



Division of Water

FAQ – Copper PBA

Water Quality Standards

The Department is proposing to adopt amendments to 18 AAC 70 (Water Quality Standards) to adopt a performance-based approach (PBA) for the development of site-specific criteria (SSC) using the biotic ligand model (BLM) for copper.

What changes are proposed?

The Department proposes to amend the Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (Toxics Manual) to adopt by reference a performance-based approach titled “Implementation of the Biotic Ligand Model for Derivation of Freshwater Aquatic Life Criteria for Copper on a Site-Specific Basis in State Water Quality Standards” in note 20.

Additionally, references to the Toxics Manual in regulation at 18 AAC 70.020(b) and in note 5 are updated to reflect the adoption date of the updated Toxics Manual; and the section at 70.235 describing how site-specific criteria are developed is repealed and readopted with changes to allow the use of a performance-based approach to develop site-specific criteria in permits.

How would this change impact Alaskans?

The proposed changes create an additional pathway to determine appropriate concentrations of copper in waters of the state in specific locations, based on toxicity prediction using the biotic ligand model (BLM.)

Dischargers with existing copper limits will not need to take any action; the statewide water quality criteria for copper utilizing a hardness-based calculation will remain in place and continue to be used in most cases.

In some instances, copper toxicity in a specific location may be impacted by factors not accounted for in the existing hardness-based equation for copper criteria, for example, by high dissolved organic carbon, or high or low pH. These amendments would allow the Department to use an alternative, yet equally protective, method to determine acceptable levels of copper on a site-specific basis.

Ultimately, this rulemaking will increase the Department’s implementation options to protect Alaska’s aquatic life, using a scientific, well-researched, and widely accepted approach (the BLM.) Alaskans will benefit from additional methods for developing permit limits and from more precise protection of Alaska’s aquatic life.

Learn more at: <https://dec.alaska.gov/water/water-quality/standards>, or scan:





What is a performance-based approach?

A performance-based approach (PBA) is a step-by-step process for calculating revised water quality criteria. When a state adopts a PBA, the EPA reviews and approves the approach, and review of each specific outcome may not be necessary. Because the approach is well-defined and consistent, Alaskans can be confident in the results; meanwhile, the reduction in administrative overhead will streamline implementation of water quality standards, increase efficiency and reduce wait times for site-specific criteria implementation.

What are site-specific criteria?

Site-specific criteria are employed to reflect that Alaska's statewide water quality standards are not appropriate to protect aquatic life in every instance. For example, some streams in Alaska have naturally high dissolved metals, due to the geology of the watershed; aquatic life that reside in these streams are typically adapted to the natural water chemistry. Not all aquatic life respond the same way to every potential toxicant; some may thrive where naturally high metal concentrations provide a competitive advantage. Considering these streams to be impaired and targeting them for remediation efforts based on these factors may not align with the state's goals or with the intent of the Clean Water Act. Site-specific criteria allow the Department to adopt water quality criteria protective of aquatic life that are reflective of a specific location's natural characteristics. Site-specific criteria must be protective of the designated uses of the waters they apply to and must be supported by science.

What is the biotic ligand model?

The biotic ligand model (BLM) is one of a number of approaches to estimating the toxicity of metals (in this case, copper) to aquatic life. The BLM considers pH, dissolved organic carbon, and major cations and anions. This approach represents an increase in accuracy over traditional hardness-based equations by accounting for the impacts of these additional factors. However, it also represents an increase in complexity, with higher data requirements for useful results.

Why isn't Alaska proposing to adopt the BLM statewide?

While the BLM is shown to be more accurate in predicting the toxicity of copper and other metals than hardness-based equations, employing the BLM requires additional ambient water quality data collection, computational power, expertise, and more rigorous quality assurance. Because of these barriers, the Department does not find the BLM to be appropriate for statewide application in Alaska at this time.