

Alaska Water Quality Standards and parameters of concern

Water Quality Standards

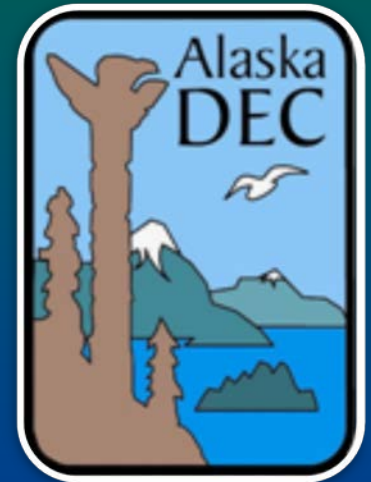
Division of Water

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Presentation

- 1 Overview of Water Quality Standards
 - Brief history and statutory basis
- 2 Where to find water quality standard information
- 3 Regulations follow science
- 4 Parameters of concern

What are Water Quality Standards?

Use + Criteria = Standard

- Designated water uses
 - Drinking, recreation, aquatic life & other uses
 - In Alaska, all waters protected for all uses
- Criteria are pollutant limits in receiving waters
 - can be either narrative or numeric
- The most stringent criterion becomes the WQS

History of the Water Quality Standards

One of the first environmental regulations passed by Congress was the Water Pollution Control Act of 1948.

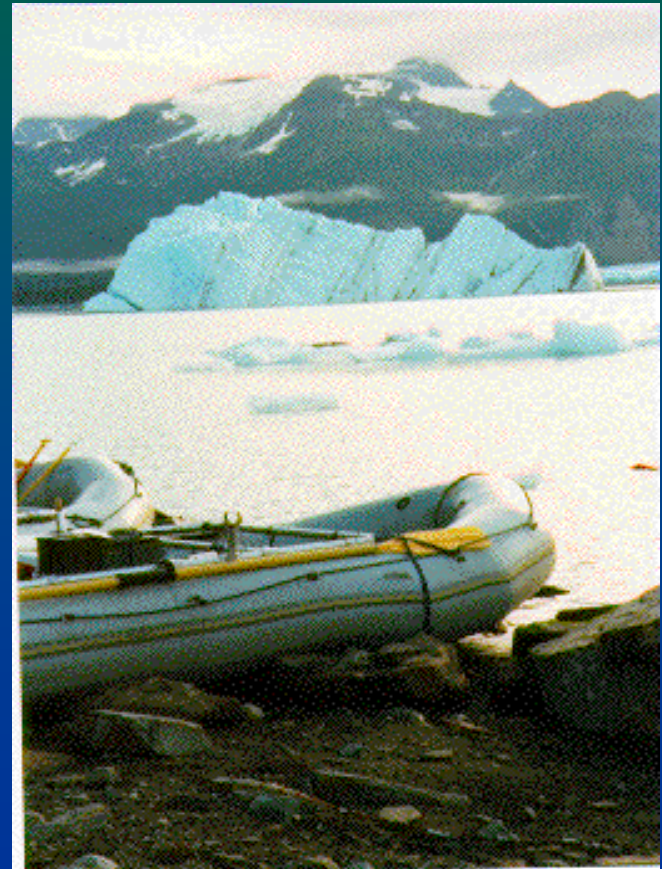
- The Act adopted principles of State – Federal cooperative program development.
 - limited federal enforcement authority
 - limited federal financial assistance

Before Federal Mandates

**Alaskan Territory Board oversaw a
Water Pollution Control Act
and a plan to keep Alaska's water
purer than the rest of the
United States**

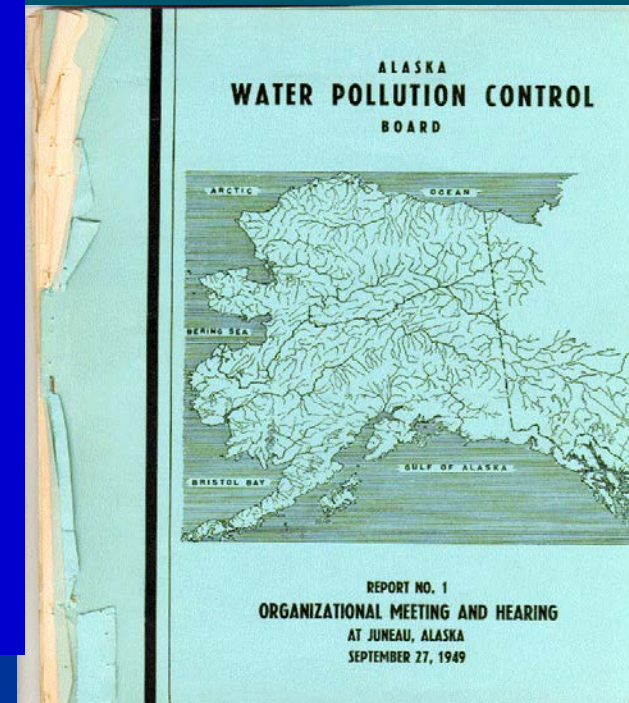
Alsek Lake near
Dry Bay, Alaska

Photo by Katy McKerney




Alaska Water Pollution Control Board

- Established in 1948 by the territorial legislature
- Alaska Water Pollution Control Act followed
- Responsible for administering the "Act" to:
 - safeguard waters from pollution
 - establish standards of water purity that affect public health, fish & wildlife, recreation & industrial development.



Developed cooperatively by Alaska, British Columbia, Idaho, Montana, Oregon, and Washington.

It was in this table that  criteria for “toxic, colored, or other deleterious substances,” first appeared.

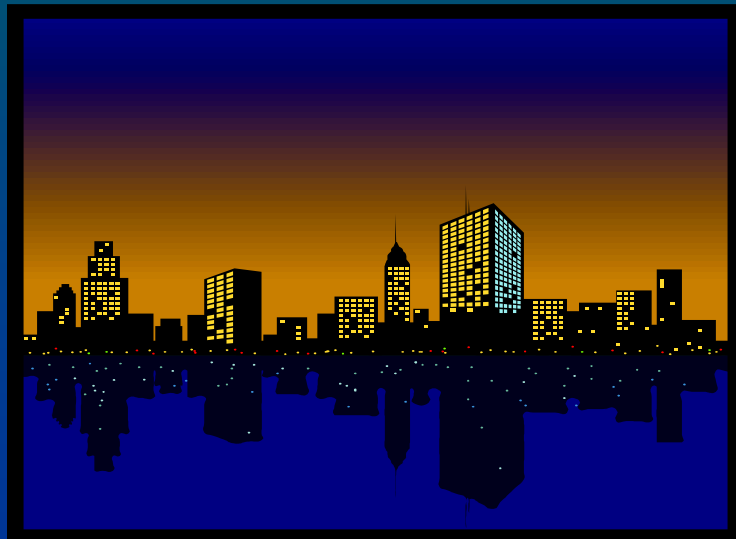


WATER QUALITY OBJECTIVES AND				
WATER QUALITY OBJECTIVES, APPLICABLE TO RECEIVING WATER				
WATER QUALITY OBJECTIVES	ORGANISMS OF THE COLIFORM GROUP	FLOATING, SUSPENDED & SETTLEABLE SOLIDS	TASTE OR ODOR PRODUCING SUBSTANCES	DISSOLVED OXYGEN
WATER SUPPLY, DRINKING, LUNARY, & FOOD PROCESSING	MOST PROBABLE NUMBER COLIFORM BACTERIAL COUNT OF A SAMPLE CONTAINING NUMBER OF SAMPLES SHOULD BE LESS THAN 10 PER 100 ML. IN 15 DAY PERIOD	NONE APPROPRIATE TO RECEIVE, UNDESIRABLE MATTER IN OTHER WATERS IS WELLED, AFTER EXHAUSTIVE TREATMENT A RESIDUAL TASTE OR ODOR MAY BE DETECTED FROM THE TREAT OF OTHER WATERS FOR THE DESIGN DISCHARGE	NONE APPROPRIATE TO RECEIVE, UNDESIRABLE MATTER IN OTHER WATERS	DISSOLVE FROM 6.5 TO 8.5 MG/L VOLUME SHOULD BE MAINTAINED
WATER SUPPLY, DRINKING, LUNARY, & FOOD PROCESSING	M.P.S. COLIFORM BACTERIAL COUNT OF A REPRESENTATIVE SAMPLE OF SAMPLES SHOULD BE LESS THAN 1000 ML. AND SHOULD NOT EXCEED 1000 ML. IN 15 DAY PERIOD	NAME AS FOR USE "A" ABOVE	NAME AS FOR USE "A" ABOVE	DISSOLVE FROM 6.5 TO 8.5 MG/L VOLUME SHOULD BE MAINTAINED
BATHING, SWIMMING AND RECREATION	M.P.S. COLIFORM BACTERIAL COUNT OF A REPRESENTATIVE SAMPLE OF SAMPLES SHOULD BE LESS THAN 1000 ML. AND SHOULD NOT EXCEED 1000 ML. IN 15 DAY PERIOD	NAME AS FOR USE "A" ABOVE	NAME AS FOR USE "A" ABOVE	DISSOLVE FROM 6.5 TO 8.5 MG/L VOLUME SHOULD BE MAINTAINED
GROWTH & PROPAGATION OF FISH, SHELLFISH & OTHER AQUATIC LIFE	M.P.S. COLIFORM BACTERIAL COUNT OF A REPRESENTATIVE SAMPLE OF SAMPLES SHOULD BE LESS THAN 1000 ML. AND SHOULD NOT EXCEED 1000 ML. IN 15 DAY PERIOD	NAME AS FOR USE "A" ABOVE	NAME AS FOR USE "A" ABOVE	DISSOLVE FROM 6.5 TO 8.5 MG/L VOLUME SHOULD BE MAINTAINED
AGRICULTURAL AND INDUSTRIAL WATER SUPPLY	M.P.S. COLIFORM BACTERIAL COUNT OF A REPRESENTATIVE SAMPLE OF SAMPLES SHOULD BE LESS THAN 1000 ML. AND SHOULD NOT EXCEED 1000 ML. IN 15 DAY PERIOD	NAME AS FOR USE "A" ABOVE	NAME AS FOR USE "A" ABOVE	DISSOLVE FROM 6.5 TO 8.5 MG/L VOLUME SHOULD BE MAINTAINED

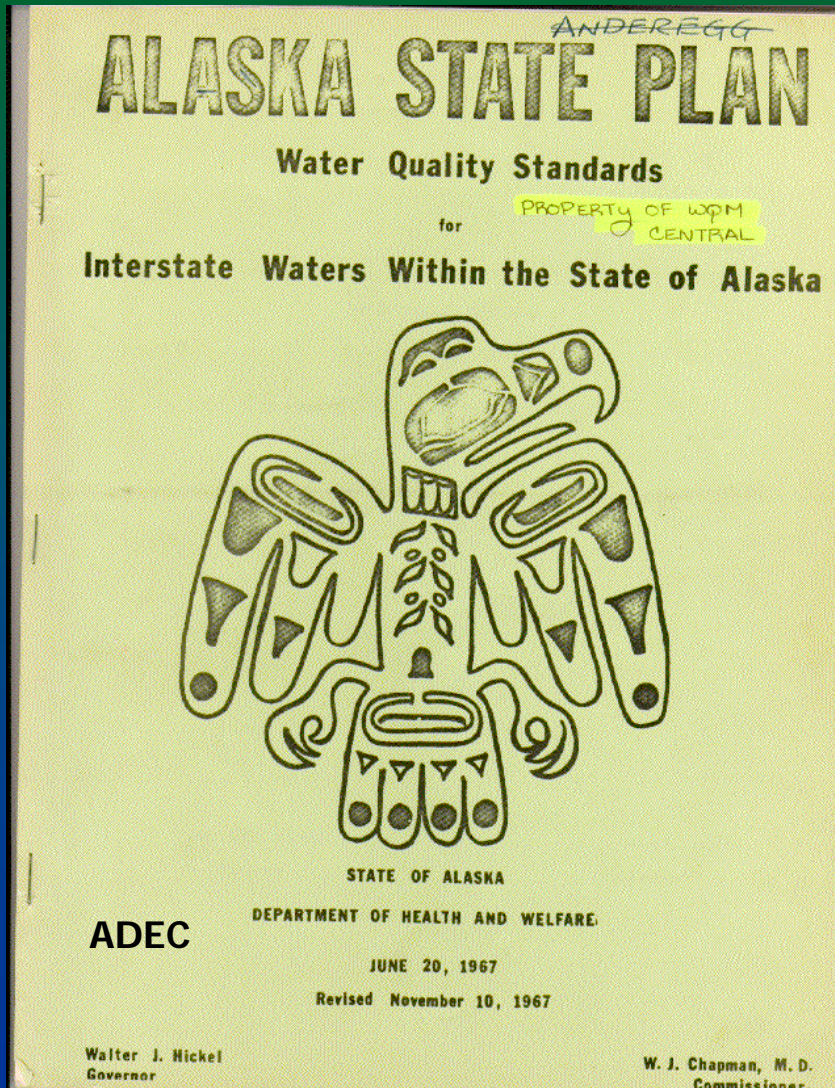
U.S. ENVIRONMENTAL AGENCY

Federal Mandates

The Federal Water Quality Act of 1965 directed states to develop water quality standards



Alaska State Plan – Water Quality Standards

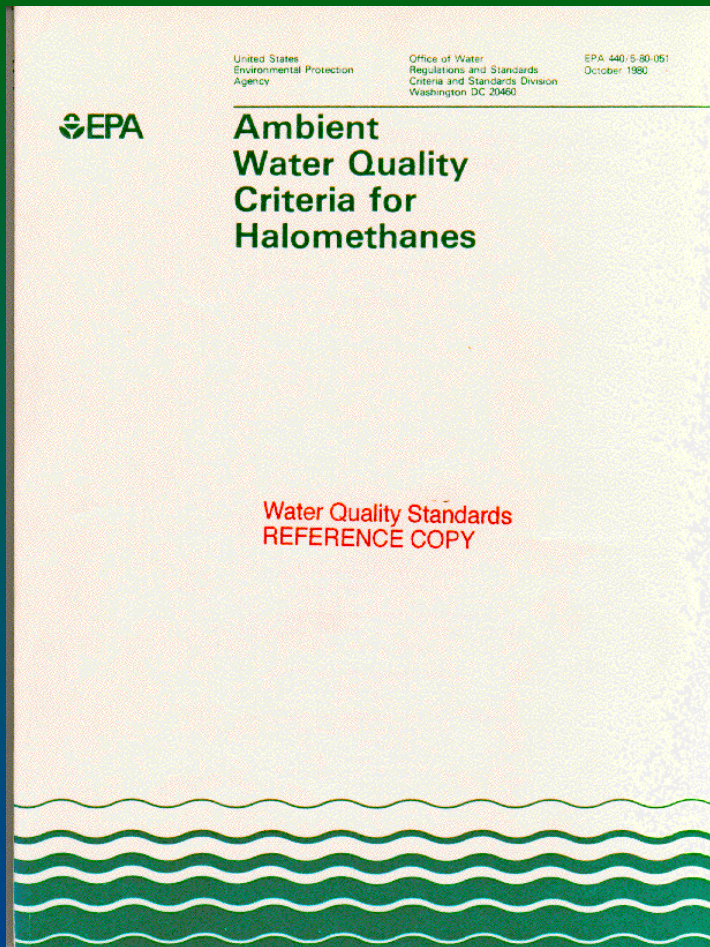


In response to the federal 1965 Act, the Alaska Department of Health and Welfare wrote the Alaska State Plan for interstate waters and published it in June, 1967.

Federal Statutory Basis for Water Quality Standards

Federal Water Pollution Control Act – Public Law 92-500 - Amendments of 1972 (Section 303(c))

- From then on referred to as the **Clean Water Act**
- Established the statutory basis for the current water quality standards program – requiring standards for all surface waters of the United States



Example of a criteria Document.

In 1980 as mandated,
EPA published chemical-specific criteria for the
Priority toxic pollutants.

- On EPA's recommendation, between 1979 and 1999, Alaska adopted by reference all the chemical-specific criteria for the *priority toxic pollutants* into the WQS.
- In 2003 Alaska adopted the Water Quality Criteria Manual for Toxic Substances.

Overview of State Authority

Alaska Statutes

Chapter 46.03 Environmental Conservation
AS 46.03.050 Authority, AS 46.03.050 Pollution Standards
AS 46.03.080 Quality and Purity Standards,
AS 46.03.100 Waste Disposal Permit

Alaska Administrative Code

Title 18 Environmental Conservation

Water Quality Standards

18 AAC 70

Protected Use Classes, Criteria,
Mixing Zones, Site Specific Criteria

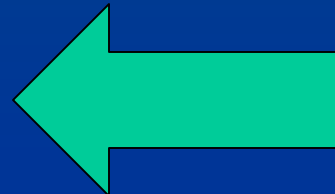
Wastewater Disposal

18 AAC 72

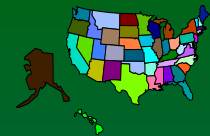
Domestic WW Permits & Plans
Nondomestic WW Permits & Plans

Water Quality Criteria Manual

Toxic & Other Deleterious Substances



Overview of Federal Authority



U.S. Code (USC)
Clean Water Act (1977)
33 U.S.C. ss/1251 et seq.
305(b) Reports, 303(d) List

Federal Register (FR)
Proposed and Final
Rulings
Modifying Regulations

EPA National Publications
Criteria Documents
EPA Methods for Analysis of Water
Guidance Documents

Code of Federal Regulations (CFR)
Title 40 - Protection of Environment
Subchapter D - Water Programs
(Parts 100-149)

40 CFR Part 122 - NPDES
Point Source Discharge
Permits
Nonpoint Source

40 CFR Part 131 - WQS
Designation of Uses
Criteria
National Toxic Rule (NTR)

40 CFR Part 130
WQ Planning & Management
Water Quality Reports for 305(b)
TMDLs for 303(d) Water Bodies

40 CFR Part 121-State
Certification
401 Certification of
NPDES

Regulations follow science

DEC uses a science based approach to determine water quality standards. Most of the water quality criteria are based on national research.

Revisions and new water quality standards are based on scientific research and largely modeled on US Environmental Protection Agency studies.

Scientific Basis

- Section 304(a)(1) of the Clean Water Act
 - Requires EPA to develop criteria for water quality
 - accurately reflects the latest scientific knowledge.
 - Criteria are based solely on data and scientific judgments on pollutant concentrations and environmental or human health effects.
 - Section 304(a) also provides guidance to states and tribes in adopting water quality standards.
 - Criteria are developed for the protection of **aquatic life** as well as for **human health**.

Scientific Basis

Nationally Recommended Water Quality Criteria:

- <http://www.epa.gov/waterscience/criteria/wqctable/index.html>

Where to find Alaska Water Quality Standard information

DEC Water Quality Standards Webpage:

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

Water Quality Criteria are generally contained in two documents:

- 1) Water Quality Standards (September 19, 2009)**
- 2) Alaska Water Quality Criteria Manual for Toxics & Other Deleterious Organic & Inorganic Substances (Toxics Manual) -adopted by reference**

Screen Shot

DEC Water Quality Standard Webpage



Antidegradation Conference:

Conference on Antidegradation Policy, Anchorage, December 2-3, 2009

Regulations and Guidance:

Water Quality Criteria are generally contained in two documents: (1) Water Quality Standards and (2) Water Quality Criteria Manual for Toxics that is adopted by reference as listed below:

Water Quality Criteria Documents:

1. Water Quality Standards:
 - 2009 Water Quality Standards (September 19, 2009) 
 - Historic 18 AAC 70 WQS - Previous versions of Alaska's Water Quality Standards (some of which are still in effect for CWA purposes) 
 - 2008 Version of WQS 
 - 2006 Version of WQS 
 - 2003 Version of WQS 
 - 1999 Version of WQS 
2. Water Quality Criteria Manual for Toxics (December 12, 2008) 

Guidance:

- Natural Condition Guidance
- Mixing Zone Guidance 

We want people to have easy access to the regulations, proposed revisions, fact sheets, technical papers, and issues that may be of interest. The links on the right include a great deal of WQS information, along with information about the [Triennial Review](#) and [BEACH Grant Initiatives](#).

What Water Quality Standards Apply and When

Recent Activities

What We Do:

- Evaluate and revise Alaska's Water Quality Standards based on science.
- Explain the Water Quality Standards and how they are used.
- Provide easy access to water quality standards related documents, including the regulations, proposed revisions, fact sheets, technical papers, guidance documents and issues that may be of interest

- › Nonpoint Source Water Protection and Restoration
- › Quality Assurance/Quality Control
- › Alaska Monitoring and Assessment Program
- › Water Quality Standards
- › Staff Contacts

Quick Links



- › 2007 Triennial Review
- › Alaska BEACH Grant Program
- › Past Water Quality Standards
- › Site Specific Criteria in current permits
- › Inorganic Toxics Criteria Worksheet 
- › Residue Criteria Proposed Changes
- › EPA Red Dog Mine Case Study Fact Sheet 
- › EPA's Alaska Water Quality Standards Page
- › Federal Clean Water Act
- › Water Quality Standards Email List
- › Natural Conditions Guidance and Tools

Parameters of Concern

Ammonia - NH_3 (un-ionized)

- $\text{NH}_3 + \text{NH}_4^+$ (Total)

Metals - Copper (Cu)

Nickel (Ni)

Zinc (Zn)

Parameters of Concern

Common characteristics (NH_3 , NH_4^+ , Cu, Z, Ni)

- All criteria found in the Toxics Manual
- As of September 19, 2009 Toxics Manual can be used for

State and APDES Permits

- Aquatic life designated use - most stringent criterion applies

Ammonia criteria for aquatic life

Both forms of Ammonia apply:

Two forms of Ammonia –

**Total - milligrams of Nitrogen per liter (mg N / L)
all forms of N and un-ionized (Un-ionized)**

Un-ionized - milligrams of NH_3 / L

Dependent on -

Ph

Temperature

Salinity for marine

See the Toxic Manual - Tables VIII – IX

Ammonia criteria for aquatic life

Based on the 1989 EPA Ammonia Criteria for Saltwater document, for saltwater species of aquatic organisms

- Effects were found on survival and growth of species for acute and chronic toxicity
- Ammonia is an important part of nitrogen metabolism in aquatic plants, but excess ammonia is toxic to saltwater plants.

Copper, Nickel and Zinc Criteria for aquatic life

- All metals
- Criteria based on toxicity tests – most sensitive organism. Toxicity tests usually used the acute to arrive at the chronic.
- All have respiratory affects (lethal and sub-lethal on fish and other aquatic life.
- Based on EPA national research and tests

Parameter (Marine)	Acute µg / liter	Chronic µg / liter
Ammonia	See Toxic's Manual Appendix F Dependent on pH, temp, & salinity	See Toxic's Manual Appendix G Dependent on pH, temp, & salinity
Zinc	90 See Appendix B (1-hr avg) ¹¹ <i>dissolved</i> ^{41, 72}	81 See Appendix B (4-day avg) ¹² <i>dissolved</i> ^{41, 73}
Nickel	74 See Appendix B (1-hr avg) ¹¹ <i>dissolved</i> ^{41, 58}	8.2 See Appendix B (4-day avg) ¹² <i>dissolved</i> ^{41, 59}
Copper	4.8 See Appendix B (24-hr avg) ¹⁰ <i>dissolved</i> ^{38, 39}	3.1 See Appendix B (4-day avg) ¹² <i>Dissolved</i> ^{38, 39}

Thank you

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