2018-2020 Triennial Review
Issues Summary and Prioritization

Summary

This document summarizes state water quality standards (WQS) issues and projects that will occur during the 2018-2020 Triennial Review (TR) cycle.

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Background

Every three years the Department of Environmental Conservation (DEC) is required to review Alaska's WQS. This comprehensive evaluation is referred to as the *Triennial Review*. The TR is required by Code of Federal Regulations (CFR) §131.13; regulations applicable to the federal Clean Water Act. The TR helps to ensure pollution limits for Alaska's surface waters are up-to-date by integrating new science, policy, technology, and federal requirements into the state WQS regulations at 18 Alaska Administrative Code (AAC) 70.

The following is the list of issues and projects that DEC has identified as DEC's priorities during the 2018-2020 TR cycle.

I. 2018-2020 Triennial Review Summary

A. High Priority Issues for Rulemaking: The following reflect prior commitments or current DEC high priority projects already under review. These project are listed in order of proposed priority:

1. Antidegradation Implementation Regulations (Continuation from 2015-2017 cycle)

2. Water Quality Standards Variances

3. Water Quality Standards Toxics Manual Update
    a. Noncarcinogens - Human Health Criteria (Continuation from 2015-2017 cycle)
    b. Carcinogens - Human Health Criteria (Continuation from 2015-2017 cycle)
    c. Ammonia- Aquatic Life Criteria
    d. Cadmium – Aquatic life criteria

4. Water Quality Criteria Clarifications
    a. Duration values for conventional criteria
    b. Definition of freshwater/marine waters
    c. Standard Analytical Methods (routine technical update)

B. **Issues for Information Gathering and Analysis**: The following issues and projects are prioritized for information gathering and analysis. Rulemaking may occur as the result of DEC's review efforts during the 2018-2020 Triennial Review.

1. Mixing Zones- Dilution Allowance Clarification
2. Temperature Criteria
3. Turbidity Criteria

C. **Issues for Tracking and Monitoring**: The following issues and projects are prioritized for tracking and monitoring for changes in scientific research and emerging science policy. Rulemaking on these issues is not anticipated during the 2018-2020 cycle

1. Aluminum – Aquatic life criteria
2. Benthic Sediment Criteria
3. Biocriteria
4. Copper – Aquatic Life Criteria
5. Dissolved Inorganic Substances for Total Dissolved Solids
6. Groundwater Standards
7. Natural Conditions
8. Nutrient Criteria: Cook Inlet Ecoregion
9. Other Toxics – Aquatic Life Criteria
    a. Acrolein – Aquatic Life Criteria
    b. Carbaryl – Aquatic Life Criteria
    c. Manganese - Human Health Criteria
    d. Methylmercury - Human Health Criteria
    e. Selenium – Aquatic Life Criteria
10. Petroleum Hydrocarbons – Aquatic Life Criteria
11. Pharmaceuticals and Personal Care Products
12. Recreational Water Quality Criteria

II. Issue and Project Descriptions

A. High Priority Issues for Rulemaking

1. Antidegradation Implementation Regulations

DEC has adopted final implementation regulations meeting federal Clean Water Act requirements. DEC will be developing additional implementation documents that reflect the updated antidegradation policies for the Alaska Pollutant Discharge Elimination System program. DEC will continue efforts to clarify the Tier 3 nomination and determination process during the 2018-2020 TR cycle.

2. WQS Variances

WQS variances are used to allow temporary modification of a designated use and associated water quality criteria. WQS variances may be applied to a discharge permit or water body.

DEC may conduct rulemaking to provide DEC the authority to adopt WQS variances in accordance with federal regulations.

3. **Water Quality Standards Toxics Manual Update**
   Periodically, Alaska updates its "Water Quality Criteria for Toxics and Other Deleterious Substances" applicable to 18 AAC 70.020(b) and noted in the Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances. This update will address the following pollutants:

   a. **Noncarcinogens - Human Health Criteria**
      Human health criteria are water quality criteria established to minimize health risks to humans through the consumption of aquatic organisms (e.g. fish, shellfish) and surface water over the course of a lifetime. DEC will be continuing to work on updating the current human health criteria, conducting outreach on the findings of the DEC Technical Workgroup, and developing tools and policies to help facilitate implementation of the new criteria in water pollution control programs. .

   b. **Carcinogens - Human Health Criteria**
      Updates to carcinogenic human health criteria will take place in conjunction with updates to noncarcinogenic human health criteria proposed during the 2018 - 2020 TR cycle.

   c. **Ammonia – Aquatic Life Criteria**
      Ammonia is a non-priority toxic pollutant found in a variety of discharges. In August 2013, EPA published final water quality criteria for acute and chronic levels of ammonia found in freshwater. DEC will consider adoption and implementation issues associated with this issue.

   d. **Cadmium – Aquatic Life Criteria**
      In 2016 EPA issued new recommended freshwater and marine criteria for the metal cadmium. DEC will consider implementation issues that may result from adoption of these criteria.

4. **Water Quality Criteria Clarifications**

   a. **Water Quality Criteria Duration Values**
      Water quality criteria consist of a numeric or narrative value (magnitude), a period in which exposure is assessed (duration), and an allowable number of exceedances of the magnitude and duration (frequency). DEC proposes to clarify duration values for certain pollutants in 18 AAC 70.020.

   b. **Definition of freshwater and marine waters**
      DEC does not have formal definitions of freshwater or marine waters at 18 AAC 70.990. DEC will consider the implications of adoption of formal definitions to different water pollution control programs.

c. Standard Analytical Methods
Standard laboratory analytical methods that have been approved of by EPA are required in order to measure compliance with state WQS. DEC proposes to review and adopt EPA's most recent approved methods to determine compliance with WQS.

B. Issues for Information Gathering and Analysis

1. **Mixing Zones- Dilution Allowance Clarification**
In certain cases the mixing of effluent and ambient waters may occur in a "rapid and complete" manner such that aquatic life will not be exposed to pollutants in a temporally or spatially limiting incomplete mixed manner. EPA permitting guidance indicates that discharges with rapid and complete mixing may be expressed as a dilution allowance. DEC will review federal and state guidance and legal authorities pertaining to application of rapid and complete mixing in the form of dilution allowances and/or mixing zones to evaluate whether DEC should revise 18 AAC 70.240 or the 2009 Mixing Zone Guidance to explicitly note when dilution allowances are allowable and under what conditions.

2. **Temperature – Aquatic Life Criteria**
Studies have indicated that increases in stream temperatures, shifts in annual temperatures, and loss of cold water refuges can negatively affect aquatic life. DEC will examine the growing body of knowledge on the effects of increasing temperatures on aquatic life, particularly salmonids, and potential amendments to the existing WQS regulations.

3. **Turbidity Criteria**
Studies have indicated a variety of impact on designed uses associated with increased turbidity above background levels. Certain studies have demonstrated that behavioral responses in fish may be more likely to occur at changes to very low levels of turbidity (0-10 NTU) in clear water systems. DEC will review current science pertaining to turbidity, various approaches to regulating turbidity and may consider alternative approaches to better regulate turbidity in Alaska.

C. Issues for Tracking and Monitoring

1. **Aluminum – Aquatic Life Criteria**
In 2017 EPA issued draft recommended aluminum criteria for freshwater aquatic life. The criteria apply a modeling approach and is most sensitive to pH and hardness. The proposed approach is considered to be a more accurate means of determining the degree of toxicity a particular pollutant poses to aquatic life based on multiple modeling inputs. DEC would be considering how the model would be implemented in Alaska as part of this Triennial Review cycle.

3. **Benthic Sediment Criteria**
   Alaska's WQS protect surface waters and "bottom substrates" but do not provide guidance on what criteria to use in bottom substrates. Maintaining the quality of sediments can be important for maintaining water quality and protecting designated or existing water uses. DEC may consider the need for and value of development and adoption numeric sediment quality criteria and/or guidance on the development of site-specific sediment quality criteria.

4. **Biocriteria**
   Alaska's WQS are predominantly derived from physical and chemical water quality criteria. This potential issue consists of looking at the development and use of biological criteria, or "biocriteria," as the basis for establishing WQS. Because the necessary knowledge base to establish numeric biocriteria generally requires ten years of monitoring data, this effort will not result in statewide numeric values. However, there is potential to adopt general narrative biocriteria for those regions of Alaska where data is available.

5. **Copper - Aquatic Life Criteria**
   EPA approved use of the biotic ligand model (BLM) for derivation of copper criteria in 2007. The BLM is more predictive of lethal and nonlethal effects to aquatic life due to its ability to assess multiple parameters (e.g. hardness, multiple chemicals) against bioavailability. DEC may consider development of guidance pertaining to use of the BLM for copper on a site-specific basis during the 2018 – 2020 Triennial Review cycle.

6. **Dissolved Inorganic Substances, Total Dissolved Solids (TDS)**
   The current criteria were adopted in 1999. TDS is a measure of inorganic salts, organic matter, and other dissolved materials in water (US EPA 1986). The current TDS criterion for drinking water supply and aquatic life is 500 mg/L. A demonstration of "no adverse effect" is allowed for the 500-1000 mg/L TDS range for aquatic life criteria under Note 12 of the criteria table in 18 AAC 70.020(b). In some studies, adverse effects as low as 250 mg/L calcium-based TDS were found during fertilization of salmonids. In April 2002, EPA approved Alaska's current TDS criteria. However, the approval letter indicated that the specific outcomes of applying the narrative standard in Note 12 would require a case-by-case EPA review until sufficiently detailed implementation procedures were developed by DEC and approved by EPA. In 2006 DEC reviewed research literature on TDS and its effect on fish and other aquatic life and found toxicity values to be less than the current standard of 500 mg/L.

7. **Groundwater Standards**
   Under current regulations, groundwater is protected using the same aquatic life criteria as surface waters. While there is not necessarily aquatic life in the groundwater itself, aquaculture facilities (e.g. hatcheries) may use groundwater to raise aquatic organisms. The more common use of groundwater is for drinking water. Water quality criteria to protect humans for the drinking water use are less stringent for many substances than the criteria to protect aquatic life. Therefore, protecting all groundwater for an aquatic life use, when that

use is rare or non-existent, may not be necessary. DEC may consider alternatives that ensure protection of aquatic life where groundwater discharges to surface waters.

8. **Natural Conditions**
   DEC does not have an EPA-approved method for determining ambient water quality based on natural conditions. EPA disapproved proposed revisions to existing regulations in 2009 but continues to allow DEC to use natural conditions language from the 2003 regulations. The 2003 regulations do not include implementation procedures. EPA is working on development of an agency policy position and recommendations to states.

9. **Nutrient Criteria - Cook Inlet Ecoregion**
   The regulation of nutrients is a major concern for EPA and many states. Preliminary nutrient studies have been undertaken on several lakes in the Cook Inlet ecoregion, including the Anchorage area, the Matanuska-Susitna valley, and the western half of the Kenai Peninsula. This ecoregion is the most likely area for impact by nutrients from urban and agricultural runoff due to the concentrations of the state population in these areas. More study will be necessary before there is sufficient data to characterize lakes in the area and adopt numeric nutrient criteria in Alaska. Narrative criteria to address nutrient problems were adopted as part of the 2003 amendments to the WQS regulations. DEC may consider whether there is sufficient information and need to amend the 2003 criteria, and proposing amendments to the WQS regulations, if warranted.

9. **Other Toxic Criteria**

   a. **Acrolein – Aquatic Life Criteria**
      Acrolein criteria was promulgated for Alaska as part of the 1992 National Toxics Rule. Acrolein is a pollutant (biocide) primarily used for irrigation ditch weed control and algal management. Alaska is working on adoption of acrolein criteria for the protection of human health during this Triennial Review cycle but does not anticipate adoption of criteria for the protection of aquatic life at this time. DEC may revise this decision should additional information warrant.

   b. **Carbaryl – Aquatic Life Criteria**
      Carbaryl is a non-priority pollutant (pesticide) used for pest control and fruit thinning. Alaska has not previously adopted criteria for this pollutant. Carbaryl is not considered to be a pollutant of public concern in Alaska at this time and DEC is not considering its inclusion during the 2018-2020 Triennial Review cycle. DEC may revise this decision should additional information warrant.

   c. **Manganese - Human Health Criteria**
      The current human health criterion for manganese is based on EPA recommendations originally published in 1976. The document indicates that manganese at levels over 0.05 mg/L may cause taste, staining and other primarily aesthetic problems. This potential Triennial Review issue would consider revising the

human health criterion for manganese based on EPA's 2000 guidance that established a lifetime health advisory criterion for manganese at 0.3 mg/L.

d. Methylmercury - Human Health Criteria
In January 2001, EPA published a water quality criterion of 0.3 mg/kg for methylmercury. This criterion describes the concentration of methylmercury in freshwater and estuarine fish and shellfish tissue that should not be exceeded in order to protect consumers of fish and shellfish. This project will consider implementation issues that may result from adoption. This project may be conducted in conjunction with general updates to Alaska's human health criteria.

e. Selenium – Aquatic Life Criteria
In 2016 EPA recommended a new chronic criterion for selenium to protect freshwater aquatic life. The new criterion is primarily based on organisms consuming selenium-contaminated food rather than only being exposed to selenium dissolved in water. The criterion is expressed as both fish tissue and water column values. DEC will be considering how this criterion would be implemented in water pollution control programs prior to engaging in rulemaking.

10. Petroleum Hydrocarbons – Aquatic Life Criteria
Alaska's numeric aquatic life criteria for petroleum hydrocarbons were adopted in 1979, were last reviewed in 2010, and continue to be the most stringent in the nation at approximately two to three orders of magnitude lower than other states' criteria. DEC will continue to monitor new scientific literature on the toxicity of petroleum hydrocarbons. In addition, DEC plans to develop implementation guidance for Clean Water Act Section 303(d) listings to address the unique characteristics of petroleum hydrocarbons and their effects on aquatic species. Petroleum characteristics have led to unique challenges in implementing this standard in Alaska. Obtaining representative samples is challenging due to the volatility of the pollutants, intermittent and seasonal sources (e.g. motorized watercraft during three-week salmon fishery periods), and chronic exposure averaging periods.

11. Pharmaceutical and Personal Care Products (PPCPs)
National water quality monitoring efforts have demonstrated that pharmaceutical and personal care products regularly enter wastewater systems through our homes and businesses and may be found in low concentrations in certain surface waters. Some examples of PPCPs include prescription and over-the-counter therapeutic drugs, veterinary drugs, Nutraceuticals (e.g., vitamins) and cosmetics. To date, scientists have found no evidence of adverse human health effects from PPCPs in the environment. However, PPCPs contain a diverse set of chemical compounds that may be under-regulated that have the potential to cause harm to aquatic life. This potential Triennial Review topic will consist of monitoring national efforts to address this issue including monitoring, risk assessment, and rule making efforts in other states or by EPA.

13. **Recreational Ambient Water Quality Criteria**
    In 2016 EPA issued new recommended criteria and/or swimming advisories for microcystins and cylindrospermopsin. The federal Beach Act requires states to adopt such criteria in a timely manner. DEC will explore the implementation issues associated with adoption of these criteria as part of the 2018 – 2020 Triennial Review cycle.