Surface Water Quality Standards

Surface Water Quality Standards are the foundation of state/tribal water quality-based pollution control programs under the Clean Water Act. They are developed to protect public health or welfare, enhance the quality of the water, and serve the purposes of the Clean Water Act.

Surface Water Quality Standards are composed of three main parts: designated uses, criteria, and antidegradation language.

Criteria for toxic chemicals in surface waters

Washington's criteria for toxics include metals such as copper and lead, organic chemicals such as pesticides, dioxins, PCBs, ammonia, chlorine and chloride. Criteria are developed to protect water quality for both aquatic life and human health.

Purpose and development of toxics criteria

Small fish eat many types of microscopic plants and animals that live in or on the water. Small fish are eaten by larger fish which may ultimately be consumed by humans. All life along the food chain is dependent on the water environment. It is for this reason that the quality of the nation's surface waters must be protected.

The Clean Water Act directs the U.S. Environmental Protection Agency (EPA) to develop criteria for water quality that accurately reflect the latest scientific knowledge about the effects of pollutants on aquatic life and human health. In developing these criteria, EPA examines the effects of specific pollutants on plankton, fish, shellfish, wildlife, plant life, aesthetics, and recreation in any body of water. This includes specific information about the concentration and dispersal of pollutants through biological, physical, and chemical processes as well as the effects of pollutants on biological communities as a whole.

States generally adopt EPA's recommended criteria into their water quality standards. Once criteria are adopted into state standards, they form the basis for many programs, including National Pollutant Discharge Elimination System (NPDES) point source permitting, Clean Water Act 303(d) listings of impaired waters, and Total Maximum Daily Load (TMDL, or water cleanup plan) evaluations.

Washington has criteria for toxic chemicals *to protect both aquatic life and human health***.** These two types of criteria establish numeric limits for toxic chemicals discharged into the water to ensure that fish and other aquatic animals can grow and reproduce safely and that humans are protected from ingestion-based exposure pathways from surface waters that have been contaminated by toxic chemicals.

Human health-based criteria

Human health criteria represent the highest concentration of a pollutant in water that is not expected to pose a significant risk to human health. People can potentially ingest toxic pollutants due to contaminated surface waters by eating fish the waters have contaminated, or by consuming untreated water. To reduce the risk to humans from these sources, EPA scientists research information to determine the levels at which specific chemicals are not likely to adversely affect human health. EPA publishes

these levels as *human health criteria* that the states use, along with other information, to set allowable concentrations of pollutants in their water quality standards. These criteria protect people from exposure to harmful levels of toxic pollutants in surface waters.

Human health criteria for toxics are calculated values that include consideration of toxicity, exposure**,** and risk:

- Toxicity: A measure of cancer potency or systemic toxicity (a measure of the strength of the toxicity of the chemical).
- Exposure: These inputs include default exposure assumptions based on national data, such as drinking 2 liters (approximately 2 quarts) of water per day, a body weight of 70 kg (154.5 pounds), an life-span of 70 years, and a fish intake rate (for Washington) of 6.5 grams per day (6.9 oz. of fish per month).
- Risk: Washington has a risk level for carcinogens that is set so that no more than one extra incidence of cancer should occur for every one-million individuals exposed to an individual toxic chemical at the exposure assumptions discussed above.

Aquatic life-based criteria

Aquatic life criteria represent the highest concentration of a pollutant in water that is not expected to pose a significant risk to aquatic life. Aquatic life criteria provide full protection for plants and animals that are found in surface waters. Aquatic life criteria are based on toxicity information. They are developed to protect aquatic organisms from death, slower growth, reduced reproduction, and the accumulation of harmful levels of toxic chemicals in their tissues that may adversely affect consumers of such organisms.

Aquatic life criteria for toxics are calculated using data on at least three considerations:

- Magnitude of the effect: Short-term effects (death) or long-term effects (reduced growth, reproduction, or bioaccumulation).
- Duration of exposure: How long the organism is exposed to the chemical in the water.
- Frequency of exposure: How frequently the organism experiences the exposure.

For more information

To see Washington's water quality standards for toxics go to http://www.ecy.wa.gov/programs/wq/swqs/toxics.html.

For additional information contact Cheryl Niemi, Surface Water Quality Standards Specialist, Department of Ecology, 360.407.6440, cheryl.niemi@ecy.wa.gov, and see http://www.ecy.wa.gov/programs/wq/swqs/toxics.html.

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