

Water Quality Standards

<http://www.state.ak.us/dec/water/wqsar/trireview/trireview.htm>

2003-2006 Triennial Review

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Mixing Zone Requirements in Regulation (as of March 23, 2006)

In determining whether to authorize a mixing zone, DEC must consider:

- the characteristics of the receiving water
- the characteristics of the effluent
- the effects, including cumulative effects of multiple discharges, along with nonpoint sources of pollution on the uses of the water
- any measures that would mitigate potential adverse effects to aquatic resources
- any other relevant factors

In order to authorize a mixing zone DEC must find that the:

- effluent will be treated to remove, reduce and disperse the pollutants using the most effective, technologically and economically feasible, and at a minimum consistent with statutory and regulatory treatment requirements
- designated and existing uses of the waterbody as a whole will be maintained and protected
- overall biological integrity of the waterbody will not be impaired
- mixing zone is as small as practicable

To obtain a mixing zone approval, the mixing zone can not:

- result in an acute or chronic toxic effect in the water column, sediments, or biota outside the boundaries of the mixing zone
- create a public health hazard that would preclude or limit existing uses of the waterbody for water supply or contact recreation
- preclude or limit established processing activities, commercial, sport, personal-use, or subsistence fish and shellfish harvesting
- result in a reduction in fish or shellfish population levels
- result in permanent or irreparable displacement of indigenous organisms
- adversely affect threatened or endangered species except as authorized under the Endangered Species Act
- form a barrier to migratory species or fish passage
- contain pollutants that bioaccumulate, bioconcentrate, or persist above natural levels in sediments, water, or biota
- present an unacceptable risk to human health from carcinogenic, mutagenic, teratogenic, or other effects
- settle to form objectionable deposits
- produce floating debris, oil, scum and other material in concentrations that form nuisances
- result in undesirable or nuisance aquatic life
- produce objectionable color, taste, or odor in aquatic resources harvested from the area for human consumption
- cause lethality to passing organisms
- exceed acute aquatic life criteria beyond a smaller initial mixing zone surrounding the outfall

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Mixing Zones Fact Sheet

What is a mixing zone?

Even with the best treatment technology, wastewater discharges from sewage treatment and industrial facilities (i.e. mining, seafood processing, oil exploration or production, etc.) sometimes have low levels of pollutants. Most wastewater discharges permitted in Alaska are to surface waters such as the ocean, lakes, streams, or rivers. The area where treated wastewater is authorized by DEC to mix with a water body is called a mixing zone.

How do they work?

All wastewater discharges into surface water require a permit that may contain authorization for a mixing zone. Mixing zone authorizations take into consideration habitat and aquatic life, water flow, water quantity, natural currents, and the quantity and quality of the wastewater that's being discharged. If the circumstances surrounding a proposed mixing zone do not meet the State's standards, a mixing zone cannot be authorized. Requiring an authorization for mixing zones ensures that they are carefully designed using waterbody-specific information, water quality is monitored, and that water quality standards are met outside the mixing zone boundary so as not to create long-term impacts to people or the environment.

Who uses mixing zones?

Most mixing zones are authorized for sewage treatment plants run by local governments, as well as seafood processors, fish hatcheries, oil and gas facilities, mining operations and other industrial facilities.

Why are mixing zones used?

Mixing zones are an important tool regulators use to control water pollution. They allow Alaska to have very high standards for water quality. Without the authority to issue mixing zones, the State would have to use other methods to adjust for current limitations in treatment technologies, which could result in lowering the overall standards. Without mixing zones, sewage treatment plants would have to treat raw sewage to a level that could serve as a source of drinking water before being discharged into a water body. Although this goal may be technically achievable by NASA standards, it is not yet an economically feasible option for most communities or industries. There are no sewage treatment plants or seafood processors in Alaska that discharge wastewater to a surface water body (and the vast majority do) that could operate without a mixing zone.

What does the law say about mixing zones?

States have authority to allow mixing zones under the Clean Water Act; the Environmental Protection Agency has published mixing zone guidance; and all other states use them in addition to Alaska. Mixing zones have been included in the Alaska water quality standards regulations since 1973.

By State statute, the department must designate specific uses of water and establish standards for quality and purity to protect those uses. The water quality standards, which include mixing zone provisions, must protect the growth and propagation of aquatic life, the public health of those who consume the water or the aquatic organisms, and other water uses such as industrial, agricultural and recreational use. State statute also directs the Departments of Natural Resources and Fish and Game to protect salmon and resident fish habitat quality and establishes requirements for construction in, or use of waters (for example, as a mixing zone) that are important to fish.

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Examples of Mixing Zones in Alaska Today

Nearly every wastewater discharge to Alaska's surface waters has a permit that includes provisions for a mixing zone. The most common are for municipal wastewater treatment systems. Under current regulations mixing zones may be authorized in streams and rivers that contain salmon, but may not be authorized in spawning areas for salmon and specified resident fish in these waters. Mixing zones are also commonly authorized in marine waters. Below are some examples of mixing zones authorized in Alaska today.

General Permit for Shore-based Seafood Processing Facilities

The large majority of seafood processing facilities operate under a general permit. The mixing zone is for residues, dissolved gas, oil and grease, pH, color, turbidity, fecal coliform, total residual chlorine and temperature. The mixing zone is defined as a cylindrical volume with a horizontal radius of 100 feet from the diffuser and the full depth of the waterbody.

Mendenhall Wastewater Treatment Plant – Juneau

A mixing zone for municipal wastewater is allowed in the Mendenhall River for fecal coliform bacteria, dissolved oxygen, pH, metals, nutrients, and whole effluent toxicity (WET). The mixing zone for this discharge is defined as the area within a rectangle centered over the diffuser with a width of 30 meters and extending both upstream and downstream from the diffuser a distance of 150 meters, and to the full depth of the river. The mixing zone size is based on a 10-year, 7-day low river flow. The mixing zone provides a dilution of 10:1.

Soldotna Wastewater Treatment Facility – Soldotna

A mixing zone for municipal wastewater is allowed in the Kenai River for fecal coliform bacteria, dissolved oxygen, temperature, total chlorine residual, pH, metals, nutrients, and whole effluent toxicity (WET). The mixing zone for this discharge is defined as the area extending downstream from the diffuser a distance of 47 meters and having a width of 5 meters. The mixing zone provides a dilution of 30:1.