



## IMPACTS OF DESALINATION

**D**esalination impacts vary widely based on the specifics of each site. The degree of the impacts in large part depends on overall plant design and operation, methods used for seawater intake and brine disposal, and specific physical and biological conditions in the vicinity of the plant. Other issues associated with the discharge are a decrease in water clarity and concentration of organic substances and metals contained in the waters being desalted. While, if unmitigated, the impacts caused by brine discharge can be severe, there are many existing measures that can be taken to minimize these impacts; by thinking wisely about the design of the facility and the location of its intakes and outfalls, the impacts can be minimized.

Desalting plants pump water in from a body of water through a structure such as a pipe or well, known as the intake. Plants using an open water intake, a pipe extending along the seafloor with one or more openings to take in water for the desalination plant, use screening material at the openings to keep large items from being sucked into the plant. When the desalting plant is actively pumping water into the plant, a current into the pipe is generated. Because of the current generated, the intake of water directly from the ocean usually results in loss of marine species through **impingement** and **entrainment**. Impingement occurs when organisms collide

with screens at the intake, and entrainment occurs when species are taken into the plant with the feed water and are killed during plant processes. Impingement and entrainment impacts can be mitigated by the use of certain designs and technologies.

Clearly the most contentious and controversial issue surrounding desalination is its potential to induce community growth. Along most of California's central coast, fresh water supply is one of the main limiting factors for community growth. With the addition of a large, new source of fresh water, growth can occur. While this issue is not addressed directly by sanctuary regulations, it is of major concern. Increased development of the coastline adjacent to the MBNMS could lead to degradation of marine water quality through increased urban runoff and higher utilization of or demand for sanctuary resources by humans.

There are currently three small desalination plants in operation along the coastline of the MBNMS. However, approximately ten additional facilities in the sanctuary region are in some stage of initial consideration or planning. Due to population growth in the area, continuing shortages and degradation of conventional water supplies, and advances in desalination technology, the trend will likely continue.

***T**he sanctuary is concerned with desalination, because it has the potential to negatively impact the marine environment through the introduction of brine discharge and other substances to sanctuary waters, and through the entrainment and impingement of marine organisms in the intake. Additionally, the construction of desalination facilities and associated pipelines often causes alteration of the seabed.*

***Three of the sanctuary's existing regulations relate directly to desalination.***

***The first*** involves a prohibition on discharging or depositing any material within sanctuary boundaries. Since the brine discharge, and in some cases other materials, are usually disposed of in ocean waters, this activity requires sanctuary authorization of Regional Water Quality Control Board (RWQCB) permits.

***The second*** sanctuary regulation pertains to discharging materials outside of sanctuary boundaries, which subsequently enter sanctuary waters and negatively impact MBNMS resources. As with the previous regulation, sanctuary approval via commenting on or authorization of the RWQCB permit is required.

***The third*** relevant regulation involves a prohibition on activities that cause alteration of the seabed. Thus, installation of certain desalination facility structures such as an intake/outfall pipeline on or beneath the ocean floor will also require sanctuary authorization.

## THE SANCTUARY'S ACTION PLAN

The sanctuary's "Desalination Action Plan" was developed jointly with a variety of stakeholders and partners and includes, but is not limited to, the following components:

- Collaborating with partners in the development and implementation of a regional planning approach to desalination
- Developing and implementing a set of guidelines to help determine how desalination plants and their intakes and outfalls can be best designed to minimize impacts to MBNMS resources
- Identifying conditions and habitat types that are most resilient to the environmental impact of brine discharge, as well as sensitive species and habitats where brine discharge disposal should be avoided
- Coordinating with the appropriate regulatory agencies to develop and implement guidelines to ensure planned facilities comprehensively consider potential impacts
- Collaborate with the appropriate regulatory agencies to define and set limits for constituents of brine discharge
- Coordinating with partners to define and implement environmental standards for minimizing entrainment and impingement
- Coordinating with the appropriate regulatory agencies to identify minimum requirements for the standard information submitted by permit-seeking applicants for proposed desalination facilities
- Coordinating with the appropriate regulatory agencies to identify additional requirements, such as sampling and monitoring, for proposed facilities that may affect sensitive habitats or may have significant impacts on coastal resource
- Coordinating with partners and other agencies to develop and implement a regional monitoring program to evaluate the cumulative impacts of multiple desalination facilities

*For a complete listing of the sanctuary's "Desalination Action Plan" please visit [http://sanctuaries.nos.noaa.gov/jointplan/m\\_reptoad.html](http://sanctuaries.nos.noaa.gov/jointplan/m_reptoad.html) and scroll down the page.*

## GLOSSARY

***Brackish water:***

Water with salt concentrations of between 5 and 20 parts per thousand (ppt).

***Brine:***

Water containing a high concentration of salt.

***Desalination:***

Process of removing salts from water sources. Also referred to as desalinization and desalting.

***Effluent:***

Water leaving a desalting process.

***Entrainment:***

Occurs when small organisms, such as plankton, larvae, and fish eggs, are drawn into a water intake and are subjected to pressure or temperature changes, usually resulting in mortality.

***Impingement:***

Occurs when fish and other aquatic organisms are trapped against screens used in intake systems.

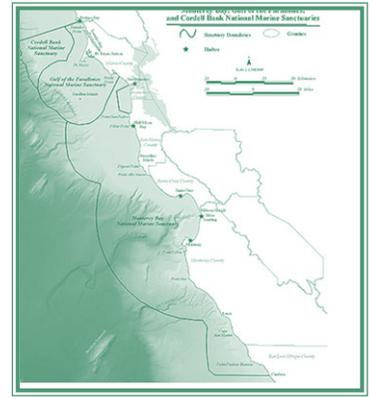
***Outfall:***

The location of brine discharge or the actual structure from which the discharge occurs.

# The Joint Management Plan Review (JMPR)

"Desalination is one of the action plans in the MBNMS Draft Management Plan. The MBNMS Draft Management Plan includes twenty-eight plans that, once finalized, will guide sanctuary management for the next five years. The plan is a revision of the original management plan, adopted with sanctuary designation in 1992, and is focused on how to best understand and protect the sanctuary's resources.

The National Marine Sanctuary Program (NMSP) is updating the management plans for the Cordell Bank, Gulf of the Farallones, and Monterey Bay National Marine Sanctuaries a process known as the Joint Management Plan Review (JMPR).



## Some Simple Things You Can Do to Conserve Water

### Saving Water Indoors

**Check** your home for leaks and repair any you find.

**Operate** automatic dishwashers and clothes washers only when fully loaded.

**Replace** your showerhead with an ultra-low-flow version and take shorter showers.

**Install** a toilet dam or displacement device to cut down on the water needed for each flush.

**Insulate** your water pipes. You'll get hot water faster and avoid wasting water while it heats up.

**Turn off** the water while shaving, brushing your teeth, or washing your face.

### Saving Water Outdoors

**Avoid** overwatering your lawn.

**Water** lawns during the early morning hours when temperatures and wind speed are the lowest.

**Position** water sprinklers so that they water plants and not your street, driveway, or sidewalk.

**Use mulch** to retain moisture in the soil, it controls

weeds competing with landscape plants for water.

**Plant** native and/or drought-tolerant grasses, ground covers, shrubs, and trees. Once established, they do not need water as frequently and usually will survive a dry period without watering.

**Use a broom** to clean leaves and other debris from sidewalks and driveways.

**Consider** using a commercial car wash that recycles water. If you wash your own car, park on the grass and use a hose with an automatic shut-off nozzle.

**Use** a shut-off nozzle on your hose adjusted down to a fine spray so water flows only as needed.

**Report** all significant water losses (broken pipes, open hydrants, errant sprinklers, abandoned free-flowing wells, etc.) to the property owner, local authorities, or your water agency.

## How You Can Get Involved in the MBNMS Management Plan Process

The MBNMS welcomes your ideas about important resource management issues in the sanctuary. A Draft Management Plan and Draft Environmental Impact Statement are scheduled for release to the public in 2006. Following their release, hearings will be held in several locations throughout the region to gather public comment. Written comments will be accepted as well. To find out about public hearings, or how to submit written comments, please visit our website at <http://www.sanctuaries.nos.noaa.gov/jointplan>.

## Resources

California Coastal Commission. *Seawater Desalination and the California Coastal Act*. March 2004. <http://www.coastal.ca.gov/energy/14a-3-2004-desalination.pdf>

California Department of Water Resources <http://www.owue.water.ca.gov/recycle>

Monterey Bay National Marine Sanctuary

<http://www.montereybay.noaa.gov/resourcepro/resmanissues/desal.html>

National Water Research Institute <http://www.nwri-usa.org>

Sanctuary Integrated Monitoring Network (SIMoN) <http://www.mbnms-simon.org>

State of California Water Desalination Taskforce "Findings and Recommendations" Report <http://www.owue.water.ca.gov/recycle/desal/Docs/Findings-Recommendations.pdf>

The ABC's of Desalting. <http://www.idadesal.org/PDFS/Publications/ABCs.pdf>

## THE MONTEREY BAY NATIONAL MARINE SANCTUARY

Stretching from Marin to Cambria, the Monterey Bay National Marine Sanctuary encompasses 276 miles of shoreline and 5,322 square miles (4,625 nautical miles) of ocean, extending an average distance of 30 miles from shore. At its deepest point, the sanctuary reaches down 10,663 feet (more than two miles). The sanctuary was established for the purposes of resource protection, research, education, and public use. Its natural resources include one of our nation's largest kelp forests and one of North America's largest underwater canyons. It is home to one of the most diverse marine ecosystems in the world, including 33 marine mammal species, 94 seabird species, 345 fish species, and numerous invertebrates and plants. This remarkably productive marine environment is fringed by spectacular coastal scenery, including sandy beaches, rocky cliffs, rolling hills, and steep mountains.

