

Proposed Desalination Amendment: Creating a Consistent Permitting Process

As part of its mandate to protect water quality and beneficial uses in California, the State Water Resources Control Board is considering an amendment to its Water Quality Control Plan for Ocean Waters that would address desalination facilities. Permits for desalination facilities are currently reviewed and approved individually by regional water quality control boards.

The proposed desalination amendment would for the first time provide a uniform, consistent process for permitting of seawater desalination facilities statewide. In doing so, it provides direction for regional water boards evaluating new or expanded facilities, and provides specific implementation, monitoring and reporting objectives and requirements.

In developing this proposed amendment, the State Water Board staff seeks to support the use of ocean water as a reliable supplement to traditional water supplies while protecting marine life and water quality. The State Water Board is considering approval of the amendment to create certainty in the permitting process by providing direction on how to best assess and minimize environmental impacts associated with seawater desalination plants.

Desalination: A Tool for Addressing Local Water Needs

Desalination is the process of removing dissolved minerals from brackish or saltwater to produce freshwater that can be used for municipal needs such as drinking water and industrial uses. It is one element in California's diverse water supply portfolio. As noted in the state's [Water Action Plan](#), desalination can be a tool to improve water supply reliability and self-reliance at the regional and local level. Indeed, several coastal communities are looking to desalination as a way to develop additional, reliable supplies of municipal water, particularly as a buffer in times of drought.

Several large seawater desalination facilities are being considered or are under construction along the California coastline to augment water supplies. These include facilities in Carlsbad, Oceanside, Camp Pendleton, Dana Point, Huntington Beach, El Segundo, Oceano, Cambria, Monterey Bay, Santa Cruz, Moss Landing, and Pittsburg. Some much smaller seawater desalination facilities are already in operation, although many operate intermittently.

There is broad agreement that the state's water management system is currently unable to satisfactorily meet both ecological and human needs, too exposed to wet and dry climate cycles and natural disasters, and inadequate to handle additional pressures of future population growth and climate change. Solutions are complex and expensive, and they require the cooperation and sustained commitment of all Californians working together. To be sustainable, solutions must strike a balance between the need to provide for public health and safety, protect the environment and support a stable economy. Desalination is no exception.

Potential Impacts

Seawater desalination facilities access source water either using surface or subsurface intakes. Surface intakes typically draw water directly from a water body (e.g. an offshore ocean intake pipe); whereas, subsurface intakes draw water through pipes that are installed underground or under the seafloor (e.g. beach wells and infiltration galleries). The construction of surface and subsurface intakes

can result in marine life mortality; however, these impacts occur only for the duration of the construction.

Marine life may also be adversely affected by operation of the desalination facility intakes through entrainment or impingement. Entrainment occurs when organisms are drawn in with the source water and enter the facility's water processing system. Impingement occurs when organisms become trapped on intake screens. Surface intakes can entrain or impinge marine organisms, whereas subsurface intakes cannot. However, subsurface intakes may not be feasible for all projects. Studies have shown that organisms do not survive entrainment in facilities using traditional technology.

Surface intakes can be screened to reduce entrainment. The size of the gaps in the screen (slot size) will determine which organisms are protected from entrainment. Many aquatic organisms are very small and can pass through intake screens with small slot-sizes. Larger organisms can become trapped or impinged on intake screens, which can result in stress, bodily damage, or mortality. In addition to the direct effects on the entrained or impinged organisms, there are indirect effects on the aquatic ecosystem due to reduced food availability for wildlife that depend on the organisms removed by surface intakes.

Desalination facility discharges can also harm marine life and impair beneficial uses. The desalination process produces reject water, or brine, that contains high concentrations of salts that were removed from the source water. Brine is saltier, denser, and heavier than ocean water and is typically discharged into coastal waters through either a brine-specific outfall or a commingled discharge (e.g. treated sewage wastewater or once-through cooling wastewater). Brine can be toxic to marine organisms, and if improperly discharged, may accumulate on the sea floor and damage bottom-dwelling communities, including fish, plants, and algae.

A Multi-year Process to Develop the Amendment

An initial scoping meeting for the proposed Desalination Amendment was held on June 26, 2007 to seek input on the scope of action and alternatives, as well as the environmental information that should be included in the documentation prepared to support the Desalination Amendment. A second scoping meeting was held on March 30, 2012. Stakeholder meetings were held on April 18, 2011 and January 30, 2013 in addition to extensive targeted stakeholder outreach in June and July of 2013 to gain stakeholder input.

The State Water Board also commissioned expert review panels and scientific studies to provide background information for the proposed Desalination Amendment. The State Water Board held public workshops on August 22, 2012 and September 23, 2013 where the expert panel members presented their findings. The expert review panels provided recommendations on intake and discharge technologies to minimize impacts to marine species and also provided recommendations on how to assess appropriate mitigation for those impacts. The final reports are available at:

The Expert Panel I: Impacts and Effects of Brine Discharges

http://www.swrcb.ca.gov/water_issues/programs/ocean/desalination/docs/dpr.pdf

Salinity Toxicity Study

http://www.swrcb.ca.gov/water_issues/programs/ocean/desalination/docs/saltoxfr08012.pdf

Expert Panel II: Intake Impacts and Mitigation

http://www.swrcb.ca.gov/water_issues/programs/ocean/desalination/docs/erp_intake052512.pdf

Expert Panel III: Intake Impacts and Mitigation

http://www.swrcb.ca.gov/water_issues/programs/ocean/desalination/docs/erp_final.pdf

External Scientific Peer Review

The scientific data relied upon in the development of the proposed Desalination Amendment underwent an external scientific peer review by seven experts in the fields of marine ecology, marine toxicology, marine civil engineering, environmental engineering, and environmental fluid mechanics. The peer review and responses to peer review comments can be found here:

http://www.swrcb.ca.gov/water_issues/programs/peer_review/desalination/

http://www.swrcb.ca.gov/water_issues/programs/ocean/desalination/docs/amendment/150424_appendix_i.pdf

State Water Board staff released the proposed first draft of the Desalination Amendment and Draft Staff Report including the Substitute Environmental Documentation on July 3, 2014. The Draft Staff Report includes the project summary and goals, the regulatory setting, the environmental setting, the issues considered, an economic analysis, an analysis of potentially significant environmental effects of the proposed Desalination Amendment, any feasible mitigation for those effects, and other project alternatives considered.

In accordance with the California Environmental Quality Act requirements, the proposed Desalination Amendment and Draft Staff Report with the Substitute Environmental Documentation were circulated for public comment July 3, 2014. The first public comment period ended August 19, 2014 at noon with a public hearing. A public workshop was held August 6, 2014 during the comment period where the State Water Board heard testimony, but did not take action on the proposed Desalination Amendment. The public comments were taken into consideration and the draft documents were revised and re-released on March 20, 2015 for a second public comment period that ended April 9, 2015. The public comments were again taken into consideration and the draft documents were revised and re-released on April 24, 2015. Throughout the public comment and draft revision process, State Water Board Staff met with stakeholders to discuss their comments in greater detail to better understand their concerns.

The four main components of the Desalination Amendment

The proposed Desalination Amendment supports the use of ocean water as a reliable supplement to traditional water supplies while protecting marine life and water quality. The State Water Board is considering the adoption of the amendment to create certainty in the permitting process by providing direction on how to best minimize environmental impacts associated with seawater desalination plants. The proposed Desalination Amendment was designed to provide flexibility for site-specific considerations as well as future innovations that provide equivalent protection as current technologies. The proposed Desalination Amendment contains four primary components intended to control potential adverse impacts to marine life associated with the construction and operation of desalination facilities as described below:

- Clarify the State Water Board's authority over desalination facility intakes and discharges
- Provide direction to the regional water boards regarding the determination required by Water Code section 13142.5, subdivision (b) for the evaluations of the best available site, design, technology, and mitigation measures feasible to minimize the intake and mortality of all forms of marine life at new or expanded seawater desalination facilities.
- A salinity limit in marine discharge areas that is applicable to all desalination facilities. This limit will ensure that brine discharges to marine waters do not cause adverse effects to marine life.
- Monitoring and reporting requirements that include effluent monitoring, as well as monitoring of sediments and the health of bottom-dwelling organisms to ensure that the effluent plume is not harming marine life beyond the brine mixing zone.

The process for adopting the Desalination Amendment

The proposed Desalination Amendment will be considered for adoption by the State Water Board on Wednesday, May 6, 2015. If the proposed Desalination Amendment is adopted by the State Water Board, it must also be approved by the State Office of Administrative Law in order to become law. If approved, the Desalination Amendment would be implemented by the regional water boards through National Pollution Discharge Elimination System permits, a federal permitting process administered by the state, or other appropriate order pursuant to their authority under the Porter-Cologne Water Quality Control Act.

How to Stay Updated

Visit the State Water Board's web site on desalination:

http://www.waterboards.ca.gov/water_issues/programs/ocean/desalination/

If you would like to sign up for future automated email notifications of meetings related to desalination, please go to http://www.waterboards.ca.gov/resources/email_subscriptions/swrcb_subscribe.shtml, fill in the requested information and click on "California Ocean Plan" under the topic of "Water Quality".

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