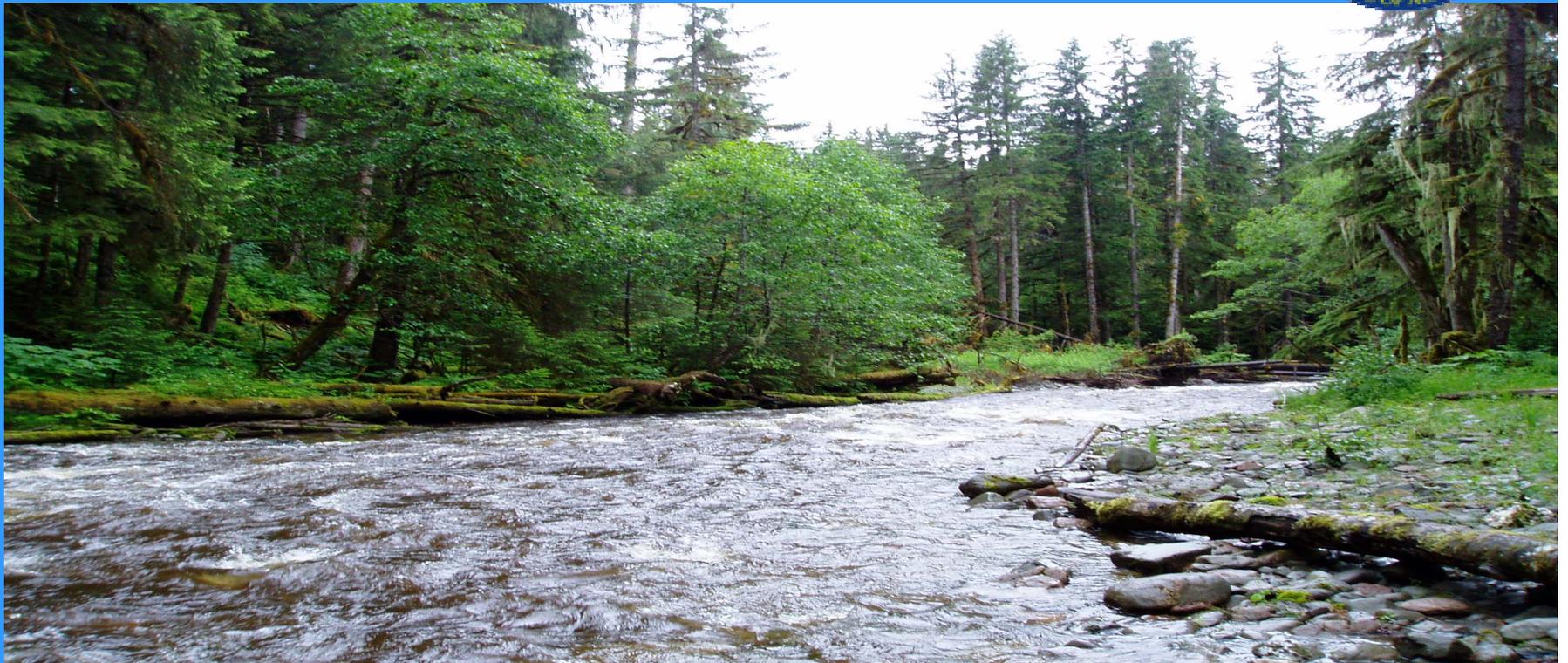


Alaska Water Quality standards and some history

Jim Powell

Department of Environmental Conservation
Water Quality Standards Section



Objectives

- Provide Context: Some history of water pollution regulation.
- Provide a basic overview of Alaska's Water Quality Standards (WQS) Program
- Describe provisions and key documents in the Water Quality Standards Program

Highlights of Alaskan Water Quality Standards History

Source: Historic Slides by Katy
McKerney

By the turn of the century Water Quality Issues
In the United States had become intolerable.

Congress passed the Rivers and Harbors Act in
1899 to fix some of the most obvious problems.



Library of Congress

Photo by John Ferrell

Washington D.C. Capitol dome from the
Botanical Gardens.

Territorial Alaska - First Pulp Mill



Alaska State Library

Site of the first Alaskan pulp mill on the Speel River at Snettisham located 28 air miles south of Juneau. (1914)

Early Prints of Alaska/Industry - Timber-Pulp Mills-4



Alaska State Library

PCA 01-2048/Early Prints of Alaska

Dock at Snettisham, Alaska. (1921)

Territorial Alaskan Views

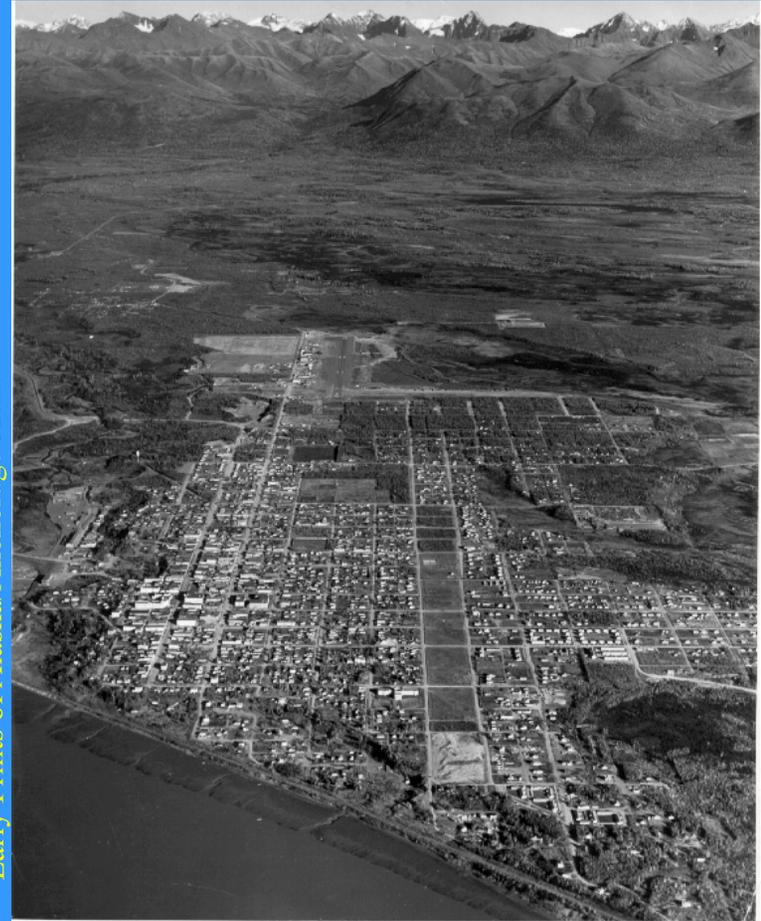
Early prints of Alaska/Fairbanks-Aerial-1



Alaska State Library Photo by the Army

Aerial view of Fairbanks,
Alaska. (March, 1934)

Early Prints of Alaska/Anchorage-Aerial Views-14



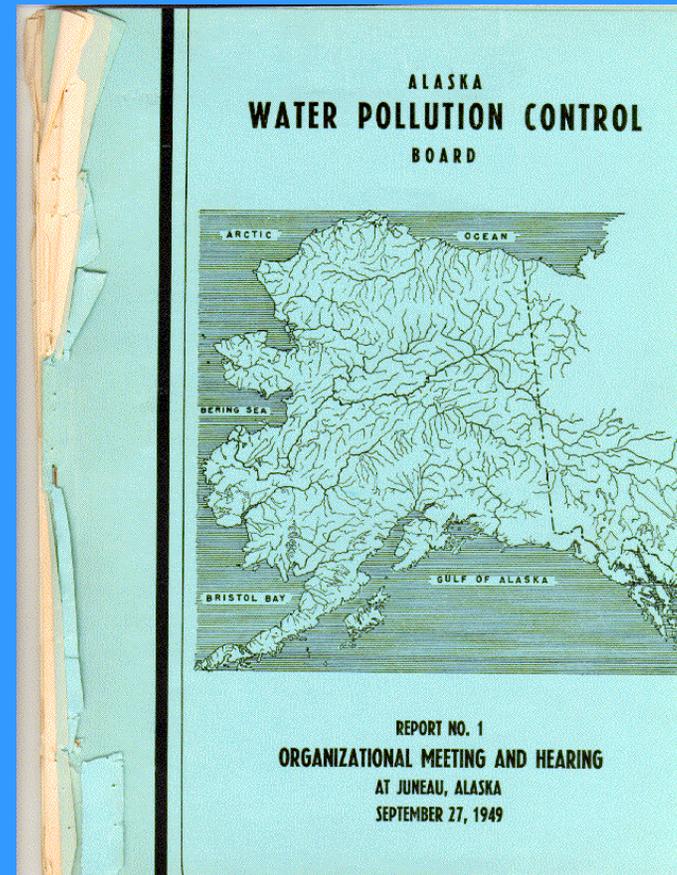
Alaska State Library

Aerial view of Anchorage,
Alaska. (March, 1948)

In 1949, the Alaska Water Pollution Control Board was established by the territorial legislature and the Alaska Water Pollution Control Act was created.



The Board was responsible for administration of the Alaska “Act” to safeguard waters from pollution and establish standards of water purity that affect public health, fish and wildlife, recreation and industrial development.



ADEC

Territorial Board Members

Honorable Ernest Gruening - Chairman - Juneau

George A. Preston - Fairbanks

Mrs. Katherine Kehoe - Nome

R. Rolland Armstrong - Anchorage

Dr. Dwight Cramer - Ketchikan



Ak. Territorial Governors/PCA 274-1-5

Alaska State Library

Ernest Gruening on a scenic vista overlooking Juneau, Alaska. (no date)



Ak. Territorial Governors/PCA 274-1-15

Alaska State Library

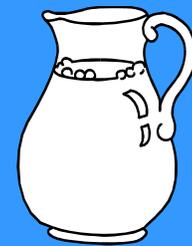
Territorial Governor, Ernest Gruening with President J. F. Kennedy and Secretary of Interior, Morris Udall. Man on far right unidentified. (no date)

The Board envisioned that Alaska had a unique chance to protect its pristine waters, unlike states that already had many polluted waters.



It was determined that Alaskan waters should be protected for the highest water use which was “water supply and their sources” or simply the drinking water use.

(Person.com., 1992, Amos Alter, Director for the Alaska Dept. of Health, 1949)



The first limits, not to be exceeded, for a handful of pollutants were taken from the 1946 federal “Public Health Service Drinking Water Standards.”

Remarkably, by 1952, prior to federal mandates or outside pressure, the Alaskan Territory had a Board to oversee a Water Pollution Control Act and a plan to keep Alaska's water purer than the rest of the United States....
.....in fact...drinking water pure.



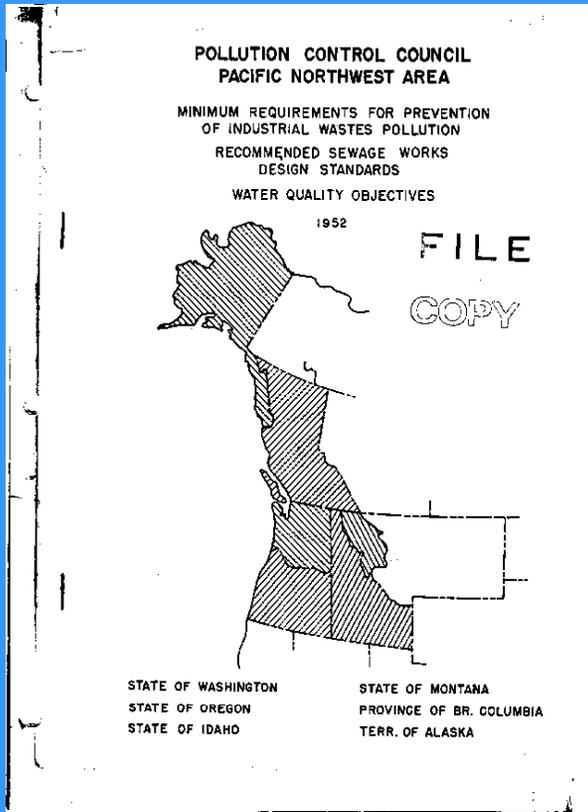
Photo by Katy McKerney

Alsek Lake near Dry Bay, Alaska

In 1952, the first Water Quality Objectives table was produced for Alaska.



It was 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 USES				
WATER QUALITY WATER USES	WATER QUALITY OBJECTIVES, APPLICABLE TO RECEIVING WATER			
	ORGANISMS OF THE COLIFORM GROUP	FLOATING, SUSPENDED & SETTLEABLE SOLIDS & SLUDGE DEPOSITS	TASTE OR ODOR PRODUCING SUBSTANCES	DISSOLVED OXYGEN
WATER SUPPLY, DRINKING, ILLINARY, & FOOD PROCESSING	MOST PROBABLE NUMBER COLIFORM BACTERIA IN TERMS OF A REPRESENTATIVE NUMBER OF SAMPLES SHOULD REMAIN LESS THAN 100 PER 100 ML. IN ANY SAMPLE.	SOME ATTRIBUTABLE TO GENERAL INDUSTRIAL WASTES IN OTHER WASTES IN WALLE, AFTER SEWAGEWATER TREATMENT A MINIMUM OF 100% REMOVAL OF SOLIDS SHOULD BE MAINTAINED FOR THE BEST USE OF WASTES RECEIVED.	SOME ATTRIBUTABLE TO GENERAL INDUSTRIAL WASTES, OR OTHER WASTES.	GREATER THAN 2 PPM (5) FACTOR FOR DETERMINING UNDERGROUND WASTES.
WATER SUPPLY, DRINKING, ILLINARY, & FOOD PROCESSING	M.P.N. COLIFORM BACTERIAL GROUPS IN A REPRESENTATIVE NUMBER OF SAMPLES SHOULD REMAIN LESS THAN 100 PER 100 ML. AND SHOULD NOT EXCEED 1000 PER 100 ML. IN ANY SAMPLE. THE NUMBER OF SAMPLES EXAMINED IN ANY WASTE WERE ASSOCIATED WITH DOMESTIC SEWAGE.	SAME AS FOR USE "A" ABOVE.	SOME ATTRIBUTABLE TO GENERAL INDUSTRIAL WASTES, OR OTHER WASTES. AFTER SEWAGEWATER TREATMENT A MINIMUM OF 100% REMOVAL OF SOLIDS SHOULD BE MAINTAINED FOR THE BEST USE OF WASTES RECEIVED.	GREATER THAN 2 PPM (5) FACTOR FOR DETERMINING UNDERGROUND WASTES.
BATHING, SWIMMING AND RECREATION	M.P.N. COLIFORM BACTERIAL GROUPS IN A REPRESENTATIVE NUMBER OF SAMPLES SHOULD REMAIN LESS THAN 100 PER 100 ML. AND SHOULD NOT EXCEED 1000 PER 100 ML. IN ANY SAMPLE. THE NUMBER OF SAMPLES EXAMINED IN ANY WASTE WERE ASSOCIATED WITH DOMESTIC SEWAGE.	SAME AS FOR USE "A" ABOVE.	SOME ATTRIBUTABLE TO GENERAL INDUSTRIAL WASTES, OR OTHER WASTES. AFTER SEWAGEWATER TREATMENT A MINIMUM OF 100% REMOVAL OF SOLIDS SHOULD BE MAINTAINED FOR THE BEST USE OF WASTES RECEIVED.	GREATER THAN 2 PPM (5) FACTOR FOR DETERMINING UNDERGROUND WASTES.
GROWTH & PROPAGATION OF FISH, SHELLFISH & OTHER AQUATIC LIFE	M.P.N. COLIFORM BACTERIAL GROUPS IN A REPRESENTATIVE NUMBER OF SAMPLES SHOULD REMAIN LESS THAN 100 PER 100 ML. AND SHOULD NOT EXCEED 1000 PER 100 ML. IN ANY SAMPLE. THE NUMBER OF SAMPLES EXAMINED IN ANY WASTE WERE ASSOCIATED WITH DOMESTIC SEWAGE.	SAME AS FOR USE "A" ABOVE.	SOME ATTRIBUTABLE TO GENERAL INDUSTRIAL WASTES, OR OTHER WASTES. AFTER SEWAGEWATER TREATMENT A MINIMUM OF 100% REMOVAL OF SOLIDS SHOULD BE MAINTAINED FOR THE BEST USE OF WASTES RECEIVED.	GREATER THAN 2 PPM (5) FACTOR FOR DETERMINING UNDERGROUND WASTES.
AGRICULTURAL AND INDUSTRIAL WATER SUPPLY	STRENGTH TREATMENT SHOULD BE THE LEVEL OF 100% REMOVAL OF MOST PROBABLE QUALITY FROM DOMESTIC SEWAGE. OTHER WASTES SHOULD BE TREATED TO THE SAME LEVEL.	SAME AS FOR USE "A" ABOVE.	SOME ATTRIBUTABLE TO GENERAL INDUSTRIAL WASTES, OR OTHER WASTES. AFTER SEWAGEWATER TREATMENT A MINIMUM OF 100% REMOVAL OF SOLIDS SHOULD BE MAINTAINED FOR THE BEST USE OF WASTES RECEIVED.	GREATER THAN 2 PPM (5) FACTOR FOR DETERMINING UNDERGROUND WASTES.

In 1959, the Territory of Alaska became the State of Alaska.



Alaska state flag

The Alaska Water Pollution Control Board was disbanded.

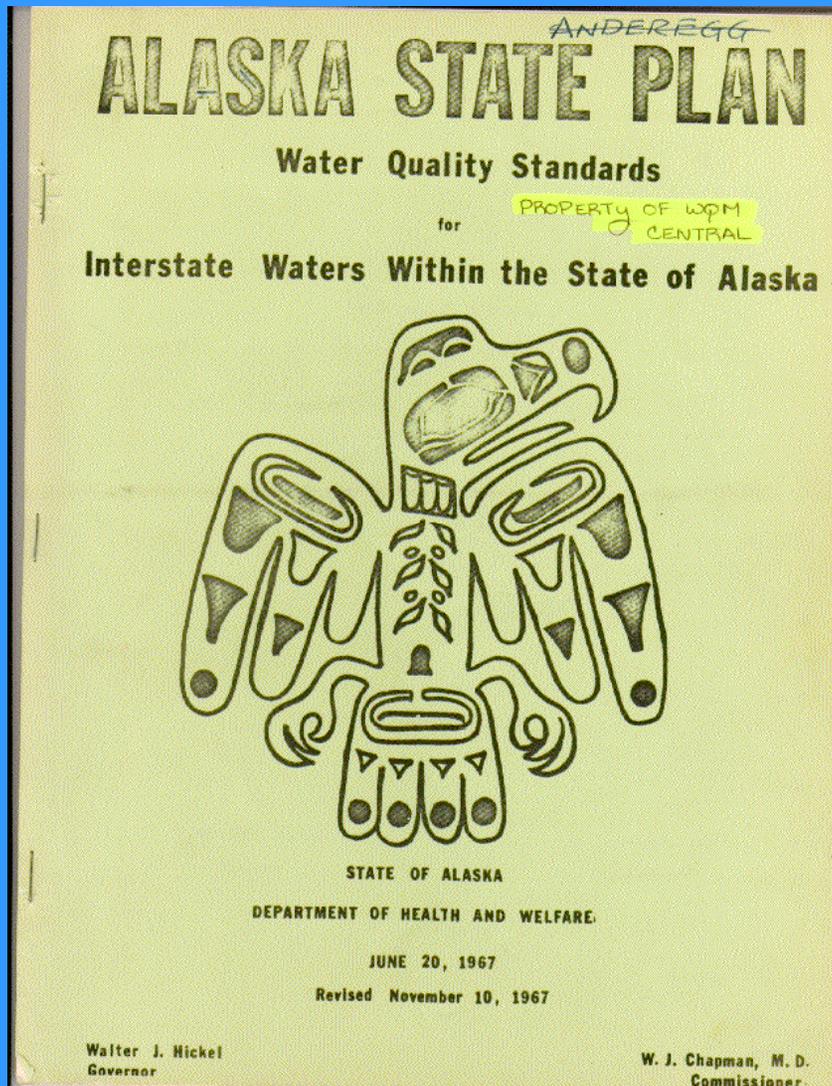
The 1952 territorial, “Water Quality Objectives” were now published in the new State’s Administrative Code, Title 7 under Health and Welfare.

Early Prints of Alaska/Anchorage-Aerial Views-9



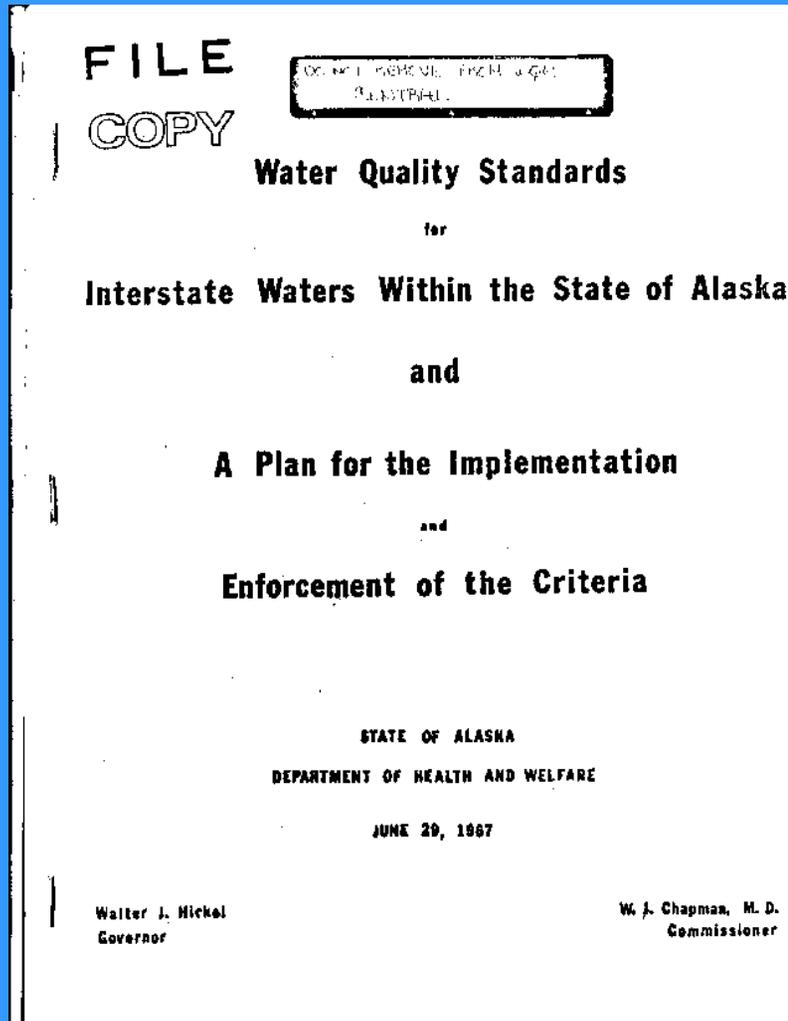
Alaska State Library

Aerial view of Cook Inlet shoreline near Anchorage. (no date)



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.

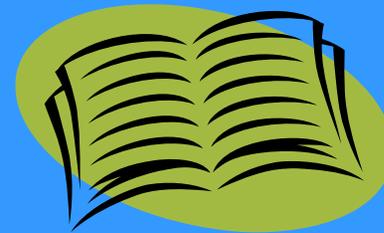
ADEC



ADEC



A plan to implement and enforce the new criteria was also published in 1967 by the Department of Health and Welfare.



Back to national actions....



The principles of the 1948 Water Pollution Control Act (WPCA) continued in the 1956 WPCA and the Water Quality Act of 1965.

The Water Quality Act of 1965 directed states to develop water quality standards thus establishing goals for interstate waters. (ANPRM, 1998)



The Water Quality Act of 1965 was written during a time when public concerns about environmental pollution began to heighten.



All that was needed to push the American public into becoming environmentally active was a catalyst.

The catalyst turned out to be a book written by Rachel Carson.

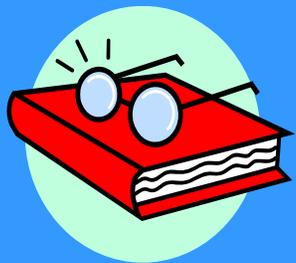


Photo by Erich Hartmann/Magnum Photos



Rachel Carson
(1907-1964)

In 1966 the Clean Water Restoration Act was signed by President Johnson.



The act authorized \$3.9 billion for construction grants to build sewage treatment plants and for grants to state water pollution control programs.



Johnstone Sewage Treatment Plant, Pennsylvania

Influential Author in the Environmental Movement



Rachel Carson's book about pesticides, *The Silent Spring*, published in 1962 ignited a revolution in public opinion about pollution.

This book attacked the indiscriminate use of pesticides.

Carson got her missionary zeal from her fear that fewer species of birds would be singing each spring unless pesticide poisoning was curtailed.

(Jack Lewis, 1985 EPA Journal).

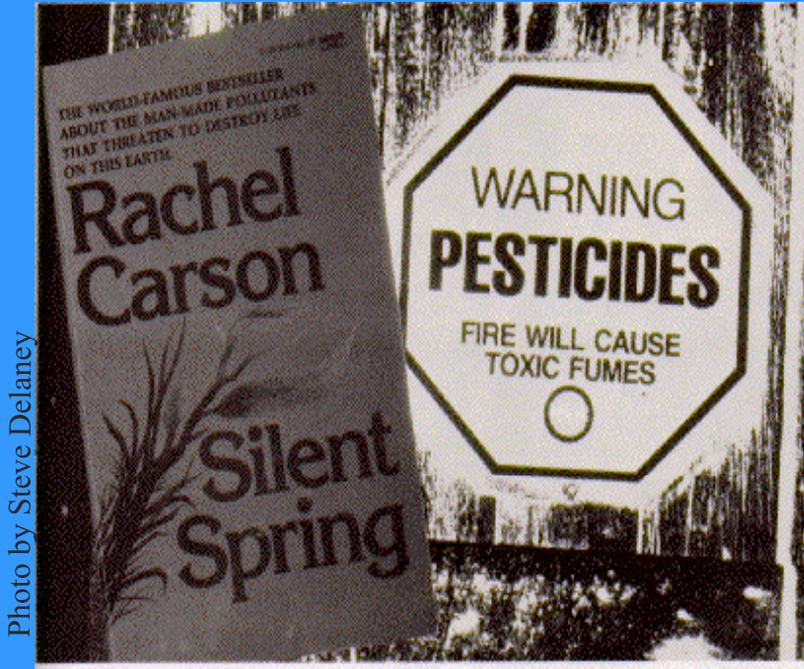


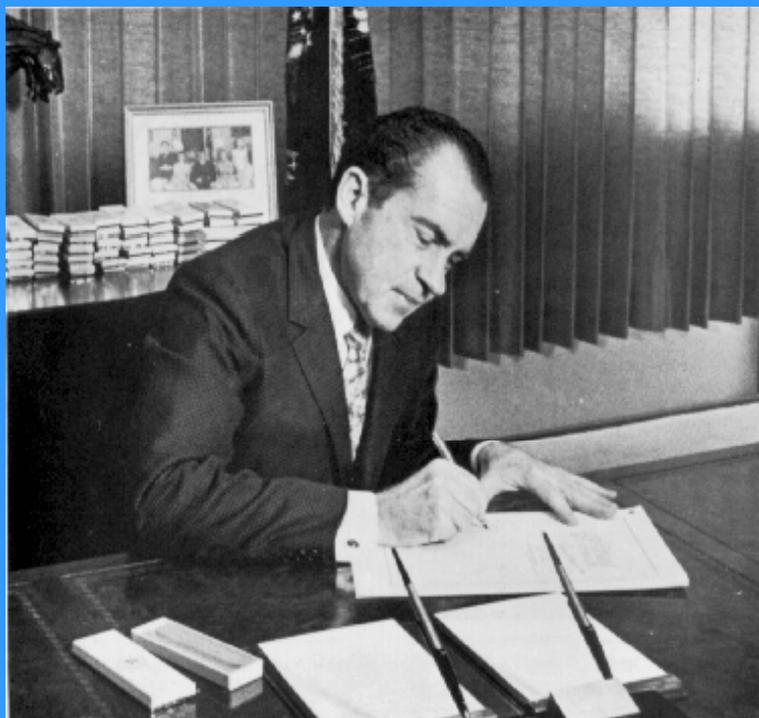
Photo by Steve Delaney

November 1985 EPA Journal

President Nixon appointed a White House committee in December, 1969 to determine if there should be a separate federal environmental agency.



Public opinion was virtually unanimous on the need for a national environmental policy.



National Archives

November 1985 EPA Journal

President Nixon signed Congress' National Environmental Policy Act (NEPA) on New Year's Day, 1970.

(Jack Lewis, Nov. 1985 EPA Journal)

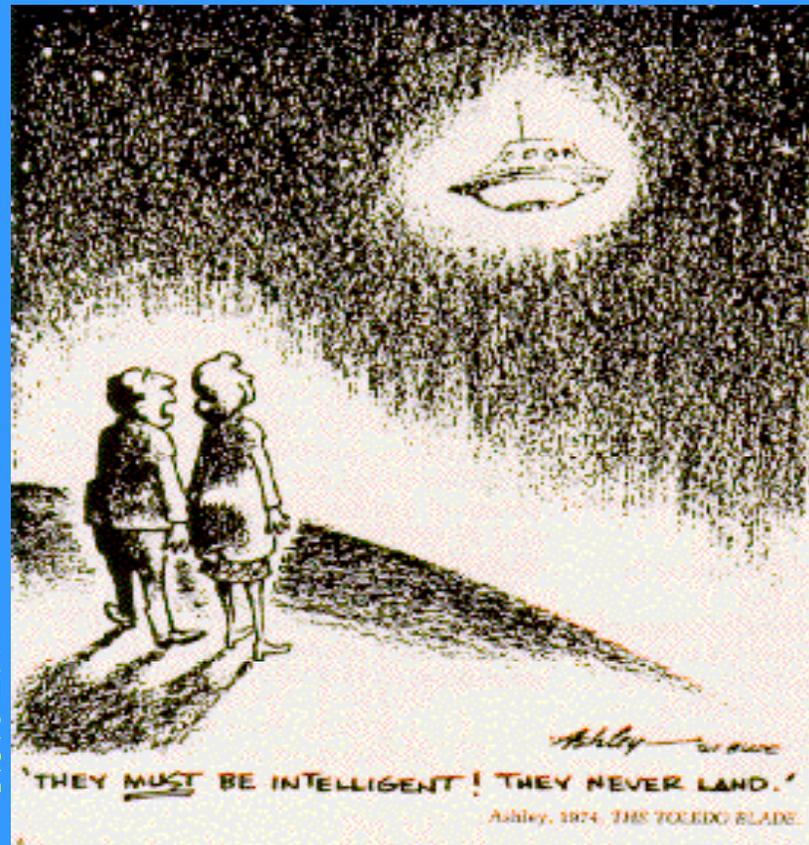
Two months later, on April 22, 1970, the first Earth Day brought 20 million Americans out to peacefully demonstrate.



© Washington Post. Reprinted by permission of the D.C. Public Library

EPA History Office

November 1985 EPA Journal



Ashley, 1974, The Toledo Blade

Participants in 1970 Earth Day
Cartoon reflecting public opinion about the state of the environment.

On December 2, 1970 President Nixon created the Environmental Protection Agency by executive order.



“*Silent Spring* played in the history of environmentalism roughly the same role that *Uncle Tom’s Cabin* played in the abolitionist movement. In fact,

EPA today may be said without exaggeration to be the extended shadow of Rachel Carson.” (Jack Lewis, Nov. 1985 EPA Journal)



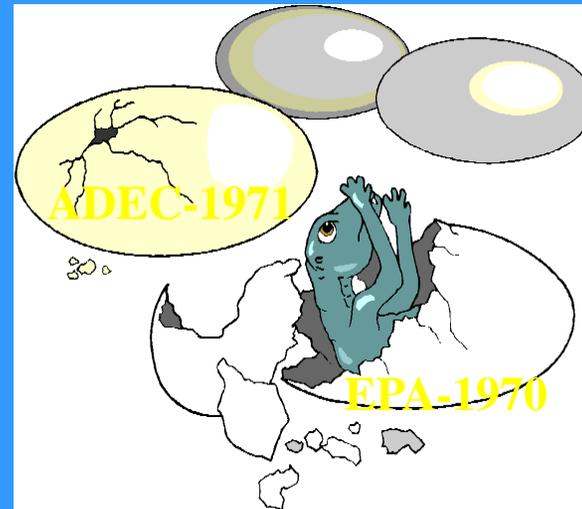
Photo by Charles O’Rear

NWDNS-412-DA-6628

Documerica Project

William Ruckelshaus, was the first Administrator of EPA.

In July of 1971 the Alaska Department of Environmental Conservation (ADEC) was created and the “Water Quality Objectives” were taken out of the Department of Health and Welfare regulations and transferred to the jurisdiction of the new agency.

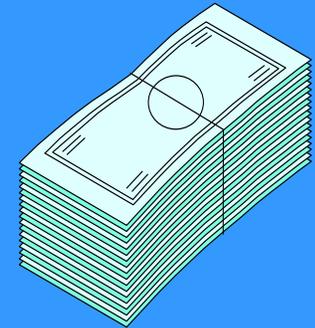


The ADEC made few changes to the 1952 objectives that now were called the Water Quality Standards under Title 18, Alaska Administrative Code, Chapter 70.

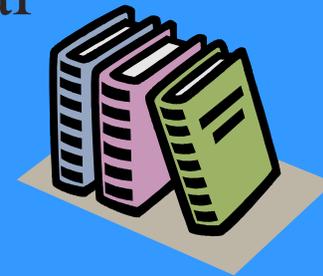
Federal Authority – Clean Water Act 1972

- Adopt, review and revise water quality standards and implementation procedures in a public process (Section 303(c))
 - May adopt standards more stringent than recommended by EPA (Section 510)
- May certify that federally licensed activities that may result in any discharge to their waters meet WQS (Section 401)

So the stage had been set where federal laws were enacted, with which states must comply or federal monies would not be granted. These monies were often necessary to achieve compliance under the new laws.



This mandate/money relationship between states and the federal government continues to play a major role in the environmental regulations that states adopt.



Overview

1) Water Quality Standards (WQS)

- mission, function, and structure

2) Key Alaska WQS Documents:

➤ - Water Quality Standards – Manual

➤ - Toxics List

➤ - Provisions for petroleum hydrocarbons

3) Clarify State approved

regulations / pending federal approval

4) Upcoming Projects

5) Questions

Water Quality Standards

Program Mission

To protect waters of the state from
pollutants

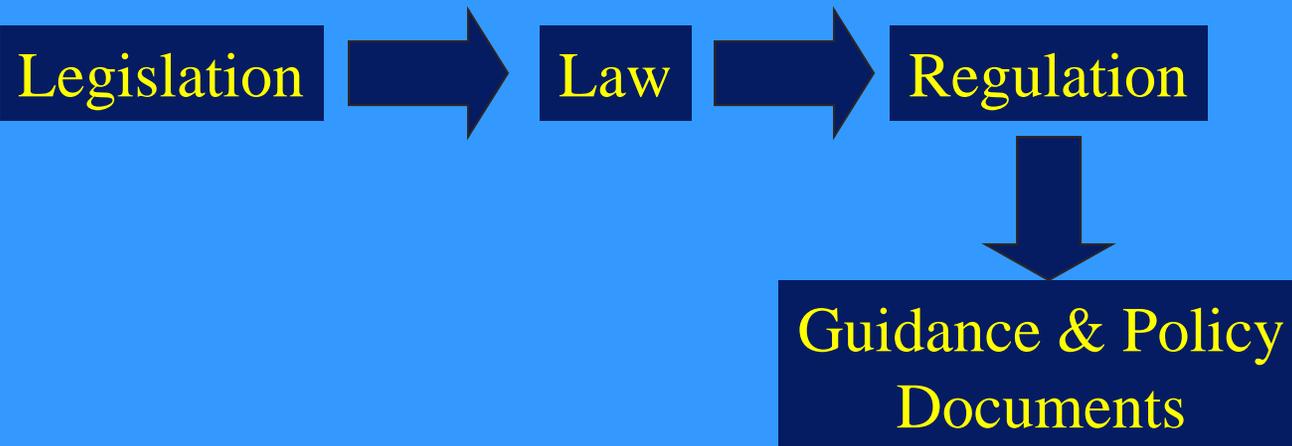
Our Objectives

To help people understand the regulations and
how they are used

To provide easy access to the regulations,
proposed revisions, fact sheets, technical
papers, and issues that may be of interest

Authority for WQS

Like most environmental programs, the WQS are based on parallel federal and state programs under the 1977 Clean Water Act



Overview of State Authority



Alaska Statutes

Chapter 46.03 Environmental Conservation

Alaska Administrative Code

Title 18 Environmental Conservation

Water Quality Standards

18 AAC 70

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

Wastewater Disposal

18 AAC 72

Domestic WW Permits & Plans
Nondomestic WW Permits & Plans

DEC - Water Quality Criteria Manual

EPA Criteria Documents

DEC - Toxic List

What are the WQS?

Use + Criteria = Standard

- Designated water use classes (7)
 - drinking, fishing, swimming & other uses
- In Alaska, all waters protected for all uses
- Criteria are pollutant limits to protect uses
- The most stringent criteria becomes the WQS
- Criteria can be either narrative or numeric

- Water Quality Standards consist of:
 - *designated uses* (e.g., protection and propagation of aquatic life, recreation in and on the water, public/agricultural water supply);
 - *criteria* (numeric and/or narrative parameters) to protect the designated uses;
 - *antidegradation policy and procedures* to maintain and protect existing water quality.

Designated Uses

Fresh Water and Marine

Water Supply

- - aquaculture
- - seafood Processing
- - industrial

Water Recreation

- - contact recreation
- - secondary recreation

Growth and Propagation of fish, shellfish,
other Aquatic life & wildlife

Harvesting for consumption of

Raw Mollusks or Other Raw Aquatic life.

Water Quality Criteria

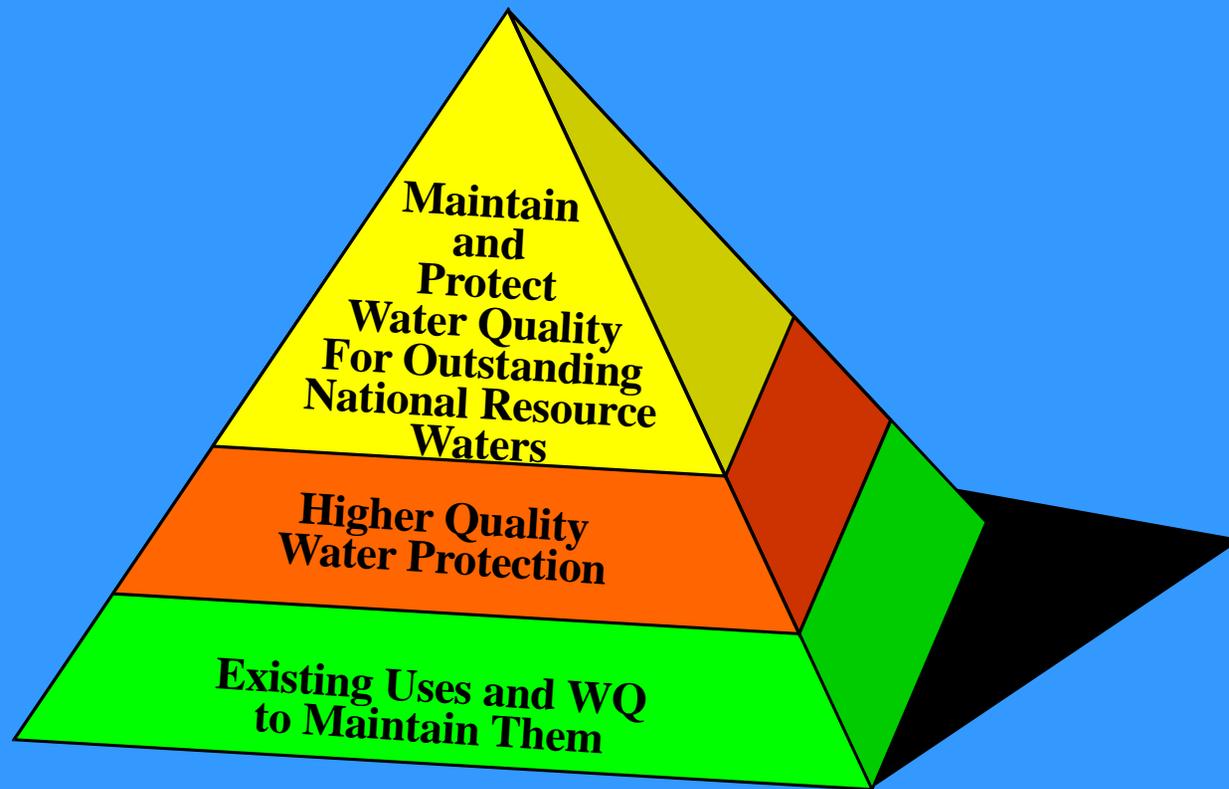
- Narrative or Numeric
- Based on a “sound scientific rationale”
- Protect a designated use

Water Quality Criteria

Narrative Example

- Residue
-present in the form of objectionable deposits; constitute a nuisance, produce objectionable odor or taste; or result in undesirable or nuisance species
 - NEEDS GUIDANCE
- Previous – numeric or 0 tolerance standard.

Antidegradation Policy



Antidegradation

- protects existing uses
- ...allows water quality that exceeds “fishable/swimmable” to be lowered by regulated activities only in certain prescribed conditions and after some type of public review...
- protects waters of national significance
- The Water Quality Standards regulations provide certain minimums for these policies...

Antidegradation Policy

Water Quality for:

Outstanding
National
Resources
Waters

High Quality Waters

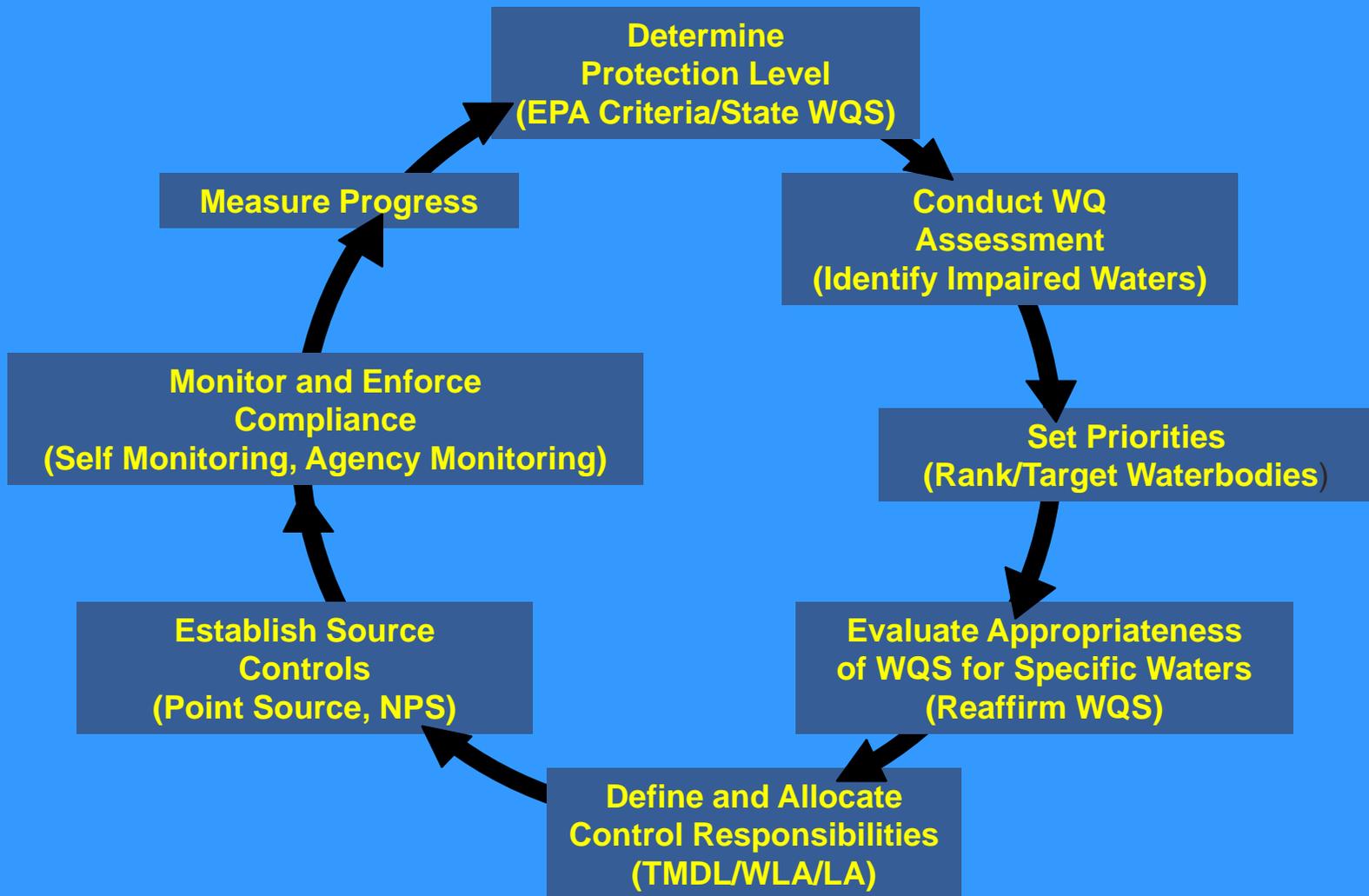
Existing Uses



Water Quality Standards

- Water Quality Standards are to:
 - Protect public health or welfare
 - Enhance the quality of the water
 - Serve the purposes of the Act
- Water Quality Standards
 - Establish water quality goals for a water body
 - Provide a regulatory basis for controls beyond technology-based limits

Water Quality Based Approach



(2) Alaska Water Quality Standards 18 AAC 70 – The Manual

Article 1. Statewide Standards

- 005 Nonapplicability of Groundwater Provisions (EXCEPT-response, cleanup, or corrective action)
- 010 General
- 015 Antidegradation Policy
- 020 Water use classes and standards table
- 025 Carcinogenic risk
- 030 Whole effluent toxicity (WET) limit

Water Quality Standards 18 AAC 70

Article 1. Statewide Standards

- Nonapplicability of Groundwater Provisions (EXCEPT-response, cleanup, or corrective action)
- General
- Antidegradation Policy
- Water use classes and standards table
- Carcinogenic risk
- Whole effluent toxicity (WET) limit

Water Quality Standards -18 AAC 70

Article 2. Exceptions to Statewide Standards

- Short term variance
- Zones of deposit (ZOD)
- Thermal discharges
- Reclassification
- Site specific criteria
- Mixing zones

Water Quality Standards

Article 3. General Provisions

- **Enforcement discretion**
- **Compliance schedule**
- **Definitions**

3 Lists of Water Bodies

- A) Site Specific Criteria - Natural Conditions
- as part of a permit and found:
<http://www.dec.state.ak.us/water/wqsar/wqs/sitecriteria.htm>

- B) Site Specific Criteria -18 AAC 70.236 (b)

- C) Reclassification -18 AAC 70.230(e)

3 Lists of Water Bodies

1) Site Specific Criteria - Natural Conditions - as part of a permit and found:

-
- - Main stem: Red Dog Creek and
- Ikalukrok Creek - Zinc
- - Goodpaster River Valley - TDS

3 Lists of Water Bodies

2) Site Specific Criteria - 18 AAC 70.236 (b)

- (1) Camp Creek - TDS
- (2) Gold Creek - TDS
- (3) Sherman Creek - TDS
- (4) Cook Inlet - 11 Metals & Turbidity
- (5) Red Dog Creek (Main Stem) - TDS

3 Lists of Water Bodies

C) Reclassification -18 AAC 70.230(e)

- **25 Waterbodies listed**
- **(pg. 28 – WQS Jan. 2007)**

Toxics Manual (list)

- *Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances*
- **Adopted by reference**
- **Replaced direct adoption by reference of EPA criteria documents for Toxics**

Toxics List

➤ Based on

- EPA 1999 national recommended water quality criteria;
- EPA 2002 cadmium criteria for aquatic life;
- Alaska Drinking Water Regulations, as amended through September 21, 2002; and
- 1968 Green Book for stockwater use criteria and 1972 Blue Book irrigation use criteria

Toxics List

5 tables for Toxic & Other Deleterious Substances listing 219 criteria

- ✓ Drinking water (76 primary MCLs only)
- ✓ Irrigation and stock watering (18 pollutants)
- ✓ Fresh water aquatic life (40 acute & chronic)
- ✓ Saltwater aquatic life (35 acute & chronic)
- ✓ Human health (48 noncarcinogenic)

Plus 4 tables for ammonia aquatic life criteria

Toxics List

EPA approved all criteria except freshwater aquatic life criteria for mercury and selenium

Previously approved criteria apply

- **Mercury: 2.4 µg/l acute and 0.012 µg/l chronic, both as total recoverable**
- **Selenium: 20 µg/l acute and 5 µg/l chronic, both as total recoverable**

No action based on essential fish habitat consultation

What are the WQS used for?

NPDES and other water quality permits

Assessing needs for monitoring and cleanup
and the ACWA integrated report

Prioritizing 319 water quality grant projects

TMDL assessments for impaired waters

What Water Quality Standards Apply and When. See WQS Website – Comparison of State and federally approved Standards.

- Arsenic
- Bacteria
- Mixing Zones
- Mercury
- Natural Conditions
- Residues
- Selenium

WQS Projects in Progress

- Mixing Zones
- Residues
- Antidegradation

Triennial Review - Three Year Work Plan

Finish EPA reviews –

mixing zones, residues,

natural conditions

High Priority -

antidegradation – guidance + ONRWs

copper

Triennial Review - Three Year Work Plan

Information gathering and Analysis

Standard Analytical methods (routine and tech)

Toxics (Human health criteria for Consumption of fish and water)

Benthic Sediment Criteria, Temperature

Fish Consumption, Bacteria, Nutrients, Methods

Issues for Monitoring

Bacteria

Biocriteria

Dissolved Inorganic Substances for TDS

Groundwater standards

Iron – Aquatic Life Criteria (freshwater)

Triennial Review - Three Year Work Plan

Issues for Monitoring (cont)

Other Human Health criteria related issues

- **carcinogens**
 - Methyl mercury
 - Manganese

Nutrient criteria – Cook Inlet Ecoregion

Temperature Criteria

Questions?

