project proponent never had the right to use the property for non-public trust uses.[97]

While placing design capacity restrictions on the intake of seawater does not conflict with any local authority, we understand the State Board's concern. To alleviate concern, we suggest the State Board be clear that reduced design capacity be limited to public trust seawater influent. The State Board should *be explicit that the design capacity for the intake of seawater shall be reduced to accommodate the best available technology, but project proponents can increase its overall capacity from other source water, such as comingling treated wastewater with the seawater intake*.

As such, we recommend the following revisions to Chapter III.L.2.c.:

> *The Regional Board shall require the best available design. Design is the size, layout, form, and function of a facility, including the production capacity, and the configuration and type of infrastructure, including intake and outfall structures. ~~The regional water board shall require that the owner or operator perform the following in determining whether a proposed facility design best minimizes intake and mortality of marine life:~~*

8. THE STATE BOARD SHOULD RECONSIDER THE CURRENTLY PROPOSED DESIGN CRITERIA TO ENSURE THE BEST AVAILABLE DESIGN IS ACHIEVED.

A. The owner or operator of the desalination facility should not be responsible for determining the best available design.

The proposed "best available design" analysis is severely lacking any real consideration of the best available design for minimizing the intake and mortality of marine life. Section L.2.c. states that the "regional water board shall require that the owner or operator perform the following in determining whether a proposed facility design best minimizes intake and mortality of marine life." First, the draft Amendment should clarify that the information provided by project permit applicants to the Regional Boards is to be carefully scrutinized. The draft needs clear direction, and elimination of any ambiguity or implication that a project proponent's own analysis of alternative designs is not afforded undue weight. We have seen in the past that allowing the project proponent to narrowly define the purpose of the project and, then design their facility to best accommodate their own self-defined limited purpose, leads to permits that do not meet the requirements under 13142.5(b).

We request the State Board *require regional boards to determine the best available design for a proposed project, in consideration of the specific purpose to design a facility that is compatible with the best available technology at the best available site to collectively minimize the intake and mortality of all forms of marine life.* Any other project goal or project design to meet that goal, would not meet the mandates of Water Code section 13142.5(b).

B. Design Factor (1) is a site consideration already analyzed under the "best available site" determination.

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[96] *Illinois Central Railroad Co. v. Illinois,* 146 U.S. 387, 452-4 (1892).
[97] *See National Audubon Society v. Superior Court,* 33 Cal. 3d 419, 440 (1983).

Avoiding sensitive habitats and sensitive species is a site consideration—not a design consideration. Section L.2.c.1. requires the owner or operator at each potential site to "analyze the potential design configurations of the intake, discharge, and other facility infrastructure to avoid impacts to sensitive habitats and sensitive species." That sounds a lot like consideration (2) of the site analysis: "[a]nalyze the feasibility of placing intake, discharge, and other facility infrastructure in a location that avoid[s] impacts to sensitive habitats and sensitive species." We agree that the best available site analysis should avoid impacts to sensitive habitats and sensitive areas, but repeating the same consideration under the design analysis is inappropriate and does not meet the legal requirements of best available design. There is only one "design" criteria we can think of that would improve the goals of the law beyond what a proper site and technology would achieve – design the production capacity to ensure compatibility with the best site and technology.

We request the State Board *remove Factor (1) from the best available design analysis* since it is already – and most appropriately – addressed in the best available site analysis.

C. Design Factor (2) is a technology consideration already analyzed under the "best available technology" determination.

Section L.2.d preamble clarifies that: "Technology is the type of equipment, materials and methods that are used to construct and operate the 'design' components…." Analyzing intakes in order to minimize the Area Production Foregone is already a consideration under the best available technology consideration. Section L.2.d.1.a. already requires sub-surface intakes if feasible, and sub-surface intakes are already accepted as the best technology in minimizing the intake and mortality of marine life (measured by APF). Alternatively, section L.2.d.1.c.ii.states that in "order to reduce entrainment, all surface water intakes must be screened with a [0.5 mm/0.75mm/1.0mmm] or smaller slot size screen when the desalination facility is withdrawing seawater." Additionally, subsection (d) states that in "order to minimize impingement, through-screen velocity at the surface water intake shall not exceed .15 meters per second." All of these provisions combined minimize the Area Production Foregone – and no further analysis is needed to minimize the intake and mortality of marine life. Repeating these two technology considerations under best available design Factor (2) does nothing additional to minimize the intake and mortality of marine life.

There is only one "design" criteria we can think of that would improve the goals of the law beyond what a proper site and technology would achieve – design the production capacity to ensure compatibility with the best site and technology.

We request the State Board *remove Factor (2) from the best available design analysis* since it is already – and most appropriately – addressed in the best available technology analysis.

D. Design Factors (3 – 5) are the same consideration repeated and re-worded.

The best available design Factors (3 – 5), are essentially the same considerations repeated. These factors require:

> "(3) Design the outfall so that the brine mixing zone* does not encompass or otherwise adversely affect existing sensitive habitat.*
>
> (4) Design the outfall so that discharges do not result in dense, negatively-buoyant plumes that result in adverse effects due to elevated salinity* or anoxic conditions occurring outside the brine mixing zone.* An owner or operator must demonstrate that the outfall meets this requirement through plume modeling and/or field studies. Modeling and field studies shall be approved by the regional water board in consultation with State Water Board staff.

(5) Design outfall structures to minimize the suspension of benthic sediments."

As discussed below, we don't believe any of these factors are appropriate to analyze the best available "design" to minimize intake and marine life mortality – they are not clearly related to the intake and mortality of marine life, but rather to the discharge of brine. Nonetheless, if Factors 3-5 are considered "design" considerations, each of these elements are essentially the same consideration and should be incorporated into only one factor. "Brine mixing zone[s]", "negatively-buoyant plumes", and "suspension of benthic sediments" are all essentially the same consideration – design the outfall to minimize the impacts of the associated brine plume. There is no need to be repetitive and expand this one consideration into three separate factors. But more to the point, these three considerations are already covered by the performance standards for brine diffusers. This subsection merely identifies the benefits of the performance standards in terms of best intake, which is both confusing and unnecessary.

It is evident that the State Board struggled to develop appropriate design criteria to determine the best available design to minimize intake and mortality of marine life. We request that the State Board, at a minimum, *analyze Factors (3 – 5) as only one factor*.

E. Design Factors (3 – 5) have nothing to do with minimizing the intake and mortality of marine life.

Designing an outfall to prevent toxic brine plumes is a laudable goal, but it has nothing to do with Section 13142.5(b)'s requirement of minimizing the intake and mortality of marine life. The best available design factors (3 – 5) all require the outfall to not have a negative discharge plume. While a discharge plume has adverse impacts on marine life, minimizing those impacts is not the same as "minimizing the intake and mortality of marine life."

We request the State Board *move Factors (3 – 5) to Section L.2.d.2.* and incorporate into the considerations for brine discharge technology if the current language in that sub-section needs any additional clarification.

9. THE BEST AVAILABLE SITE SHOULD ACCOMMODATE THE BEST AVAILABLE TECHNOLOGY.

We think the analysis of the best available site necessarily starts with the "best available technology." It is undisputed that sub-surface wells eliminate the intake and mortality of all forms of marine life to any measurable degree. While the law doesn't mandate complete elimination of intake and mortality, a technology that would achieve that degree of minimization is clearly the "best." Nonetheless, a Subsurface Infiltration Gallery (SIG) effectively minimizes intake and mortality of marine life to the same degree. The difference in minimizing marine life mortality between a subsurface well and a SIG is the potential mortality associated with construction and maintenance of a SIG.

However, as articulated in the Riverkeeper cases, a range of performance is allowable and justifiable to define "best" because measuring the efficacy of a technology will show different results at different times – therefore measuring the efficacy of different technologies is allowed if it is within that range of performance bounded by the margin of error. The court established that "range" for a performance standard to be effectively equitable as 10% -- and the OTC Policy adopted that range.

The operation of either wells or a SIG is assumed to minimize intake and mortality 100%. But the mortality from construction and maintenance of a SIG is difficult to calculate because monitoring and measuring the impact is nearly impossible. So, the efficacy is equitable within a margin of measuring and monitoring error. And because a SIG is "available" without the hydro-geological constraints of siting wells, it is arguably the "best available" and should be used to set the performance standard. Finally, surface intakes, whether screened or not, are not equitable to sub-surface intakes and are not to be considered "best available technology." However, as noted in the OTC Policy's analysis, where sub-surface intakes are proven to be "not feasible", screened intakes may be part of a suite of alternatives that, in combination, may achieve an equitable minimization of the intake and mortality of marine life as that of a SIG. However, the choice of the defined “best available technology” allows permitting the facility without any monitoring requirements and conditions that the intake technology may have to be changed if the alternative technology(s) fails to meet the performance standards.

To be consistent with the Ocean Plan amendment 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. *The performance standard for the “best available technology” established in the Ocean Plan should be the determining factor in defining “best available site.”*

The Ocean Plan draft should that the “site” of a facility is “best” if it is compatible with the installation of a sub-surface intake. The “best sites” for the use of wells is limited by the availability of seawater aquifers and arguably not the “best available” under one interpretation of that phrase. However, the “best sites” for the use of a SIG are much more “available.” A SIG can be sited in areas where there is enough open sandy-bottom habitat to accommodate the size of a gallery or multiple galleries. And while some places are preferable for reducing potential maintenance and repairs, areas where a SIG can be constructed are readily available statewide, and any SIG (regardless of maintenance and repairs) is equitable for minimizing the intake and mortality of all forms of marine life. Reducing maintenance and repairs are considerations for optimal sites for reasons other than minimizing the intake and mortality of all forms of marine life. What is optimally “feasible” is what is the best for minimizing the intake and mortality of all forms of marine life, and any unavoidable maintenance and repairs does not render a site infeasible. In fact, surface intakes for power plants require regular maintenance and repairs, including an occasional shut-down of the facility altogether. Yet these surface intakes are clearly feasible – although it’s also clear they are not the “best.”

There are arguably other considerations for what may be the “best site” for a facility – for example consolidating industrial facilities, avoiding special terrestrial habitats and species, co-locating with a sewage treatment plant for dilution water, etc. But for achieving the section 13142.5(b) legislative intent of minimizing the intake and mortality of all forms of marine life, the best site available is a site that is compatible with the best technology available. The State Board should *clearly articulate a baseline for minimization of the mortality of all forms of marine life lost to an open intake, and a reasonable performance standard established as a range between 100 and 90 percent reduction of intake and mortality from the baseline*. Further, the guidance should *clarify that the “best site” is determined by the site’s compatibility with technologies that achieve the performance standard*.

An important issue missing in the draft feasibility analysis of alternative sites, that has come up repeatedly in past permit applications, is the scope of the area considered reasonable for alternative sites. To date, the geographic scope of the alternative site analysis has been determined by a project proponent’s self-defined and narrow “project purpose.” And consequently, the proposal has never looked far for alternative sites that may be compatible with a SIG or well.

As part of the feasibility analysis, the draft amendment should add a sub-section to clarify the geographic scope of alternative sites available to ensure consistency in Regional Board decisions and to ensure full enforcement of section 13142.5(b).

We recommend the geographic scope of alternative sites be bounded by practical constraints to moving the water from the production site to the point of demand. And for further clarification, this practical boundary does not imply that the actual water molecule needs to travel through distribution infrastructure from the point of production to the point of consumption – rather it is simply possible, or even common, to “transfer” water across jurisdictions.

From experience, we know this is an important issue when defining the feasibility of different sites to ensure the “best.” We recommend that a section devoted to this consideration, with recommended language to codify the rule, and that the State Board consider the language and invite public comment before adopting it into the Ocean Plan amendment.

10. THE BEST AVAILABLE SITE SHOULD MINIMIZE IMPACTS TO MARINE PROTECTED AREAS AND OTHER SPECIAL PROTECTED AREAS.

In 2012, California finalized the nation's first science-based network of Marine Protected Areas (MPAs). Stretching from Oregon to the US/Mexico border, this network of 124 protected areas was created to safeguard the productivity and diversity of marine life and habitats for future generations.

To achieve significant ecological benefits, the Marine Life Protection Act Science Advisory Team (SAT) provided guidelines for MPA design, which included criteria for size, space, habitat representation and replication. Additionally, the scientific guidelines included a recommendation to avoid locating MPAs within areas of poor or threatened water quality, such as power plant intakes and discharges and municipal or industrial outfalls.

The water quality siting guidance was developed in recognition that degraded water quality has the potential to threaten marine life and impede the recovery of ecosystems in areas set aside for protection. To ensure the long-term success of California's MPA network, it is critical that desalination facilities be sited appropriately.

Desalination plants with infrastructure sited in or near MPAs would likely result in significant impacts from intakes and brine discharge to resources, similar to impacts from power plant intake and discharge sites. Furthermore, desalination plants sited in proximity to MPAs may reduce larval connectivity between protected areas through entrainment and impingement, thereby compromising the effectiveness of the broader network.

Given the potential impacts of desalination projects on protected areas, we fully support the unambiguous directive in Chapter III.L.2.b.6. of the draft Amendment that intake and discharge structures for desalination facilities will not be located within MPAs or State Water Quality Protected Areas (SWQPAs). We also support the statement that discharges should be sited at a sufficient distance as to have no impacts on MPAs or SWQPAs; however, the criteria for avoiding impacts from discharges is currently limited to salinity. While salinity and brine dilution levels are a top concern, impacts of chemicals used in the desalination process also need to be evaluated. The State Board should *establish additional criteria - such as thresholds for chemicals like coagulants and anti-foulants - that will be used to determine that discharges are having no impact on protected areas*.

We also appreciate and support the statement that, to the extent feasible, intakes shall be sited to maximize the distance from MPAs and SWQPAs. However, consistent with CEQA requirements and other state laws such as the Coastal Act,[98] potential impacts on important ecological features, such as a kelp bed, canyon head or other productivity hot spot, should be analyzed and addressed even if they occur outside of a protected area. We recommend the State Board *revise section L.2.b.6 of the desalination policy to include the statement that "Intakes should be sited to minimize impacts to important ecological features in addition to maximizing their distance from MPA and SWQPA boundaries."*

Additionally, the Board will need to reconcile the language in the recently approved Ocean Plan amendment that creates a new designation to protect water quality within MPAs (State Water Quality Protection Areas – General Protection, SWQPA-GP) with the language in the desalination amendment. The SWQPA-GP amendment states that "[n]o new surface water seawater intakes shall be established within a State Water Quality Protection Area—General Protection" and goes on to state that this "does

[98] Section 30230 of the California Coastal Act requires that special protection be given to areas and species of special biological or economic significance and that uses of the marine environment be carried out in a manner that will sustain the biological productivity of coastal waters and maintain healthy populations of all species of marine organisms.

not apply to sub-seafloor intakes where studies are prepared showing there is no predictable entrainment or impingement of marine life." This language is inconsistent with section L.2.b.6 of the proposed desalination amendment, which prohibits *any* intake structures within MPAs and SWQPAs. The approach in the draft desalination amendment is preferable, given that a facility with a subsurface intake would still have discharges with adverse effects that should not occur in a SWQPA or MPA.

To ensure benefits from MPAs are realized and SWQPA designations are fulfilling their purpose of protecting water quality within these refuges, we recommend the State Board *adjust section E.5.d.2 of the SWQPA amendment to match the related provision in section L.2.b.6 of proposed desalination amendment, prohibiting all intake structures within MPAs and SWQPAs*.

11. EXEMPT EXPANDED FACILITIES FROM THE SITE ANALYSIS UNDER 13142.5(B).

It is prudent public policy to allow already constructed facilities, and those that are deemed "expanded facilities" under the Policy, be exempt from the Section L.2.b. analysis. The State Board is proposing that "Chapter III.L.2 (Water Code §13142.5(b) Determinations for New and Expanded Facilities: *Site*, Design, Technology, and Mitigation Measures) applies to new and *expanded* desalination facilities withdrawing seawater." Furthermore, the State Board defines an "expanded facility" as an "existing facility" which either increases the amount of seawater intake or changes its design.

We agree that the State Board has the authority to require expanded but existing facilities to evaluate the best available site post-construction. Water Code Section 13142.5(b) is clear that expanded facilities need to achieve the best available site, design, technology, and mitigation measures feasible. There is no clear intent by the Legislature that expanded but existing facilities be exempt from any of these factors to minimize the intake and mortality of marine life.

The California Legislature likely modeled Section 13142.5(b) after the federal Clean Water Act section 316(b). Like Section 13142.5(b), CWA Section 316(b) does not exempt expanded – or even existing – facilities from the required best available site determination. The U.S. EPA considers "site" as one of the most important factors in minimizing adverse impacts from ocean withdrawals, because "many adverse impacts can be avoided simply by not siting the intake in areas of sensitive or important natural resources."[99] But section 13142.5(b), as interpreted in the draft Amendment, combines site, design and technology to collectively minimize the intake and mortality of all forms of marine life an goes beyond just avoiding sensitive habitat areas – as it should. So the Amendment provides an excellent opportunity to require the best available site, because the policy will be adopted before the majority of facilities are built. The U.S. EPA agrees that selecting a site where the best available technology may be used "is likely to be easier for a new facility than an existing facility."[100] Yet even for an existing facility, EPA believes alternatives sites "must be considered…because it may be possible in some cases to reduce impacts by replacing an existing [facility] with a new one at a new location."[101]

While we maintain that the State Board has the authority to require expanded facilities to choose the best available site, we do not believe it is appropriate at this time to require expanded facilities to comply with the best available site analysis under Chapter L.2.b. Facilities already constructed, but considered an expanded facility, should invest limited resources on implementing the best available design, technology, and mitigation measures to minimize marine life mortality at the existing site.

The State Board should determine that it is impracticable for expanded facilities be required to move to another location. In order to get around the legal requirement that expanded facilities must use the best

[99] "Plant siting and the location of the intake structure with respect to the environment can be the most important consideration relevant to applying the best technology available for cooling water intake structures. Care in the location of the intake can significantly minimize adverse environmental impacts." EPA 1976 Development Document, p. 178.
[100] EPA Guidance 7-23. See EPA 1976 Development Document, p. 169.
[101] EPA Guidance 7-23. See EPA 1976 Development Document, p. 169.

available site, we suggest the State Board limit the site analysis for existing and expanded facilities to the property where the facility has already been built. The State Board can limit this analysis by stating a very specific and narrow rule that the "best available site for expanded facilities is the site already selected", and find that requiring a constructed facility to move to another location is "infeasible."

The State Board should not require expanded facilities to move locations, but an expanded facility should be required to site its intake, discharge, and other facility infrastructure at the pre-selected site to minimize intake and mortality of marine life and avoid impacts to sensitive habitats and sensitive species.

12. AFTER-THE-FACT RESTORATION IS NOT MITIGATION.

Allowing mitigation to restore marine life mortality after-the-fact is counter to the California Water Code. The Amendment Section III.L.2.e. states that the best available mitigation is "the replacement of marine life or habitat that is lost due to the construction and operation of a desalination facility after minimizing marine life mortality through site, design, and technology measures." We agree that the best available mitigation should be implemented after minimizing marine life mortality through site, design, and technology measures. However, attempting replacing marine life that is lost due the activity of a desalination facility is not an appropriate way to minimize mortality. . Indeed, federal courts have concluded that after the fact restoration cannot be used "in-lieu" of the best technology available.

A. The Riverkeeper I decision finds after the fact restoration illegal.

As the State Board is well aware, the Clean Water Act prohibits the use of "restorative" or "corrective" measures (that is, "after the fact" mitigation measures) to meet the section 316(b) best available technology requirement. The Second Circuit has definitively affirmed that the technology requirement of section 316(b) cannot be satisfied with "after-the-fact" mitigation. As the court explained in the first *Riverkeeper* case:

> Reclaiming abandoned mines to reduce acid mine drainage into the waterbody, removing barriers to fish migration, and creating buffers to reduce destructive runoff from agricultural lands, . . . however beneficial to the environment, have nothing to do with the location, the design, the construction, or the capacity of cooling water intake structures, because they are unrelated to the structures themselves. Restoration measures correct for the adverse environmental impacts of impingement and entrainment; they do not minimize those impacts in the first place.[102]

Beyond the plain language of the statute, the Second Circuit cited supporting legislative history, prior agency interpretation of section 316(b), and EPA's own statements concerning the significant complexity and difficulty of "planning, implementation, and evaluation of restoration measures for populations of aquatic organisms and ecosystems as a whole."[103] For all of these reasons, the court rejected EPA's argument that restoration measures are a permissible consideration in determining best available technology.

In *Riverkeeper II*, the court strongly reaffirmed that allowing compliance with section 316(b) through environmental restoration measures constitutes an impermissible construction of the statute.[104] The court explained that "restoration measures substitute after the-fact compensation for adverse environmental impacts that have already occurred for the minimization of those impacts in the first instance."[105] As such, they are "'plainly inconsistent' with the statute's text" and "contradict the unambiguous language of

[102] *Riverkeeper I,* 358 F.3d at 189.
[103] *Id*. at 190 (quoting 66 Fed. Reg. 65,285, 65,314).
[104] 475 F.3d at 109-10.
[105] *Id*. at 110 (citing Riverkeeper I, 358 F.3d at 189).

section 316(b)."[106] In short, restoration is not "technology" under section 316(b) and, therefore, cannot take the place of alternative cooling technologies to satisfy that statute's best available technology requirement.

B. California courts will look to the interpretation of 316(b) to interpret Section 13142.5(b).

In interpreting similar language in section 13142.5(b) of the Porter-Cologne Act, modeled after and partially implementing section 316(b), state courts will look to this federal interpretation,[107] as the State Board wisely did in crafting its OTC Policy. Although section CWA 316(b) does not apply to the intake systems for desalination facilities, section 13142.5(b) of the Porter-Cologne Act is not limited to power plants and it applies equally to industrial installations utilizing seawater. It is illogical for the State Board to interpret section 13142.5(b) not to allow after-the-fact mitigation for power plants while the Desal Policy allows the use of after-the-fact mitigation for other facilities using seawater. Indeed, as it currently stands, existing power plants must come into compliance with the OTC Policy by phasing out their open-ocean intake, while a brand new desalination facility operating under the same statutory provision would be allowed to use mitigation in lieu of satisfying best available site, design and technology requirements. That outcome not only undermines the new OTC Policy, but renders California's marine resource policies incomprehensible.

A plain reading of section 13142.5(b), like that of CWA 316(b), precludes interpreting the term "mitigation" as synonymous with, or inclusive of, restorative measures. The language in the Porter-Cologne Act provides that all four elements – site, design, technology and mitigation -- whether read holistically or individually – must "…minimize the intake and mortality of all forms of marine life." As explained by the *Riverkeeper* court, and instructive to interpreting 13142.5(b), "restoration measures substitute after-the-fact compensation for adverse environmental impacts that have already occurred for the minimization of those impacts in the first instance."[108] In like fashion, restorative measures, by definition, do nothing to "mitigate" the intake and mortality of all marine life in the first instance. The mere use of the term "mitigation" is not sufficient to justify an interpretation of section 13142.5(b) that is inconsistent with the OTC Policy serving the same purpose.

The Amendment must establish clear and unambiguous direction to regional boards to only consider restorative measures after fully enforcing the individual and collective "best" available site design and technology to minimize the intake and mortality of all forms of marine life. And even then, the calculation and planning of restorative measures must be shown to achieve the performance standards of subsurface intakes.

After the fact restoration is not allowed under the law. The State Board should revise the Desalination Policy to *ensure restoration is not used in-lieu of the best available site, design, and technology for minimizing intake and mortality of marine life*.

13. THE MITIGATION FEE CALCULATION SHOULD BE CORRECTED.

A. The ETM/APF model contains too many scientific assumptions.

Any discussion of the use of ETM/APF for calculating the area of habitat construction/restoration, and even more so for any discussion of a "mitigation fee" based on APF, needs some qualifying assumptions and statements included in the Ocean Plan. Most importantly, it should be made clear that replacement of all forms of marine life is an inherently difficult, if not an impossible task. Experts have created models like ETM/APF to estimate the damage and convert the loss into an area that may create or improve the productivity of marine habitats to replace all the species and life stages of those species. But the experts

[106] *Id*.
[107] *See*, e.g., Reno v. Baird, 18 Cal. 4th 640, 647 (1998).
[108] 475 F.3d at 110 (citing Riverkeeper I, 358 F.3d at 189).

admit that this model is a “best effort” and not an exact science. The marine environment and ecological systems are too complex and too poorly understood to have complete confidence that habitat restoration or creation will have the desired effect of replacing all forms of marine life lost to a facility. This has been recognized in the science community, the regulatory community and the judicial system.

This is the reason it is sound public policy to ensure minimization of the intake and mortality of all forms of marine life in the first place. To the extent minimization achieves or approaches 100% performance, and elimination of the risk to healthy marine ecosystems and the myriad species that support that system is achieved, the task of trying to replace those organisms and maintain ecosystem function is unnecessary.

The Amendment should establish clear enforceable standards to ensure the intake and mortality of marine life is minimized through implementation of the best available site, design and technology before turning to inherently difficult and admittedly imperfect attempts to recreate complex marine ecosystems.

B. The ETM/APF model should be qualified.

As noted in the scientific literature, elsewhere in these comments and the Expert Panel workshops, ETM/APF is not an exact method for quantifying the area and types of habitats necessary to effectively replace all forms of marine life lost to the intake of a facility. Nonetheless, we agree it is a superior method for measuring ecological impacts from the loss of the myriad species and life-stages of marine life affected, as compared to an “Adult Equivalency Lost” or “Fecundity Hindcasting” model.

Consequently, any attempt to “monetize” a replacement value based on APF must first ensure that the APF calculation is qualified, and the risk of under-compensation (or less than full replacement value) is minimized. The draft Desal Policy takes the first step in ensuring “full replacement value” by mandating a 90 percent confidence level in the APF calculation. *The confidence level should be increased to 99 percent, and the acreage calculation should include a greater than 1:1 ratio to ensure against unpredictable and/or unquantifiable circumstances reducing the projected productivity of the restoration project.*

But even then, any attempt to convert a restoration project to a fee paid to a “mitigation bank” only compounds the risk factor and results in less confidence in achieving the goal to “minimize the intake and mortality of all forms of marine life.” We are not aware of any “mitigation banks” in the marine environment. And aside from designating and enforcing more area in marine reserves, we are not sure how a marine habitat mitigation bank would include all habitats necessary for replacing all forms of marine life lost to the facility intake. And mitigation banks established to restore or create coastal wetlands are clearly only attempts to increase productivity for a sub-set of the species’ populations suffering intake and mortality at the facility. And again, this “not in-kind” habitat creation/restoration problem is compounded when the calculation “averages” all the APFs for different habitats affected.

Further, the examples shown by the Expert Panel for how to calculate a “mitigation fee” included many assumptions that need clarification. For example, the presentation included several past restoration project costs from past efforts at mitigating the impact of cooling water intakes. It did not appear to capture the cost of land acquisition, project planning, and other costs that a full mitigation fee must include. And it seemed to include a past project that, in combination with wetlands creation/restoration, created artificial rocky reef. This is an example of the difficulty, if not impossibility, of replacing “all forms of marine life – creating shallow rocky reef on areas of sandy bottom compounds the loss of species that inhabit sandy habitat or forage in sandy habitat.

We are reluctant to suggest methods for improving the confidence that a restoration project or a mitigation fee calculation will result in full replacement value beyond the recommendation to require a 99% confidence level and something greater than a 1:1 acreage ratio. However, we recommend a clarification in the draft, like that concerning a later determination of the best slot size for intake screens, that the staff will review comments on the subject before finalizing the Amendment – and we would add that both these details in the Amendment will be coordinated efforts of several agencies with relevant expertise and include full public notice and comment opportunities.

The best solution is avoidance of the problem in the first place. A very strict adherence to a combination of "best available site, design and technology" standards will all but eliminate the need for "after-the-fact" restoration. Further**,** *the complexities of marine ecosystems and the "benefit" of maintaining healthy ecosystems should form the basis of a "reasoned analysis" to prohibit "cost" as an element of defining "not feasible."*

C. Project proponents are asking for a lower confidence level.

Project proponents are requesting limits that would exacerbate the risk of under-compensation rather than recommendations for how to better ensure success of any "after the fact" restorative measures. Project proponents recommend lowering the "confidence level" in the draft Ocean Plan amendment from 90% to 50% based on past decisions using a 50/50 chance of success. They are arguing, in effect, that if past decisions have failed to incorporate measures to ensure success, the amendment should not correct those errors. We disagree. Amendments to the Ocean Plan to enforce the law are the right time to set statewide standards for resolving any past errors and ensure those errors are not repeated.

The SED articulates why a higher confidence level is used in other regulatory schemes, and why it is necessary in this context. The limits of our understanding of marine ecosystems demands a precautionary approach and assurances that the restoration is scaled properly and performs properly over time.

Finally, at the August 6th Workshop[109] we have heard requests for "credit" in the restoration scaling method to account for higher productivity habitat created or restored to compensate for less productive habitat. A careful read of the ETM/APF assumptions, combined with a careful read of section 13142.5(b) shows why that request must be denied.

The ETM model estimates the source water body for a sample of species in the entrainment studies, and the APF calculation includes several habitat types to represent the species in the sample. Those separate individual APFs are then combined to calculate a cumulative APF. But importantly, the assumption in the model is that the "cumulative APF", and the restoration project scaled on that calculation, will be proportional to the different species and habitats in the ETM calculation.

And the language and intent of section 13142.5(b) is clear, but often overlooked. The relevant language states the intent to minimize the intake and mortality of "all forms of marine life." This is not simply a mandate to minimize the intake and mortality of marine life in general – it is a mandate to minimize the intake and mortality of each and every form of marine life.

Taken collectively and within the context of "ecosystem-based" management[110], the assumptions in the APF model must be realized to ensure compliance with the intent of section 13142.5(b). There is no "credit" allowable for restoring or creating a single habitat type based on some productivity comparison. Just the opposite, *the calculation must include a "multiplier" to ensure that, if the creation/restoration project replaces habitats that are not proportional to the species lost to the intake, the indirect benefits are reasonably "discounted" – not credited. It should be clarified in the draft amendment that the purpose of any habitat restoration/creation project is to fully replace "all forms of marine life." If that goal is to be measured in biomass, it must be species-specific biomass measured in proportion to the species lost. It is not "general biomass" that may or may not have some indirect benefit to the species*

[109] West Basin Water District's public comments at the August 6th Board Workshop.
[110] This is a recognized principle in habitat creation/restoration efforts. For example, wetlands restoration are not simply the creation or restoration of areas permanently or intermittently covered in water. While those areas in and of themselves represent different habitat types, and resident species – full restoration often requires additional "upland" habitat to ensure ecosystem functions and full productivity.

lost.

As noted above, we are reluctant to recommend a formula for ensuring that habitats in a restoration project are proportional to the lost productivity of myriad species lost to the intake of proposed facilities. Once again, the complexities and limits to accurately measure the impacts, and the inherent risk of under-compensation and disproportional compensation, argue for a very strict policy to minimize the intake and mortality of "all forms of marine life" in the first place. And once again, if the performance of sub-surface infiltration galleries is the enforceable standard for "best available technology" then the residual intake and mortality is all but eliminated, and reliance on imperfect models and restoration projects is minimized.

14. MITIGATION FEES NEED TO BE SPENT PROPERLY TO MINIMIZE THE INTAKE AND MORTALITY OF MARINE LIFE.

We support the requirement to fully mitigate for all marine life mortality associated with a desalination facility, and to do at least three years of baseline monitoring to estimate that mortality. However, compensating for killing a wide variety of larvae and other sea life by restoring specific habitats is an embryonic, inexact and unproven science. The challenges of converting estimates of a sample of the sea life harmed by a project into an area of production foregone, then restoring sufficient habitat to replace the lost production for the full range of affected species underscore several key points in this policy.

First, it is critically important to minimize mortality in the first place by making the best choices about siting, design and technology respectively, due to the impossibility of guaranteeing successful replacement of larval production (See Section E above). Even a well-designed mitigation plan cannot be counted on to restore the exact species, the quantities of those species, and the ecological *functions* that surface intake structures harm. For that reason, we reiterate that subsurface intake technology should be required as best available technology and not left to best professional judgment on the combination of best site, design and technology.

Second, for impacts that cannot be avoided despite the use of best siting, design and technology, respectively, mitigation measures should be designed to replace an acre of production foregone with a significantly greater area of replacement production. In section III.L.2.e.(3)(b)iii, we urge the board to strive to achieve replacement value at least equivalent to the impact of the facility by calling for a ratio greater than 1:1 (area of production replaced to area of production lost) in this policy.

As noted in the Staff Report, wetlands mitigation policies often require a ratio significantly greater than 1:1 to take into account the uncertainty and difficulty of replicating natural systems with their full array of ecosystem functions and benefits. The California Coastal Commission, for example, has in the past used a ratio of 4:1 for wetlands mitigation.[111] A similar rationale applies in this case, where the track record of previous success is even more limited than that of wetlands mitigation.

We recommend a ratio of 3:1 or higher to take into account the potential for less than 100 percent success and the significant uncertainty about how best to accomplish successful mitigation projects involving larval production. Such a ratio can also help account for the fact that desalination intakes and discharges may have adverse impacts on the food web or other ecosystem functions that aren't fully captured in measurements of larval mortality.

Next, we support including a broad list of potential mitigation projects as identified in section III.L.2.e.(3)(b)i, along with clear performance standards and measurement requirements. Having a broad list may help provide the flexibility needed to increase the prospects for a proportional and successful mix of restoration projects to fully replace "all forms of marine life" lost to the intake. *The State Board should*

[111] California Coastal Commission. 2013, Local Coastal Program Update Guide:. Environmentally Sensitive Habitats, Part 1, Section 4, p. 10.

also include a preference for mitigation projects in the geographic vicinity of the proposed project, to help match replacement production as closely as possible to marine life losses. However, some caution is necessary to ensure that the productivity of the restoration project is not within a "source water body" which may increase entrainment and reduce the replacement value of the restoration project.

We recognize the challenges of developing successful mitigation projects and the resulting need for flexibility in their location. *We suggest balancing proximity value with geographic flexibility by adding, perhaps as a new Section III.L.2.e.(3)-(b)iv, a statement like: "Preference shall be given to projects in the geographic vicinity of the desalination facility."* Such a preference would likely also have the advantage of better replicating the species mix impacted by the facility. *In section III.L.2.e.(4), Mitigation Option 2, the State Board should add "or projects" after "ongoing implementation of a mitigation project…" in line 4 of that paragraph. We make this suggestion because a combination of projects may well be needed to fully mitigate impacts in certain cases.*

Additionally, we appreciate the emphasis on completing actual mitigation projects with measurable benefits as described in Chapter III.L.2.e.(3) or, as described in Chapter III.L.2.e.(4), providing funding for available mitigation programs. The health of ocean ecosystems is the endpoint that matters with respect to mitigation. Mitigation efforts should therefore focus on full replacement of all forms of marine life that are harmed. Money can facilitate that restoration but is no substitute for it.

In Section III.L.2.e.(3)(b)i, we suggest the following changes: "Mitigation shall be accomplished through expansion, restoration or creation of one or more of the following: kelp beds, estuaries, coastal wetlands, natural reefs, MPAs, State Water Quality Protection Areas, or other projects approved by the regional water board that will mitigate for intake and mortality of marine life associated with the facility."

In Section III.L.2.e.(4)(b)m suggest adding clause in caps: "The amount of the fee shall be based on the cost of the mitigation project, or if the project is designed IN WHOLE OR IN PART to mitigate cumulative impacts from multiple desalination facilities or other development projects…"

Lastly, Chapter III.L.2.e.(5) authorizes agencies to conduct audits and inspections of any mitigation projects, but provides no guidance as to what steps those agencies can take to address problems or inadequacies they may find. We urge the State Board to *add steps, including, at a minimum, actions to correct flaws in the project pursuant to the adaptive management portion of the mitigation plan, use of the audit findings to inform periodic reviews of waste discharge requirements and NPDES permits, authority to open a permit at any time to ensure compliance, as provided in the OTC Policy, and other actions as needed.*

15. SPRAY-BRINE DIFFUSERS SHOULD BE DETERMINED THE BEST AVAILABLE DISCHARGE TECHNOLOGY.

A. *Requiring treated wastewater for dilution will conflict with California's recycled water goals.*

Requiring treated wastewater for dilution will conflict with California's recycled water goals. The goal of reaching 2 million acre feet of recycled wastewater will be best met if every water purveyor statewide is able to contribute.[112] So, it is a concern if wastewater discharge volumes are permanently allocated to brine dilution for a seawater desalination facility – effectively undermining the ability of any given region to fully contribute to reaching the State's goal to advance the use of recycled wastewater.

For example, CalAm is currently considering whether to mix the brine from their proposed Monterey desalination facility with a wastewater discharge, or to install diffusers. That choice is dependent on the availability of the wastewater for recycling. While it is unclear whether the recycling facility will be

[112] State Water Resources Control Board, Recycled Water Policy (2013), available at http://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2013/rs2013_0003_a.pdf.

available before the deadline to operate the desal facility (based on the Carmel River CDO deadline), should CalAm apply for a permitted comingling with wastewater in their NPDES permit, this desalination Ocean Plan should ensure against "enshrinement" of the commingled discharge – effectively eliminating the recycling option in the future. The permanent elimination of wastewater for recycling through a permitted comingling with brine would directly undermine the intent of the Recycled Water Policy to advance recycled wastewater. The State Board should *apply these principles statewide for any potential future local opportunity to expand wastewater recycling capacity*.

Industry is arguing that this provision is beyond the State Board's authority because: "Water supply agencies are responsible for development of water supply and reliability projects, not the SWRCB or its Regional Boards[113]." This argument mis-states the authority of the State Water Board. The draft Amendment is simply enforcing the Clean Water Act and Porter-Cologne Act in regards to the discharge. In that sense, it does not necessarily place a limit on the water agencies' discretion to develop seawater desalination as a part of a portfolio. It simply ensures that the brine discharge does not violate the law. Further, the State Board has already exercised its authority in this field. While it is not asserted in the Amendment, this provision would ensure that the adopted State Board policy to develop recycled wastewater is consistent with the provisions of the Desalination Amendment. To our knowledge, water supply agencies did not have any objections to the State Board's policy on recycled water – which arguably had just as much connection with the choices made by local water agencies as this Ocean Plan amendment would have.

B. Spray brine diffusers are the best available technology for discharging brine.

The Brine Expert Panel did not cite any studies disproving that spray brine diffusers would cause the mortality of marine life – the calamity caused from trying to disprove a negative statement. Nonetheless, other experts concluded that it would likely be a small impact[114]. There is no empirical data to support the hypothesis of intake and mortality in spray brine diffusers. And judging by the comments of several project proponents at the August 6th Workshop, either there is a divergence of opinion on the hypothesis, or the intake and mortality is extremely site specific. For example, Poseidon-Carlsbad has implied that the intake and mortality in the brine plume would exceed that of a modified intake system – although they have no studies to support that claim. On the other hand, MWDOC, CalDesal and Poseidon-Huntington seem to imply that any minimal mortality in the spray brine diffuser plume would be so small so that a minor adjustment to the restoration project should more than compensate for the harm (implying it is immeasurable). Industry should not be allowed to modify the Amendment in hopes that "site-specific" determinations undermine the goal of consistent statewide enforcement of the law, and simultaneously undermines the intent of the Clean Water Act to comply the "best technology available" for the control of polluted discharges.

Until there is some empirical evidence, or at a minimum laboratory tests, showing the degree of mortality in a spray brine plume, properly designed and sited diffusers should be considered the best available technology for brine dilution.

Alternatively, or in any case, if the principle behind the preference for co-mingling wastewater with the brine is an effort to take a precautionary approach and avoid any potential harm from mortality in the diffuser, that precautionary principle should be equally applied in every issue where there is a lack of scientific evidence to disprove a hypothesis (eg. the hypothesis that fine-mesh screens create increased impingement mortality).

As such, we recommend the following revisions to Chapter III.L.2.d.2.(b):

[113] *See* Attachment: Municipal Water District of Orange County (MWDOC) [in consultation with other water agencies, Cal Desal and Poseidon], "Information Item", August 4, 2014, bullet 6.
[114] See Joint Intake Panel and Discharge Panel presentation, desal workshop in Sacto, date???

Multiport diffusers are the ~~next~~ best available method for disposing of brine* ~~when the brine* cannot be diluted by wastewater and when there are no live organisms in the discharge~~. Multiport diffusers* shall be engineered to maximize dilution, minimize the size of the brine mixing zone,* minimize the suspension of benthic sediments, and minimize marine life mortality.*

16. TOXICITY MONITORING MUST BE DONE PROPERLY.

A. We support the current requirements for toxicity monitoring.

In addition to the entrainment and impingement impacts from the intakes, desalination facilities pose a serious threat to marine ecosystems from concentrated brine discharge. Concentrated brine discharge can cause both acute and chronic toxicity to the ecosystems.[115] In particular, brine discharges "can pose significant risks to sensitive habitats."[116] For example, brine discharges have been associated with "reduced growth, reduced biomass, and the disappearance of seagrasses."[117] In addition to toxicity associated with elevated salinity, brine plumes can form a physical barrier preventing adequate mixing of dissolved brine resulting in anoxia or hypoxia in benthic organisms.[118]Exposure to brine and other potentially toxic constituents in desalination effluent can cause serious impacts on bottom-dwelling organisms including: osmotic stress or shock, endocrine disruption, compromised immune function, acute or chronic toxicity, and even death in extreme conditions.[119] While mobile organisms may swim away from the discharge, stationary organisms cannot move away and thus might experience more serious effects.[120] Due to the serious nature of the potential toxicity of brine discharges, we support the draft Desal Policy's requirement for a establishing a minimum of baseline monitoring for 36 months prior to commencing brine discharge and conducting a Whole Effluent Toxicity (WET) test.

B. The State Board is using the proper species for the WET test.

The draft Desal Policy requirement that WET test be conducted for germination and growth for giant kelp (*Macrocystis pvrifera*), development of red abalone (*haliotis refescens*), development and fertilization for purple urchin (*Strongleocentrotus purpuratus*), development and fertilization for sand dollar (*Dendraster excentricus*), and larval growth rate for Topsmelt (*Athernipos affnis*)[121] is scientifically sound and appropriate.

In 2012, scientists at U.C. Davis Department of Environmental Toxicology conducted hyper-salinity studies using U.S. EPA west coast methods on a number of species including bay mussels, purple sea urchins, sand dollars, and red abalone, giant kelp, and Topsmelt.[122] These studies, known as the Granite Canyon studies" form the basis for the recommended WET test studies in the SED. The State Water Board staff reduced the list of species to reduce costs and focused the species list on those that are most affected by salinity, while still representing a variety of taxa.[123] This is a reasonable while still scientifically sound approach.

While the species list in the recommended WET test may not always be found at every proposed desalination site, it is still appropriate to conduct the WET test for all of these species as they are

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[115] Roberts *et al.* Impacts of desalination of plant discharges on the marine environment: A critical review of published studies, 117-5138 Water Research 44 (2010).
[116] Supra note 3, at 36.
[117] *Id*. at 37.
[118] *Id*. at 82 quoting Hodges et al. Impingement and Entrainment: Biological Efficacy of Intake Alternatives Presented at the Desalination Intake Solutions Workshop 16-17 October 2008, Alden Research Laboratory, Holden, MA; Roberts supra note 114.
[119] Supra note 3, at 82.
[120] *Id*.
[121] Draft Desalination Policy at I.3.c.(1)(b)
[122] Phillips et al., Hyper-Saline Toxicity Thresholds for Nine California Ocean Plan Toxicity Test Protocols, Final Report, University of California Davis, Department of Toxicology at Grand Canyon
[123] Supra note 3, at 107.

representative of other similar species that may occur along our coast.[124] For example, abalone are in the Phylum Mollusca, which is a diverse tax that includes snails, shellfish, squid, octopus, nautilus and nudibrachs. Some desalination proponents have suggested running toxicity test on species at the location of the proposed discharge site to establish facility-specific receiving water limit. However that process would be cost, labor, and time intensive because an owner would have to first establish which species are the most sensitive to salinity changes and then would have to establish and validate U.S. EPA test protocols for the most sensitive species. Again the established indicator species listed in the SED were selected due to their sensitivity to toxicity and are appropriate as a minimum species to use for tests. Although we do not support substituting species for those established in the SED, we do support supplementing the established WET test with additional location-specific species as appropriate.

Additionally, some desalination proponents have suggested running toxicity studies on species caught directly in the proposed discharge environment. This approach is also not scientifically advised as wild-caught species will have different levels of physical fitness, which can result in inconsistencies in the results. As the SED notes "there is a high probability toxicity studies on wild caught species will result in inconclusive results."[125] We support the Staff recommendation of conducting toxicity studies on laboratory or farm raised species that have established U.S. EPA approved test protocols because it will increase the accuracy of the results.

17. ALTERNATIVE TECHNOLOGIES NEED TO BE HELD TO THE "BEST AVAILABLE" STANDARD.

A. Alternative intake technologies need to substantially meet the performance standard of the best available intake technology – subsurface infiltration galleries.

The CWA, and thus California's granted authority to enforce the Water Code as long as the State's laws and regulations are as protective or more protective than those in the federal law, allows alternative technologies to be implemented if they are proven to be as effective as the "best available technology." The Porter-Cologne Act is used to implement California's duties under the CWA, and the "most salient characteristic of the [CWA], articulated time and again by its architects and embedded in the statutory language, is that it is technology-forcing."[126] Meaning, as new technologies are developed, and permits are renewed, permittees are required through an iterative process to continue implementing the "best available" technologies.

The technology-forcing nature of the CWA and the California Water Code also allows permittees to be innovative at meeting their compliance options. The innovative concept behind the CWA takes a three-step approach. First, a permitting authority is required to determine the best available technology for minimizing impacts to a waterway. Second, the permitting authority determines the appropriate performance standard that is met by the best available technology. Third, the permitting authority allows permittees to meet the performance standard – not only through the option of implementing best available technology – but through other technologies demonstrated to meet the performance standard set by the best available technology. We support this innovative approach to CWA and Water Code compliance, and agree that the State Board should provide an opportunity and requirement for innovation in the Amendment.

The OTC Policy allowed for innovation in meeting its compliance standard. The approach taken in the OTC Policy found that "dry cooling towers" were the best technology for minimizing the adverse impacts, but used "wet cooling towers" as the basis for the performance standards. The reasoned analysis concluded that the performance of wet towers was "equivalent" to dry towers (93 percent reduction), and that a marginally lower performance standard was justified to allow more universal availability. The OTC Policy clearly stated that either wet cooling towers or dry cooling towers would be allowed because dry

[124] *Id*.
[125] *Id*. at 108.
[126] *Natural Resource Def. Council v. Envtl. Prot. Agency*, 822 F.2d 104, 123 (D.C. Cir. 1987).

towers exceeded the performance standard. Finally, the OTC Policy allowed alternative approaches where wet cooling towers were shown to be "not feasible." Arguably, the "90% reduction of a 93% reduction" allowed a "less than best" performance standard. Nonetheless, the State Board found this standard "functionally equivalent" to the "best".

While we support the State Board's decision to allow innovative alternate technologies, those technologies must meet the performance standard set by the best available technology. The State Board followed the Second Circuit's ruling by requiring alternative technologies in the OTC Policy to meet the performance standard set by the best available technology – within a range of performance based on the agency's reasoned analysis.

Unlike the OTC Policy, the draft Amendment does not require alternative technologies meet the best available technology performance standard. In fact, the draft does not include a clearly stated performance standard – nor an explanation how it is derived from the effectiveness the "best technology." Instead, the State Board is allowing alternative intake technologies "so long as the alternative method provides equivalent protection…as is provided by a [0.5 mm/0.75 mm/1.0 mm] slot size screen." Wedge-wire screens are not the proper performance standard by which alternative technologies should demonstrate compliance. As discussed above, and stressed in the *Riverkeeper II* decision, alternative technologies can be used to comply with the "best available" standard, but those technologies must demonstrate equivalent protection as the best available technology.

As discussed above, subsurface infiltration galleries should be determined as the best available intake technology for minimizing the intake and mortality of marine life. As expressed in *Riverkeeper II*, and followed by the State Board in the OTC Policy, the State Board should *only allow alternative technologies, or a suite of measures, that meet the performance standard of subsurface infiltration galleries*.

To ensure the Desalination Policy properly allows for innovative intake technologies, we offer the following revisions to Chapter L.2.d.1.c.iii.:

> *An owner or operator may use an alternative method of preventing entrainment so long as the alternative method provides equivalent protection of eggs, larvae, and juvenile organisms as is provided by subsurface infiltration galleries ~~a [0.5 mm (0.02 in)/ 0.75 (0.03 in)/ 1.0 mm (0.04 in)] slot size screen [see note above]~~. The owner or operator must demonstrate the effectiveness of the alternative method to the regional water board. The owner or operator must conduct a pilot study to demonstrate the effectiveness of the alternative method, and use an Empirical Transport Model* (ETM)/ Area of Production Forgone* (APF) approach* to estimate entrainment at the pilot study location.*

B. *Alternative discharge technologies need to substantially meet the performance standard of the "preferred technology" – dilution with wastewater.*

Alternative discharge technologies must demonstrate equivalent protections as dilution with wastewater. As discussed above, we support the ability of permittees to use innovative alternative technologies to comply with the Policy, but alternative technologies must meet the best available technology performance standard.

Under Chapter L.2.d.2.a.,"preferred technology for minimizing intake and mortality of marine life resulting from brine disposal is to commingle brine with wastewater." This "preferred technology" sets the performance standard as explained in Riverkeeper II and followed by the State Board in the OTC Policy. However, the draft Desal Amendment does not state that alternative technologies needs to meet the numeric water quality standard and numeric ZID limit as a performance standard. Chapter L.2.d.2.d. states that "[b]rine disposal technologies other than wastewater dilution and multiport diffusers, such as flow augmentation, may be used if an owner or operator can demonstrate to the regional water board that the technology provides a comparable level of protection." That "comparable level of protection" is the performance standard, and the Amendment would be clearer if it used that terminology in the relevant areas.

If the State Board intends alternative discharge technologies to be comparable to either wastewater dilution or multiport diffusers, then the State Board needs to be explicit that both technologies have the same performance standard. *If the State Board does not find both technologies to have equivalent performance standards, then the State Board needs to be explicit that alternative discharge technologies must demonstrate equivalent protections as dilution with wastewater.*

To ensure the draft Desal Policy properly allows for innovative discharge technologies, we offer the following revisions to Chapter L.2.d.2.d.:

> *Brine disposal technologies other than wastewater dilution and multiport diffusers, such as flow augmentation, may be used if an owner or operator can demonstrate to the regional water board that the technology provides a comparable level of protection as dilution with wastewater.*

C. *Zero discharge desalination technologies need to be given special consideration as an alternative brine disposal technology.*

Zero discharge desalination (ZDD) should be explicitly allowed as an alternative discharge technology, and should be exempt from empirical studies demonstrating equivalent protections as dilution with wastewater. ZDD is a discharge technology specific for desalination facilities that separates salts into salable products. The ZDD concept utilizes the energy-saving feature of electrodialysis to remove salts from the brine reject and concentrate them about threefold before evaporation.[127] Although ZDD systems have higher capital cost than traditional desalination facilities that discharge into the ocean, the ZDD technology could potentially reduce the cost of seawater desalination when all the costs and benefits are considered.[128] ZDD also has the potential to reduce the regulatory burdens and costs associated with discharging brine directly into the ocean.

As the name suggests, ZDD results in zero discharge of brine from desalination facilities. This technology is the ultimate "best technology" for discharging of brine. However, we understand the State Board's concerns that this technology – while innovative – is not necessarily "available" in the context of a regulatory scheme. Despite ZDD not being "available", it is exactly the type of innovative technology this Policy should be cultivating.

As we understand the Policy, ZDD would be approved as an alternative design technology because a project proponent can easily demonstrate equivalent protection as dilution with wastewater. However, Chapter III.L.2.d.(2)(d) requires empirical studies or modeling to demonstrate comparable levels of protection. While we support the requirement for empirical studies to demonstrate discharge compliance, we believe it is unwarranted for ZDD technology given the obvious benefits of zero discharge to the marine environment.

Given ZDD's performance standard of zero brine discharge, we recommend the State Board *incentive ZDD technology, and remove the discharge demonstration requirements under Chapter III.L.2.d(2)(d) for ZDD projects*.

18. FLOW AUGMENTATION FOR BRINE DILUTION IS ILLEGAL.

[127] Davis, H. (2006). Zero Discharge Seawater Desalination: Integrating the Production of Freshwater, Salt, Magnesium, and Bromine. Columbia, SC: University of Southern California Research Foundation. http://www.usbr.gov/research/AWT/reportpdfs/report111.pdf.
[128] *Id.*

A. Allowing flow augmentation as an alternative discharge technology is illegal and bad public policy.

As discussed above, flow augmentation (increased intake volume), is illegal and should not be an allowable technology or practice for discharging brine. As the State Board admits, withdrawing "additional seawater through surface intakes for the purpose of diluting brine effluent to meet water quality standards (referred to as "flow augmentation") can significantly increase entrainment and impingement." Moreover, even if a technology can reduce entrainment through "low turbulence intakes" "[a]dditional mortality may occur through brine exposure in the mixing process and through predation in conveyance pipes."[129]

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,[130] and that entrainment impacts on individual populations and the ecosystem can be significant.[131] Withdrawing additional source water with traditional pumps to dilute brine would result in significantly increased marine life mortality compared to discharging through multiport diffusers.[132]

Only one project proponent believes flow augmentation using low-turbulence screw pumps (e.g. Archimedes screws pumps, screw centrifugal pumps, or axial flow pumps) can significantly reduce marine life mortality by lowering turbulence and through-pump mortality at the point of intake.[133] That singular project proponent and expert consultants, have failed to prove the claim – even though multiport diffusers are available in numerous places and tests could have been conducted years ago, And Alden Labs apparently told State Board staff the tests of alternative low-turbulence pumps could be performed in their test laboratories.

Proponents of flow augmentation have argued that flow augmentation can overall result in less marine life mortality compared to multiport diffusers even though the mechanisms to do so have not been clearly demonstrated.[134] To date, there are no empirical data that have estimated egg, larvae and small juvenile mortality at the low-turbulence pumps, even though such studies are technically feasible.[135]

Besides no data demonstrating that low-turbulence screw pumps are capable of minimizing entrainment, flow augmentation does not prevent marine life mortality at the mixing zone. The State Board acknowledges that "[o]rganisms entrained in the flow augmented dilution water may experience turbulence and shearing stress, osmotic stress or shock, or thermal stress as brine and dilution water are mixed prior to discharge."[136]

Flow augmentation results in a net loss of marine life mortality, and no data exists to prove that low-turbulence screw pumps reduce entrainment. There is nothing to suggest that flow augmentation can demonstrate equivalent protections as that of dilution with wastewater. Despite no evidence to justify flow augmentation as an alternative discharge technology, the State Board is allowing a project proponent to invest in low-turbulence screw pumps and operate them for up to three years before demonstrating equivalent protections as dilution with wastewater.

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[129] *Id*. at 46.
[130] 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.
[131] Raimondi, P. 2011. Variation in Entrainment Impact Based on Different Measures of Acceptable Uncertainty. Prepared for California Energy Commission, Public Interest Energy Research Program.
[132] Supra note 3, at 88.
[133] *Id*.
[134] *Id*.
[135] *Id*.
[136] *Id*.

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

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

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 in-plant dilution technology? How many years after a re-design does the proponent get to prove the new design is in compliance? In fact, given the opportunities to collect empirical data on the mortality of marine life entrained in a diffuser plume, and the availability of laboratories to test low-turbulence pumps for efficacy reducing mortality – project proponents should be mandated to prove their hypothesis prior to issuance of a permit.

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~~.*

19. THE STATE BOARD NEEDS TO MONITOR FOR HARMFUL ALGAE BLOOMS TO PROTECT PUBLIC HEALTH AND THE ENVIRONMENT.

1. *Scientists are unsure whether reverse osmosis technologies remove all toxins from harmful algae blooms.*

The science is unclear whether impacts from harmful algae blooms (HABs), commonly referred to as "red tides," may occur due to desalination operations. HABs are a concern for desalination plants due to the high biomass of microalgae present in ocean waters and a variety of substances that some of these algae produce. These compounds range from noxious substances to powerful neurotoxins that constitute significant public health risks if they are not effectively and completely removed by the RO membranes.[137] Algal blooms can cause significant operational issues that result in increased chemical consumption, increased membrane fouling rates, and in extreme cases, a plant to be taken off-line.[138] Early algal bloom detection by desalination facilities is essential so that operational adjustments can be made to ensure that production capacity remains unaffected.[139] Although numerous issues involving the desalination process are now being examined,[140] very limited information exists on the risks that algal blooms pose to seawater desalination facilities.[141]

The science community is unaware of any "published reports on the effectiveness of reverse osmosis for removing dissolved algal toxins from seawater."[142] Some of these toxin molecules (e.g. domoic acid) are near the size of molecules rejected by reverse osmosis membranes, but experimental studies are required to validate the effective of this process on toxin removal.[143]

Until more studies are conducted on the effectiveness of reverse osmosis to remove HAB toxins, the State Board should *take a precautionary approach to siting desalination facilities near HABs*.

2. *Discharges of harmful algae bloom toxins back into the marine environment amplify the impacts.*

A desalination facility's pretreatment process may exacerbate HAB impacts. The science community has discovered that the desalinations' "pretreatment process might disrupt cells and create significantly higher concentrations of dissolved organic substances, including toxins, than were originally present in the source water."[144] Therefore, it is important that the desalination community carefully characterize these potential contaminants and their removal to improve treatment approaches in seawater desalination.[145]

In addition, more information will be needed to understand the potential impact of discharged brine and pretreatment backwash water resulting from the reverse osmosis desalination process on the ecology of coastal ecosystems. Reports conclude that if HAB toxins are in the intake water, then pretreatment coagulant would "concentrate toxic algae and their associated toxins."[146] Similarly, the "discharge of brine resulting from the reverse osmosis process would contain elevated concentrations of dissolved algal toxins relative to unfiltered seawater."[147] Given the potential for brine discharges to elevate the impacts from HABs, it is critical that the State Board *address HABs in the Amendment*.

3. *Monitoring is needed to ensure harmful algae blooms are not discharged with the brine.*

As detailed above, it is essential that a desalination facility incorporate a means of rapid algal bloom detection so that, when necessary, proper process changes can be made to maintain the production capacity. Sensors for detecting an eminent algal bloom can be located at the desalination facility to inform personnel regarding changes in water quality that are directly observed on the source water.[148]
When constructing a new intake pipeline, the selection of its location (e.g. depth and distance from shore) can be greatly enhanced through the use of offshore monitoring devices and efforts to take into account the presence of any local accumulations of algal biomass due to currents, water mass

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[137] Caron et al., Harmful Algae and Their Potential Impacts on Desalination Operations Off Southern California, pg. 1 (2009), available at https://dornsife.usc.edu/assets/sites/378/docs/Caron_pdfs/2009_Caron_etal_WR_Proofs.pdf.
[138] *Id*.
[139] *Id*.
[140] Separation Processes Inc., 2005; Gaid and Treal, 2007; Pankratz, 2008, 2009.
[141] Supra note 137, at 1.
[142] *Id*.
[143] *Id*.
[144] *Id*.
[145] *Id*.
[146] *Id*.
[147] *Id*.
[148] *Id*.

convergences/divergences or internal waves, and also subsurface maxima in algal abundance.[149] Toxic blooms in the vicinity of desalination plants are rare or often unrecognized events, and plant operators are generally unaware of the threat that algal toxins pose. As a result, no measurements of marine algal toxins before and after treatment have been made at any full-scale desalination plant during an actual HAB.

HABs on the U.S. west coast exhibit significant generalities but the details of bloom dynamics differ with geographic location, depth and season. The high degree of variability associated with these events makes constant monitoring of HABs in intake water for desalination a vital issue.[150]

It is also important to consider the benefits of subsurface intakes in regards to HABs. Subsurface intakes provide a natural barrier to suspended sediments, algal toxins, pathogens, dissolved or suspended organic compounds, harmful algal blooms, kelp, sea jellies, debris, or oil or chemical spills, and adult and juvenile marine organisms.[151]

The State Board should *require all projects that are not using subsurface intakes to be required to conduct ocean monitoring for HABs, and be required to shut-down all intake operations when a HAB is present*.

4. The State Board should include drinking water permitting as part of the Policy.

With the California Drinking Water Program not part of the State Water Board, it should consider drinking water permits during the Adoption of the Amendment. Previously, the California Department of Public Health (DPH) had permitting responsibilities under the Safe Drinking Water Act. DPH had the authority to review desalination facilities operations and include specific performance standards for construction and operation of a facility, evaluation of the integrity of equipment used at the facility, determining the required response by the facility operator to various problems, and other requirements.[152]

During the initial drinking water permit review of the Carlsbad facility in 2006, the project proponent stated that toxins associated with potential red tide/algal bloom episode(s) in the waters around the plant intake *should* not pass through the various treatment processes. The public health office concluded that as "industry-wide understanding of the Harmful Algal Bloom (HAB) phenomenon, and related biotoxin toxicity issue, in drinking water progresses, *both the monitoring and operations* of permitted desalination facilities may require alteration."[153] DPH went on to find that in the event that the Department makes a determination that biotoxins should be regulated, then Carlsbad would be "required to change their operations and monitoring plans to include, but not be limited to establishing: monitoring ranges, recording and reporting infrastructure, and shut down set points."[154]

Since 2006, the science community has become increasingly concerned about the effectiveness of reverse osmosis operations to filter all HAB toxins. As discussed above, the pretreatment process may elevate toxin levels in the source water, and scientists are unsure whether HAB toxins are completely removed. Moreover, the internationally community is now confronted with HAB incidents. In 2013, a desalination facility in Oman was "shut down due to the uncertainty that the drinking water would remain safe during the red tide."[155]

Given the growing concerns regarding HABs and desalination operations, we believe *California's*

[149] *Id*.
[150] Caron, 407.
[151] Supra note 3, at 54.
[152] Desal Handbook, 53.
[153] Carlsbad termporary drinking water permit.
[154] *Id*.
[155] Website: http://www.desalination.com/wdr/49/10/red-tide-shuts-down-swro.

Drinking Water Program should reassess whether desalination facilities should be required to monitor their source and product water to ensure HAB toxins are completely removed from the drinking water supply.
As such, we request the following revisions to Chapter III.L.2.c.:

> *The owner or operator of a desalination facility* must submit a Monitoring and Reporting Plan to the regional water board for approval. The Monitoring and Reporting Plan shall include monitoring of effluent and receiving water characteristics, monitoring for harmful algae blooms influent and final product water, and impacts to marine life. The Monitoring and Reporting Plan shall, at a minimum, include monitoring for benthic community health, aquatic life toxicity, and receiving water characteristics consistent with Appendix III of this Plan and for compliance with the receiving water limitation in chapter III .L.3. A project proponent implementing the best available technology of subsurface intakes shall not be required to monitoring for harmful algae blooms*.

20. THE EMERGENCY EXEMPTION NEEDS TO BE PROPERLY DEFINED.

Chapter III.L.1.(a). of the draft Amendment defines exceptions where the Amendment would not apply. The exception includes an Executive Director waiver of the rule for "facilities that are operated to serve as a critical short-term water supply during a state of emergency as declared by the Governor." We do not oppose reasonable exceptions to the rule for emergency situations. We agree that, in a state of emergency declared by the Governor, these portable units should be available for temporary emergency relief. In fact, the draft exception to the rule should be expanded to ensure disaster relief for emergencies in California declared by Federal authorities, and to indicate that several portable units may be needed in an area to ensure public safety during disasters.

The second exception for "operation" of facilities to serve as a short-term water supply is not clearly defined and may create an "exception that swallows the rule." For example, permanent facilities are required to use the "best design" to minimize the intake and mortality of marine life. To date, permanent facilities have been proposed for inclusion in a permanent water supply portfolio. It is not clear how a facility that is designed and operated as a permanent component of a water supply portfolio could change that "operation" to "serve as a critical short-term water supply." If it is designed to produce a determined volume of water, and that production capacity is relied on in non-emergency times, it is unclear how it can be "operated" differently during an emergency to produce a "short-term water supply" beyond what the facility normally produces. Therefore, the "executive director waiver" for operation of facilities to serve a short-term supply of water should be deleted – existing facilities can only produce what they are designed to produce regardless of whether the product water is used continuously or only during an emergency. Alternatively, if the draft is anticipating some use of existing facility we have not considered, *the "waiver provision" should be clarified so that it is not applicable to projects proposed for permanent non-emergency use that just happen to apply for a permit during times of emergency – or any other application that undermines the intent of the rule*.

21. CO-LOCATION WITH AN OTC FACILITY DEMANDS 316(B) STANDARDS APPLY.

The State Board should apply both Water Code Section 13142.5(b) and the CWA Section 316(b) to all desalination plants that are using a seawater intake that uses at least 25 percent of the influent for coolant. As currently written under Chapter III.L.2.a.(2) that the "regional water board shall conduct a Water Code section 13142.5(b) analysis for all new and expanded desalination facilities. But the Amendment makes no mention of CWA Section 316(b) applying to desalination facilities. CWA section 316(b) requires that the location, design, construction, and capacity *of cooling intake structures* reflect the best technology available for minimizing adverse environmental impact. Section 316(b) does not distinguish between new, expanded, or existing facilities, but does not explicitly state that desalination facilities are covered. Unlike Section 13142.5(b) which is explicit what type of facilities are covered (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 CWA 316(b) if the facility is co-located with an OTC facility and is using their cooling intake structure.

Currently, numerous proposed facilities are sited adjacent to OTC facilities with the hope that the facility can utilize the existing OTC intake structure. These facilities should theoretically be required to meet both Section 13142.5(b) and 316(b). However, the U.S. EPA developed regulations that define 316(b) rule to apply only to facilities that withdraw at least two million gallons per day of cooling water and use 25 purposes or more of the water withdrawn exclusively for cooling purposes. Therefore, a desalination facility that is co-located with an OTC facility, and uses its intake structure which withdraws at least two MGDs 25 percent of which goes to cooling purposes would be required to comply with 316(b).

The draft Amendment contains no provision requiring desalination facilities to comply with CWA Section 316(b). However, the State Board notes that Section 316(b) "indirectly applies to desalination facilities co-located with power plants and other industrial cooling water intakes insofar as a cooling water intake structure, used to withdraw water for use by both facilities, must meet the requirements of the federal statute and applicable regulations."[156] The State Board goes on to note that "a desalination facility that collects source water through an existing, operational cooling water intake associated with a power plant, or certain other types of industrial facilities, may be required to comply with technology-based standards for minimizing impingement and entrainment impacts."[157]

To ensure desalination facilities are properly regulated under 316(b), the State Board should *add a provision requiring new, expanded and existing facilities that are co-located with an OTC facility and meet the U.S. EPA regulations shall comply with both the OTC Policy and this Amendment*.

22. ALTERNATIVE WATER SUPPLIES SHOULD BE DEVELOPED BEFORE DESALINATION.

A. California has feasible water supply alternatives that provide multiple benefits to Californians.

A recent survey of public perceptions of water use showed that respondents underestimate water use by a factor of 2 on average, with large underestimates for high water-use activities.[158] Compared with other countries that use desalination, California's urban water consumption ranks the highest at 201 gallons per capita per day (GPCD), compared with Australia's urban water use of 80–130 GPCD in the early 2000's, Israel's 84 GPCD, and Spain's 76 GPCD.[159] The California Urban Water Conservation Council (CUWCC) documented that the state could save more than 27.5 billion gallons of water per year.[160] Similarly, the Pacific Institute calculated that California could reduce current in-state demand for water by six-to-eight million acre-feet per year (between 1.9 and 2.6 trillion gallons), equivalent to roughly 20 percent of statewide use, through existing, cost-effective technologies and practices.[161]

Stormwater runoff is a drastically underutilized potential resource in California. For example, a one-inch storm in Los Angeles County can result in 10 billion gallons of runoff flowing through the area's storm drain systems and being discharged into the ocean.[162] At the same time, stormwater runoff is also the

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[156] Supra note 3, at 28.
[157] *Id*.
[158] Shahzeen Attari et al. *Perceptions of Water Use, Proceedings of the National Academy of Sciences (2014)* doi: 10.1073/pnas.1316402111.
[159] PUBLIC POLICY INSTITUTE OF CALIFORNIA, WATER AND THE CALIFORNIA ECONOMY, 7 (2012), *available at* http://www.ppic.org/content/pubs/report/R_512EHR.pdf. Australia's urban water use has declined further in recent years due to prolonged drought in the 2000s. *Id.*
[160] HEATHER COOLEY ET AL., CALIFORNIA'S NEXT MILLION ACRE-FEET: SAVING WATER, ENERGY, AND MONEY 6-7 (2010) *available at* http://www.pacinst.org/reports/next_million_acre_feet/next_million_acre_feet.pdf.
[161] HEATHER COOLEY, JULIET CHRISTIAN-SMITH, PETER GLEICK, MICHAEL COHEN, MATTHE HEBERGER, CALIFORINA'S NEXT MILLION ACRE-FEET: SAVING WATER, ENERGY, AND MONEY 6-7 (2010) *available at* http://www.pacinst.org/reports/next_million_acre_feet/next_million_acre_feet.pdf
[162] NRDC DROUGHT RECOMMENDATIONS TO THE STATE WATER RESOURCES CONTROL BOARD 17 (Feb. 26, 2014), http://docs.nrdc.org/water/files/wat_14022701a.pdf

leading source of surface water pollution in California, carrying bacteria, metals, and other pollutants to our waterways, resulting in harm to the environment and economic loss potentially into the hundreds of millions of dollars every year from public health impacts alone.[163]

Low impact development (LID), is a land planning and engineering design approach that emphasizes rainwater harvesting, including through infiltration of water into the ground as well as capture in rain barrels or cisterns for later use onsite at new and redeveloped residential and commercial properties in the urbanized areas.[164] Improved stormwater management both enables cities, states, and individuals to increase access to safe and reliable sources of water while reducing the amount of energy consumed and global warming pollution generated by supplying the water.

Increased recycling of waste water is another important water supply option that is less impactful than sweater desalination. Between Santa Barbara and San Diego, sewage treatment facilities discharge between 1.5 to 3 billion gallons of freshwater a day. According to state estimates, development of water recycling projects can readily achieve an estimated 1.4 million to 1.7 million acre-feet by the year 2030, of which 0.9 million to 1.4 million acre-feet (62 to 82 percent) would be recycled from discharges that would otherwise be lost to the ocean, saline bays, or brackish bodies of water.[165] In Orange County, the Sanitation District built a world-renowned water reuse facility which generates enough purified water to serve 500,000 people.[166] According to the Report Card for America's Infrastructure, this facility is between 35 and 75% less expensive than saltwater desalination and will consume half the energy.[167] By prohibiting ocean discharges from wastewater treatment plants by 2030, the State Board could dramatically accelerate the adoption of water recycling and significantly improve the drought resistance of urban communities.[168] This would significantly increase available water supply for both agricultural and urban water users, at costs that are comparable to imported water and alternative supplies. This policy change would have at least two added benefits: it would improve coastal water quality by reducing ocean discharges, particularly of wastewater that is only treated to secondary levels; and it could potentially reduce greenhouse gas emissions, because recycled water consumes less electricity than many alternative water supply sources, including water imported from the Bay-Delta to Southern California and ocean or brackish water desalination. It is also recommended that the state develop a General Permit that would allow for the onsite use of greywater under specific conditions.

B. Alternative water supply options are less expensive than desalination.

Water produced by seawater desalination is very expensive with an average price per acre foot 4 to 8 times higher than water from other sources. Estimates for plants proposed in California range from \$1,900 to more than \$3,000 per acre-foot.[169] A 50 MGD plant, such as the one under construction in Carlsbad is projected to have a price between \$2042 - \$2290 per acre foot.[170] By comparison, the Department of Water Resources data cited in the 2009 California Water Plan Update found that:

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[163] *Id.*

[164] NOAH GARRISON ET AL., A CLEAR BLUE FUTURE: HOW GREENING CALIFORNIA CITIES CAN ADDRESS WATER RESOURCES AND CLIMATE CHALLENGES IN THE 21ST CENTURY, NRDC Technical Report 4 (2009), ***available at*** http://www.nrdc.org/water/lid/files/lid.pdf

[165] CAL. DEP'T OF WATER RES. CALIFORNIA WATER PLAN: UPDATE 2009 11-10 (2009), ***available at*** http://www.waterplan.water.ca.gov/docs/cwpu2009/0310final/v2c11_recycmuniwtr_cwp2009.pdf.

[166] Groundwater Replenishment System, Website: Question and Answer page, ***available at*** http://www.gwrsystem.com/about-gwrs/questions-a-answers.html

[167] American Society of Civil Engineers, Report Card for America's Infrastructure, ***available at*** http://www.infrastructurereportcard.org/case-study/groundwater-replenishment-system.

[168] NRDC DROUGHT RECOMMENDATIONS TO THE STATE WATER RESOURCES CONTROL BOARD 18-19 (Feb. 26, 2014), http://docs.nrdc.org/water/files/wat_14022701a.pdf

[169] ***See*** HEATHER COOLEY ET AL., PAC. INST., EXECUTIVE SUMMARY KEY ISSUES FOR DESALINATION IN CALIFORNIA: COST AND FINANCING 5 (2012), ***available at*** http://www.pacinst.org/reports/desalination_2013/financing_exec_sum.pdf

[170] ***See*** HEATHER COOLEY AND NEWSHA AJAMI, PAC. INST., KEY ISSUES FOR DESALINATION IN CALIFORNIA: COST AND FINANCING 12 (2012), ***available at*** http://www.pacinst.org/reports/desalination_2013/financing_final_report.pdf

- The "estimated range of capital and operational costs of water recycling range from $300 to $1300 per acre-foot" depending on local conditions.[171]
- The cost to realize an acre-foot of water savings through efficiency measures ranges from $223 to $522 per acre-foot.[172]
- The agricultural efficiency improvements that result in water savings of between 120,000 to 563,000 acre-feet per year can be achieved at a cost ranging from $35-$900 per acre-foot.[173]

While the cost of seawater desalination has declined over the past 20 years, the cost remains very high and there are unlikely to be major breakthroughs in the near- to mid-term that make it cost-competitive with the less expensive, and less impactful, alternatives.

C. Alternative water supplies options are less energy intensive—do not perpetuate climate change—compared to desalination.

A 2011 life-cycle energy assessment of California's alternative water supplies commissioned by the California Energy Commission found that, while a desalination system can have a wide array of impacts depending on the water source: "In all cases, the energy use is higher than alternative water supply."[174] Energy accounts for 36% of the cost to run a reverse osmosis seawater desalination plant.[175] The seawater desalination plant under construction in Carlsbad will require 47 percent more energy than water delivered to San Diego from the State Water Project Transfers – currently the highest energy demand in the region's water supply portfolio.[176] The Los Angeles Economic Development Corporation found ocean desalination to indirectly create more greenhouse gases than any other water source.[177] The Inland Empire Utilities Agency has similarly reported that ocean desalination would use *over ten times more energy* than water recycling in its service area.[178]

California's current water management system is already extremely energy-intensive: "water-related energy use consumes 19 percent of the state's electricity, 30 percent of its natural gas, and 88 billion gallons of diesel fuel every year."[179] In its 2008 Climate Change Scoping Plan document, the California Air Resources Board noted that one way for the state to achieve GHG emissions reductions is to replace existing water supply and treatment processes with more energy efficient alternatives.[180] Because

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171 CAL. DEP'T OF WATER RES. CALIFORNIA WATER PLAN: UPDATE 2009 11-10 (2009), *available at* http://www.waterplan.water.ca.gov/docs/cwpu2009/0310final/v2c11_recycmuniwtr_cwp2009.pdf.
172 CAL. DEP'T OF WATER RES. CALIFORNIA WATER PLAN: UPDATE 2009 3-25 (2009), *available at* http://www.waterplan.water.ca.gov/docs/cwpu2009/0310final/v2c03_urbwtruse_cwp2009.pdf
173 CAL. DEP'T OF WATER RES. CALIFORNIA WATER PLAN: UPDATE 2009 2-13 (2009) http://www.waterplan.water.ca.gov/docs/cwpu2009/0310final/v2c02_agwtruse_cwp2009.pdf
174 Arpad Horvath et al. LIFE-CYCLE ENERGY ASSESSMENT OF ALTERNATIVE WATER SUPPLY SYSTEMS IN CALIFORNIA, CAL. ENERGY COMM'N, 4 (2011) *available at* http://www.energy.ca.gov/2013publications/CEC-500-2013-037/CEC-500-2013-037.pdf; *see also* BARRY NELSON, ET AL., NATURAL RES. DEF. COUNCIL, IN HOT WATER: WATER MANAGEMENT STRATEGIES TO WEATHER THE EFFECTS OF GLOBAL WARMING 19, 35 (2007), *available at* http://www.nrdc.org/globalwarming/hotwater/contents.asp.
175 *See* HEATHER COOLEY AND NEWSHA AJAMI, PAC. INST., KEY ISSUES FOR DESALINATION IN CALIFORNIA: COST AND FINANCING 10 (2012), *available at* http://www.pacinst.org/reports/desalination_2013/financing_final_report.pdf
176 Bill Powers, Memorandum for Surfrider Foundation, "Assessment of Energy Intensity and CO_2 Emissions Associated with Water Supply Options for San Diego County," (Oct. 12, 2007).
177 LAEDC, "Where Will We Get the Water? Assessing Southern California's Future Water Strategies," 2 (Aug. 14, 2008) (LAEDC Report); *available at* http://www.laedc.org/sclc/documents/Water_SoCalWaterStrategies.pdf
178 MARTHA DAVIS, INLAND EMPIRE UTILITIES AGENCY, PRESENTATION TO THE STATE WATER RESOURCES CONTROL BOARD (March 2009), *available at:* http://www.swrcb.ca.gov/water_issues/programs/climate/docs/ieua_030409.pdf. *See also* CAL. ENERGY COMM'N, LIFE-CYCLE ENERGY ASSESSMENT OF ALTERNATIVE WATER SUPPLY SYSTEMS IN CALIFORNIA, (CEC-500-2005-101) *available at* http://www.energy.ca.gov/research/environmental/project_summaries/PS_500-02-004_HORVATH.PDF (evaluating the global warming potential of desalination versus recycling and import of water).
179 CAL. ENERGY COMM'N, CALIFORNIA'S WATER-ENERGY RELATIONSHIP 1 CAL. ENERGY COMM'N (2005), *available at* http://www.energy.ca.gov/2005publications/CEC-100-2005-007/CEC-100-2005-007-CMF.PDF.
180 *See* CAL. AIR RES. BD., CLIMATE CHANGE SCOPING PLAN APPENDICES, VOLUME I C-134 (2008), *available at* http://www.arb.ca.gov/cc/scopingplan/document/appendices_volume1.pdf

seawater desalination is so energy intensive, extensive development of this technology could lead to "greater dependence on fossil fuels, an increase in greenhouse gas emissions, and a worsening of climate change."[181]

To effectively minimize the impacts of climate change and reduce GHG emissions, the state should prioritize water supply and treatment alternatives that are energy efficient.

D. California should not encourage desalination because of the drought.

California should learn from Australia's mistakes. Severe drought from the mid-1990s until 2012 prompted Australia to construct six large-scale seawater desalination plants at a cost of $10 billion to provide an alternative source of drinking water.[182] At the same time, water policy reforms and improved efficiency measures were implemented through the country's National Water Initiative.[183] The plants took years to build, and by the time they were operational, the drought had eased and cheaper alternatives, made possible by the National Water Initiative, made the water from the desalination plants impractical.[184]

Today, four of the six Australian plants stand idle, illustrating the danger of demand risk, which "is the risk that water demand will be insufficient to justify continued operation of the desalination plant due to the availability of less expensive water supply and demand management alternatives."[185] Because many of the seawater desalination projects proposed in California are privately financed:

> "project developers may build large plants in an effort to capture economies of scale and reduce the unit cost of water. This can, however, lead to oversized projects that ultimately increase demand risk and threaten the long-term viability of a project."[186]

The plant in Sydney cost $2 billion to build, yet in 2012 it was shut down while taxpayers were left to pay $16 million per month for the cost of building the plant and its pipeline.[187] Melbourne also reacted to the drought and built the $3.6 billion Wonthaggi desalination plant, which came online in 2012.[188] Similar to the Sydney plant, Wonthaggi is now idle. Nevertheless, water consumers are continuing to pay $670 million annually for Wonthaggi's construction through water bill surcharges, and that is without one drop of water being drawn from the plant.[189] 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.

E. The State Board should consider the real-world implementation of the Amendment before it is adopted.

Over the past decade, our organizations have engaged in numerous industry conferences, academic and policy research efforts, and regulatory permitting processes for several California desalination proposals. That experience has given us a deep understanding of the need for the State Board to articulate not only the intent of the Desalination Amendment, but the specific language needed to ensure that the intent is

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[181] COOLEY ET AL. PAC. INST, DESALINATION, WITH A GRAIN OF SALT, A CALIFORNIA PERSPECTIVE 7 (2006), *available at* http://www.pacinst.org/reports/desalination/desalination_report.pdf

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

[183] *Id.*

[184] *Id.*

[185] KEY ISSUES FOR DESALINATION IN CALIFORNIA: COST AND FINANCING at 7.

[186] *Id.*

[187] Liz Foschia, "Sydney desalination plant to be switched off," ABC News (June 26, 2012), *available at* http://www.abc.net.au/news/2012-06-26/sydney-desalination-plant-to-switch-off/4092482.

[188] Murray Griffin, "Drought Prompts Australia to Turn to Desalination Despite Cost," Bloomberg (March 6, 2013), *available at* http://www.bloomberg.com/news/2013-03-06/drought-prompts-australia-to-turn-to-desalination-despite-cost.html.

[189] *Id.*

realized. Several past decisions by regional boards have clearly shown how the words and phrases of Water Code section 13142.5(b) can be interpreted and manipulated to undermine the goal of siting, designing and constructing seawater desalination facilities to minimize the intake and mortality of all forms of marine life. However, there are examples that exhibit the "good actors" ability to meet the intent of the law, and also ensure a quicker path to permits from several agencies, including regional boards.

The simplified question is whether a project proponent seeking a permit from a Regional Board has done everything possible to reduce the intake and mortality of marine life of all forms and life stages, through a combination of the best site available, the best design available, and the best technology available to achieve that minimization of harm. Obviously, if the project combined these elements in a way that eliminated the intake and mortality of all forms of marine life, or got as close as possible to elimination, that would clearly be the best possible combination. But if the project proposal does not get as close as possible to eliminating the harm, the question then becomes whether there is a better site, better design or better technology available. Pre-determining any one of these elements without ensuring compatibility with the other elements can result in the other elements being considered "infeasible" – and consequently result in a "less than the best" desalination project that does not minimize environmental impacts. For example, when an applicant requests adoption of a "site-specific" best technology standard[190], they are clearly not combining the "best site" with the "best technology" to collectively minimize the intake and mortality of all forms of marine life. We know from experience that this is "code" for picking a site for some other reason than minimizing the intake and mortality of all forms of marine life, and then arguing that the best technology is not feasible at the site. Further, some proposals show an unnecessarily high reliance on "after-the-fact restoration" over full minimization[191], and then argue against full replacement through after-the-fact restoration[192]. This is clearly undermining the intent of the law and the policy, but is arguably allowed under the currently proposed Amendment as written.

Fortunately there are also examples of project proposals that do combine the elements – site, design, and technology – in a way that collectively minimizes the intake and mortality of all forms of marine life. Permitting of the Sand City project, and planning for the CalAm project in Monterey has, in effect, started with the identification of sub-surface intakes as the best technology, and then identified several sites that may be compatible with that technology. Further, in the CalAm proposal, the design is still contingent on whether recycled wastewater can provide a portion of the demand, either now or in the future. We recommend the State Board follow this approach and advance a Desal Policy that requires site location, facility design, and technology to be collectively combined to minimize the intake and mortality of all forms of marine life: each of the elements has to be the best available, and the combination has to emphasize that the separate elements must be compatible and collectively minimize the intake and mortality of marine life. While we agree with the Municipal Water District of Orange County (MWDOC) and Poseidon that "minimize" harm does not necessarily mean "eliminate" harm – it is important to clarify that eliminating harm is clearly the best minimization. And as the *Riverkeeper* court clearly articulated, if the best possible minimization is 100 percent, and there is an acceptable variance of 10 percent, then 90 percent is the performance standard – not 89 percent.

Therefore, we request the State Board <u>*consider previous desalination permitting, and provide clear guidance and less discretion to Regional Boards to ensure consistent enforcement statewide*</u>. <u>*The final Amendment must include additional clarification language to ensure the elements of section 13142.5(b) minimize the intake and mortality of all forms of marine life both individually and through a combination that ensures compatibility and collective minimization.*</u>

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[190] *See* Attachment 1, Municipal Water District of Orange County (MWDOC) [in consultation with other water agencies, Cal Desal and Poseidon], "Information Item", August 4, 2014, bullet 3.

[191] *Id* at bullet 3 and bullet 5.

[192] *Id* at bullet 10.

The undersigned groups want to see a Desalination Policy adopted that requires seawater desalination facilities to be built in a manner that protects fish and marine life, and to be located in sites that minimize harm to the coast and ocean. 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
Surfrider Foundation

Sarah Sikich
Science & Policy Director, Coastal Resources
Heal the Bay

Karen Garrison
Co-Director, Oceans Program
Natural Resources Defense Council

Attachment 1

Item No. 4

INFORMATION ITEM
August 4, 2014

TO: **Planning & Operations Committee**
(Directors Osborne, Barbre, Hinman)

FROM: Robert Hunter
General Manager

Staff Contact: Karl Seckel/Richard Bell

SUBJECT: **Draft Amendment to the Water Quality Control Plan for Ocean Waters of California - Desalination Facility Intakes and Brine Discharges**

COMMITTEE RECOMMENDATION

Staff recommends the Committee receives and files the report.

SUMMARY

The SWRCB has been developing its Ocean Desalination and Brine Disposal Policy and Amendment to the Water Quality Control Plan for Ocean Waters of California ("Ocean Plan") over the past three years. On July 3, 2014 SWRCB staff released their Draft Staff Report, Draft Substitute Environmental Documentation report, and proposed Draft Amendment to the Ocean Plan. A public workshop and public hearing are scheduled for August 6 and 19 in Sacramento. Richard Bell will be attending.

Staff has been working with CalDesal, several coastal agencies developing ocean desalination projects, and with Poseidon Resources. The proposed regulations provide some flexibility, are well written and clear, but require improvement in several areas to make the regulations more workable and to clean up areas where oversights or inconsistencies exist, and where interpretation could lead to unintended constraints. Following are our main comments where the regulations need to be revised.

Budgeted (Y/N): n/a	Budgeted amount:	Core X	Choice __
Action item amount:	Line item:		
Fiscal Impact (explain if unbudgeted):			

1. **The term "Feasible" is not defined in the water code or proposed regulations; the SWRCB staff indicates this would allow greater flexibility in use of the term; we disagree.**

   It is our opinion, that a reasonable definition of feasible is warranted. It should be noted that in the recent Court of Appeals Decision in *Surfrider Foundation v. Cal. Regional Water Quality Control Board* upheld the use of the definition of "feasible" under CEQA. Under CEQA, "feasible" means "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social and technological factors". The Coastal Act relies on the same definition. For consistency, the SWRCB should consider this same definition.

2. **Need for Ocean Desalination and consistency with regional planning documents.**

   Page 4. 2.b.(1) – This section (under determination of the best site available), brings into the Ocean Plan the determination whether the proposed ocean desalination facility is needed and whether the proposed project is consistent with an integrated regional water management plan or an urban water management plan and County or City general plans regarding growth.

   This determination is beyond the scope of the statutory requirement under Section 13142.5 and is not part of the determination of the best available site. We don't see a need for this in the Ocean Plan. Water supply agencies are responsible for determining the need for local resource developments, not the SWRCB or RWQCB's. Local resource development plans, including ocean desalination, are typically included in their water supply agency plans. In the event that the SWRCB will not remove this provision, the provision should be expanded to also include water agency Water Master Plans, Water Resource Plans, and Water Reliability Plans.

3. **Regional Boards shall require subsurface intakes unless it determines that subsurface intakes are infeasible. This provision could be onerous, depending on the definition of feasibility.**

   The intake option should be a site specific, project-by-project determination. One size does not fit all. This standard could result in excessive costs and delays in permitting projects. It is the responsibility of the Project Proponent to make a determination of the best project intake system, based on cost, capacity, and other factors. This requirement could create an unreasonable burden and potentially increased costs to water agencies and to the public.

   The reason and justification given for this approach is that subsurface intakes do not cause impingement and entrainment impacts and thus would fully achieve the statutory requirement to minimize the intake and mortality of marine organisms. However, the statutory requirement **<u>does not require zero impact</u>**, but requires that impacts be minimized. Subsurface intakes may impact coastal environments during construction and maintenance activities. The water agency should determine the best intake method for each project considering all factors.

In the case of the Doheny Ocean Desalination Project, we have found that a subsurface slant well intake is feasible, provides adequate capacity for local agencies, causes no impact to marine organisms, can provide seawater intrusion control benefit, is less costly than an open intake system, coastal impacts can be mitigated to a less than significant level, and that the project can participate in assistance in restoration of the seasonal coastal lagoon and efforts to help in the recovery of southern steelhead trout.

4. **Brine Discharges shall be sited to "maximize their distance from Marine Life Reserves" and salinity shall not exceed natural background levels in MLR's.**

Page 4. 2.b.(6) – This section requires that brine discharges shall be sited **to maximize** their distance from an Marine Protected Area (MPA) or a State Water Quality Protection Area (SWQPA) such that there are **no impacts** to these areas and that the salinity does not exceed the natural background salinity. "Maximizing" the distance from an MPA or SWQPA is limitless, sets no feasible boundary, is a subjective consideration, and could lead to excessive costs to public agencies without any added protective benefit to marine organisms. Determination of a reasonable or sufficient distance to be protective of the MPA and SWQPA should be determined by the Regional Board with dispersion modeling information provided by the project proponent and taking into consideration that a 2 part per thousand parts (ppt) standard is fully protective for the most sensitive marine organisms. Determining a natural background salinity could be impossible from a compliance standpoint due to the impacts of the brine discharge and natural salinity variations. Siting the discharge edge of the Brine Mixing Zone (BMZ) at a reasonable distance from the MPA or SWQPA would achieve the protective objective of this section.

5. **Subsurface Intakes can be determined to be infeasible by the Regional Board.**

Section 2d(1)(a)(i): The Regional Board can determine that subsurface intakes are infeasible based on their analysis of specified criteria, including "presence of sensitive habitats, presence of sensitive species, energy use, impact to freshwater aquifers, local water supply, and existing water users..." This section should allow for mitigation of impacts and not be solely used by the Regional Board to determine that a subsurface intake is infeasible due to a finding of the **presence** of any of these criteria.

6. **Potential for recycling could prohibit co-disposal of brine with municipal wastewater.**

Section 2d(2)(a) states that the preferred technology for minimizing mortality of marine life resulting from brine disposal is to "…commingle brine with wastewater…**unless the wastewater is of suitable quality and quantity to support domestic or irrigation uses**". This clause in effect could be used to prohibit co-disposal of brine with municipal wastewater if the Regional Board determines that the wastewater could potentially be used in the future for recycling.

The Regional Board would likely condition the permit to require the agency to use an alternate method for brine disposal should a recycling project(s) reduces the amount of wastewater below levels necessary for dilution of the brine. This clause should be deleted or revised. Water supply agencies are responsible for development of water supply and reliability projects, not the SWRCB or its Regional Boards.

7. **Intake Marine Life Mortality Report and 3 year Entrainment Study is onerous.**

Page 37 Section 2e(1)(a): Entrainment Study requires at least a 36 consecutive month period of ocean sampling. This would delay the Poseidon Project from two to three years in order to comply with this requirement as only one year was used in procuring their existing NPDES permit, which is up for renewal in a couple of years. This requirement should be reduced to 1 year of ocean sampling for the permit application and allow additional post-permit issuance sampling to refine the predicted entrainment impact and mitigation determinations.

8. **Requirement for mitigating entrainment impacts in the Brine Mixing Zone (BMZ).**

Existing wastewater agencies are not required to mitigate for the very small entrainment losses that might occur from wastewater disposal within the zone of initial dilution. The SWRCB Expert Panel indicated that the mortality from shearing losses is likely quite small from high pressure jets. The monitoring costs would far exceed the value and cost of any mitigation and this can be better handled as a small adjustment to the mitigation acreage.

9. **Definition of BMZ prohibits acute toxicity in the BMZ which is non-attainable and would inadvertently prohibit brine disposal.**

As defined, it is impossible to prevent acute toxicity in the Brine Mixing Zone (BMZ) due to brine disposal. When brine firsts enters the ocean from the diffuser it is acutely toxic prior to being adequately diluted. A reasonable zone within the BMZ should be exempt from the acute toxicity rule. One approach is to make this definition consistent with current municipal wastewater discharge acute toxicity requirements in the Zone of Initial Dilution which prohibits acute toxicity beyond 10% of the distance from the edge of the discharge structure to the edge of the chronic brine mixing zone, if this is an adequate distance. Otherwise, this provision would in effect prohibit brine disposal. This is obviously not the intent of the SWRCB and this provision needs to be revised to make disposal through multi-port high pressure jets workable.

10. Mitigation requirements as proposed are excessive.

The mitigation for entrained organisms using the Area Production Foregone method as proposed would require meeting a 90 percent confidence level where prior mitigation requirements have required a 50 percent confidence level. Based on data shown in the appendix, the 90 percent confidence level would increase the required land area for mitigation by a factor of 4 fold or higher. In addition, using the two mesh sizes, the standard 335 micron size and a new requirement for a finer 200 micron mesh, would result in a greater number of entrained larvae and eggs, increasing the required mitigation level. Coastal wetland areas are limited and increasing the area requirement by a factor of 4 or more is unreasonable, especially if the approach is to use individual species. Use of mean species would be more representative of the total effect and would be a more reasonable approach if the benefits to be derived by the higher confidence levels and smaller mesh size are significant. If not, the amendment should rely on the prior standardized approach.