

US EPA ARCHIVE DOCUMENT

**Alaska Department of Environmental Conservation**

**Division of Water**

**Water Quality Monitoring & Assessment Strategy**



**The Yukon River, North America's Fourth Largest River,  
at Yukon-Charley Rivers National Preserve, Alaska (NPS, 2001).**

**Prepared by the  
Alaska Department of Environmental Conservation  
Division of Water  
Water Quality Assessment & Monitoring Program  
Juneau, Alaska**

**June 2005**

**Revision 1.1 - September 2005 (Website Hyperlinks Updated)**

## Table of Contents

1.0	Monitoring Strategy Purpose .....	1
1.1	Introduction.....	1
1.2	State and Federal Statutory Basis for the Strategy.....	2
1.3	State and Federal Administrative Policy.....	3
2.0	Division of Water- Monitoring & Assessment Objectives.....	4
3.0	Division of Water- Monitoring & Assessment Activities.....	5
3.1	Monitoring Approaches .....	5
3.2	Alaska’s Water Quality Standards.....	7
3.3	305(b) & 303(d) “Integrated Report” .....	8
3.4	Environmental Monitoring & Assessment Program.....	9
3.4.1	DEC’s Coastal Environmental Monitoring & Assessment Program.....	11
3.4.2	DEC’s Wadeable Streams Environmental Monitoring & Assessment Program .....	11
3.5	Alaska’s Clean Water Actions (ACWA) Initiative.....	12
3.6	Wastewater Discharge Program.....	15
3.6.1	NPDES Program in Alaska.....	15
3.6.2	DEC Wastewater Permitting Activities .....	16
3.6.3	CWA §401 Certification.....	17
3.7	Beach Act & Bacteria Monitoring .....	19
3.8	Fish Safety Monitoring Project.....	19
3.9	Collaborative Opportunities.....	20
4.0	Division of Water -Water Quality Indicators.....	21
4.1	EMAP Indicators .....	21
4.1.1	Coastal EMAP Indicators .....	21
4.1.2	Freshwater EMAP Indicators.....	23
4.2	ACWA Indicators .....	23
4.3	Wastewater Discharge Indicators .....	24
4.3.1	Technology-Based Effluent Limits.....	24
4.3.2	Water Quality-Based Effluent Limits .....	25
4.3.3	Site Specific Conditions.....	26
5.0	Division of Water- Quality Assurance Practices .....	26
5.1	Quality Assurance Documents.....	26
5.2	Quality Assurance Assistance.....	27
5.3	Integrated Report .....	27
5.4	Environmental Monitoring & Assessment Program.....	28
5.5	Alaska’s Clean Water Actions Initiative.....	28
5.6	Wastewater Discharge Permitting.....	28
6.0	Division of Water- Data Management.....	28
6.1	ACWA Application .....	29
6.2	STORET Water Quality Database.....	30
6.2.1	Data Entry into STORET .....	30
6.3	Assessment Database .....	31
6.3.1	Assessment Data Base & the Integrated Report .....	31
6.3.2	Reach Indexing Tool.....	32
6.4	National Hydrography Dataset .....	32

6.5	Wastewater Discharge Program Data Management .....	32
6.5.1	EPA’s PCS & TRI Databases .....	32
6.5.2	DEC’s AKPERMIT & DROPS Databases .....	33
7.0	Division of Water- Data Analysis.....	33
7.1	Integrated Report .....	34
7.2	Alaska’s Clean Water Actions Initiative.....	35
7.3	Wastewater Permitting.....	36
7.3.1	Technology-Based Effluent Limits.....	36
7.3.2	Water Quality-Based Effluent Limits & Mixing Zone Analysis .....	36
8.0	Division of Water- Reporting Requirements .....	37
8.1	Integrated Report & TMDL Reporting .....	37
8.2	Environmental Monitoring & Assessment Program.....	37
8.3	Alaska’s Clean Water Actions Initiative.....	37
8.4	Wastewater Discharge Program.....	37
8.5	Beach Monitoring Program.....	38
9.0	Division of Water- Program Evaluation .....	38
9.1	Integrated Report .....	39
9.2	Environmental Monitoring & Assessment Program.....	39
9.3	Alaska’s Clean Water Actions Initiative.....	39
9.4	Wastewater Discharge Program.....	39
9.5	Beach Monitoring Program.....	40
10.0	Division of Water- General Support & Infrastructure .....	40
11.0	Bibliography .....	40
	Appendix A- Figures.....	42

### List of Tables

<b>Table 1. Alaska’s Aquatic Resources .....</b>	<b>6</b>
<b>Table 2. Core &amp; Supplemental Monitoring Indicators for Select DEC Permitted and Non-Permitted Activities .....</b>	<b>22</b>
<b>Table 3. DEC’s Integrated Report Waterbody Category Descriptions.....</b>	<b>34</b>
<b>Table 4. Number &amp; Percent (%) of Rivers &amp; Streams Assessed Comparison. ....</b>	<b>35</b>

### Appendices

#### Appendix A- Figures

- Figure 1. EMAP Project Plan for Alaska: Phase I.**
- Figure 2. Alaska’s Coastal EMAP Regions.**
- Figure 3. EMAP Established Sampling Sites for South-Central Alaska Coastal Region.**

Figure 4. EMAP Established Sampling Sites for Southeast Alaska Coastal Region.

Figure 5. EMAP Proposed Sampling Sites for Aleutian Islands Coastal Region.

Figure 6. EMAP Proposed Sampling Sites for Arctic Coastal Region.

Figure 7. EMAP Proposed Sampling Sites for Bering Sea Coastal Region.

Figure 8. EMAP Wadeable Streams, Tanana River Basin Established Sampling Locations.

Figure 9. ACWA Decision Tree.

## List of Acronyms (alphabetical)

<u>Acronym</u>	<u>Full Name</u>
AAC	Alaska Administrative Code
ACOE	Army Corps of Engineers
ACWA	Alaska's Clean Water Actions Program
ADB	Assessment Database
AS	Alaska Statutes
AWSHED	Alaska Watershed & Stream Hydrography Enhanced Datasets
BA	Biological Assessment
BAT	Best Available Technology
BCT	Best Control Technology
BEACH	Beaches Environmental Assessment and Coastal Health Act
BMP	Best Management Practices
BOD	Biological Oxygen Demand
BPJ	Best Professional Judgment
CALM	Consolidated Assessment & Listing Methodology
CEMP	Citizens Environmental Monitoring Program
CFR	Code of Federal Regulations
CIIMS	Cooperatively Implemented Information Management System
COD	Chemical Oxygen Demand
CPVEC	Commercial Passenger Vessel Environmental Compliance
CWA	Clean Water Act
CZMRA	Coastal Zone Management Reauthorization Act
DEC	Department of Environmental Conservation
DFG	Department of Fish & Game
DHSS	Department of Health & Social Services
DMR	Discharge Monitoring Report
DNR	Department of Natural Resources
DROPS	Discharge Permits & Online Permit System
EA	Environmental Assessment
EDD	Electronic Data Deliverable
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ELG	Effluent Limitation Guideline
EMAP	Environmental Monitoring & Assessment Program
ENRI	Environmental & Natural Resources Institute
EPA	Environmental Protection Agency
ESA	Endangered Species Act

FDA	Food & Drug Administration
GIS	Geographic Information System
IHCA	Interagency Hydrology Committee of Alaska
IPHC	International Pacific Halibut Commission
NEPA	National Environmental Planning Act
NHD	National Hydrography Dataset
NMFS	National Marine Fisheries Service
NOAA	National Oceanic & Atmospheric Administration
NOEC	No Observed Effects Concentration
NPDES	National Pollutant Discharge Elimination System
NPR	National Petroleum Reserve
NPS	Non-Point Source
NSPS	New Source Performance Standards
PCB	Polychlorinated Biphenyls
PCS	Permit Compliance System
POP	Persistent Organic Pollutant
POTW	Publicly Owned Treatment Works
PPG	Performance Partnership Grant
QAP	Quality Assurance Plan
QNCR	Quarterly Non-Compliance Report
RFP	Request for Proposals
SDWA	Safe Drinking Water Act
SIM-DE	STORET Interface Module for Data Entry
SQT	Sediment Quality Triad
STORET	Storage & Retrieval System
TBEL	Technology-Based Effluent Limit
TMDL	Total Maximum Daily Load
TOC	Total Organic Carbon
TRI	Toxics Release Inventory
TSS	Total Suspended Solids
USFWS	United States Fish & Wildlife Service
WEG	Water Experts Group
WET	Whole Effluent Toxicity
WLA	Waste Load Allocation
WQAMP	Water Quality Assessment & Monitoring Program
WQBEL	Water Quality-Based Effluent Limit
WQS	Water Quality Standard
ZID	Zone of Initial Dilution

## 1.0 Monitoring Strategy Purpose

### 1.1 Introduction

The Alaska Department of Environmental Conservation (DEC), Division of Water has developed a long term Water Quality Monitoring and Assessment Strategy (Strategy) to guide its stewardship of Alaska's marine and fresh water resources. The Strategy is intended to meet the federal expectations for state water quality stewardship activities enumerated in the Clean Water Act in a manner influenced by Alaska's unique needs and challenges.

The purpose of this document is: to serve as a framework for Alaska resource agency decisions required for assessing and monitoring Alaska's water resources; to support protection, stewardship, restoration and permitting decisions; and serve as a roadmap for improving state, federal, local, tribal and public capabilities and performance over time for monitoring the status and trends of Alaska's water resources.<sup>1</sup>

In March 2003, the Environmental Protection Agency (EPA) issued "*Elements of a State Water Monitoring and Assessment Program*" (EPA, 2003). This document provides a framework for DEC to follow and to demonstrate that its monitoring program meets the requirements of Section 106(e)(1) of the Clean Water Act. DEC must demonstrate continuing progress towards development of a state water monitoring and assessment program to remain eligible for Section 106 state assistance grants. The Strategy is organized around ten elements which must be addressed to ensure that monitoring and assessment activities are conducted on a rational basis and in a manner which ensures that information is of good quality and is accessible for resource management decisions. The ten elements which the Strategy addresses are:

1. Monitoring Program Strategy
2. Monitoring Objectives
3. Monitoring Design
4. Core and Supplemental Water Quality Indicators
5. Quality Assurance
6. Data Management
7. Data Analysis/Assessment
8. Reporting
9. Programmatic Evaluation
10. General Support and Infrastructure Analysis

---

<sup>1</sup> The State of Alaska's resource agencies include the Departments of Environmental Conservation (DEC), Natural Resources (DNR), and Fish and Game (DFG). DEC is responsible for managing water quality. DNR is responsible for managing water quantity and habitat. DFG is responsible for managing habitat and state fish and wildlife resources.

The Strategy's context is based upon the need to be consistent with state and federal water quality law, policies, and guidance. The statutory basis for the strategy is described in the next section. It is followed by a discussion of state and federal administrative policy which shape the strategy. EPA's written guidance for the Strategy, "*Elements of a State Water Quality Monitoring and Assessment Program*" is found at <http://www.epa.gov/owow/monitoring/elements/elements.html> (EPA, 2003).

## **1.2 State and Federal Statutory Basis for the Strategy**

National concern about the nation's water quality led Congress to enact the Federal Water Pollution Control Act Amendments of 1972. In 1977, this law was further amended and became commonly known as the Clean Water Act (CWA). Section 305(b) and 303(d) of the CWA provide the main drivers for federal expectations of the states with regard to assessing and reporting on their water quality. Section 305(b) requires states to report on the conditions and needs of their waters biennially including:

- a description of the water quality of all navigable waters, accounting for seasonal, tidal and other variations {CWA§305 (b)(1)(A)}.
- an analysis of the extent to which all navigable waters provide for the protection and propagation of a balanced population of shellfish, fish and wildlife, and allow recreational activities in and on the water {CWA§305(b)(1)(B)}.

Federal authority under the CWA is limited to navigable waters and does not extend to all state waters. Alaska's Legislature authorized DEC to establish standards for water quality (Alaska Statutes (AS) 46.03.070-080) and regulate waste disposal through permitting processes (AS 46.03.100) for all waters both navigable and non-navigable. In Alaska, navigable waters are defined by Alaska State Statutes as follows:

“any water of the state forming a river, stream, lake, pond, slough, creek, bay, sound, estuary, inlet, strait, passage canal, sea or ocean, or any other body of water or waterway within the territorial limits of the state or subject to its jurisdiction, that is navigable in fact for any useful public purpose, including but not limited to water suitable for commercial navigation, floating of logs, landing and takeoff of aircraft, and public boating, trapping, hunting, waterfowl and aquatic animals, fishing, or other public recreational purposes” (AS 38.05.365(12)).

Generally, any waterbody in Alaska that can float a boat is considered navigable. Alaska is estimated to have over 20,000 navigable rivers (pers. com. Atkinson, 2004), plus three million lakes and countless streams. The Strategy when fully implemented is intended to address all waters within Alaska, not just navigable waters, including but not limited to tidal and non-tidal rivers, streams, lakes, wetlands, groundwater, floodplains, estuaries and near coastal waters (inclusive of the three-mile state economic zone).



The CWA does not specifically require states to administer programs for monitoring and assessing ambient water quality conditions. The CWA has an elaborate framework for protecting water quality. The importance of monitoring within that structure is generally assumed, but not specifically addressed. Although there are no specific provisions authorizing state ambient monitoring programs, the CWA prohibits granting Section 106 funds to states not establishing water quality monitoring procedures (ASIWPCA, 2002).

Since 2002, Alaska has been reporting on the status and needs of its waters through a biennial document titled the Integrated Water Quality Monitoring and Assessment Report (Integrated Report). The Integrated Report is discussed throughout the Strategy.

### **1.3 State and Federal Administrative Policy**

The Strategy integrates policy and program elements embodied in the Alaska Clean Water Actions (ACWA) Policy, EPA's *Consolidated Assessment and Listing Methodology* (CALM) (EPA, 2002), and *Elements of a State Water Monitoring Program* (EPA, 2003). These major policies define, from a state and federal perspective, specific objectives for the Strategy. During the last two years, DEC and EPA have made progress through disparate efforts to develop approaches to rationally manage water resources. In March 2001, Alaska's resource agencies issued *Alaska's Clean Water Actions, Protecting Our Waters* (DEC, 2001). This document laid out the need and approach for state resource agency efforts to protect and improve water quality, water quantity and aquatic habitat. The ACWA approach was institutionalized in state government through issuance of Administrative Order 200 in October 2002. Resource agencies have subsequently developed and implemented the ACWA process to collaboratively rank and prioritize waterbodies for monitoring, assessment and restoration. A single grant application and review process is now established which funds priority projects with monies coming from multiple state and federal sources. The ACWA Initiative is described in more detail throughout the Strategy.

EPA issued the first edition of *The Consolidated Assessment and Listing Methodology* (CALM), *Toward a Compendium of Best Practices* in July 2002 (EPA, 2002). The CALM approach serves DEC as a framework for documenting how water quality data should be collected, analyzed and used for environmental decision making. The CALM approach is complimentary to Alaska's intention to take a holistic approach to prioritizing assessment, monitoring, and restoration needs and was adopted by DEC for its 2002/2003 Integrated Report. Within the Integrated Report, waterbodies are assigned to one of five categories which describe the extent to which waters are attaining water quality standards, whether they are impaired and require listing on the CWA 303(d) list, or whether they may be removed from the list. The CALM approach also recognizes that there are different methods (other than the Total Maximum Daily Load process) that can be used to reach attainment, and that waters may require attention for non-pollution related problems such as habitat degradation and water quantity. DEC's CALM approach is described and incorporated throughout the Strategy.

## 2.0 Division of Water- Monitoring & Assessment Objectives

The Division of Water is the primary Division within DEC responsible for water quality monitoring, assessment and protection. In order to meet the Division's water quality monitoring and assessment objectives, as well as the objectives of the CWA, the Division's monitoring strategy when fully implemented will enable DEC and others to:

- assess and describe the existing baseline conditions and long term trends of Alaska's water resources; to assess and describe the water quality of Alaska's navigable and non-navigable waters, accounting for seasonal, tidal and other variations.
- analyze the extent to which Alaskan waters provide for the protection and propagation of a balanced population of shellfish, fish and wildlife, and allow recreational activities in and on the water; to identify those Alaskan waters which are or not meeting Alaska's water quality standards (WQS).
- develop and refine point source permit effluent limits and conditions; design and recalibrate mixing zone dimensions for wastewater permits; assess permit compliance.
- establish Total Maximum Daily Loads (TMDLs); identify and target restoration of priority waters as identified through the ACWA process; evaluate the response of a waterbody to point source load reductions and non-point source best management practices (BMPs) established under the TMDL and ACWA processes; determine the effectiveness of BMPs used for controlling stormwater, dredge and fill and forestry related non-point source water pollution.
- develop and establish new WQS using narrative and numeric criteria based on quality controlled data collected from Alaskan waters.
- assist permit applicants and natural resource agencies when developing wastewater discharge permit limits and conditions for new development projects in Alaska.

### 3.0 Division of Water- Monitoring & Assessment Activities

The following section provides a brief introduction to the various monitoring approaches that the Division of Water utilizes to assess the health of Alaska's waters. This is followed by a description of Alaska's WQS; DEC's Integrated Report; and the water quality monitoring and assessment activities being conducted and managed by DEC's Division of Water. The Division of Water is comprised of several individual programs, three of which are primarily responsible for water quality monitoring and assessment activities: Water Quality Assessment & Monitoring Program; Non-Point Source Water Pollution Control Program; and the Wastewater Discharge Program. Individual programs within the Division of Water coordinate their monitoring and assessment responsibilities. Therefore, the monitoring and assessment activities, as described below for each program, are presented with the understanding that some of these activities may be jointly administered under more than one program.

The Monitoring Strategy reflects the Division of Water's current organizational structure. The Strategy will be updated and revised to reflect future, programmatic or structural changes within the Division of Water. Updates to the Strategy may also occur as new programs are added. More information about DEC's Division of Water and its programs is found at <http://www.dec.state.ak.us/water/>. DEC's Division of Environmental Health, Division of Air Quality, and Division of Spill Prevention and Response also manage and conduct environmental monitoring and assessment activities. A brief description of the Division of Environmental Health's Fish Safety Monitoring Project is presented in Section 3.8. More information about these Division's and their respective programs can be found at DEC's main web page (<http://www.dec.state.ak.us/>).

#### 3.1 *Monitoring Approaches*

Alaska is rich in aquatic resources (Table 1). Approximately 40% of the total surface waters of the United States are located in Alaska. Alaska has approximately 47,000 miles of coastal marine shoreline, which constitute more than 50% of the total U.S. coastline (AOW, 2002). The surface area of coastal bays and estuaries in Alaska is 33,211 square miles, almost three times the estuarine area of the contiguous 48 states. Alaska's surface waters include over 15,000 salmon streams – an important resource to Alaskans and the world (DEC, 2004b). The vast majority of Alaska's water resources are in pristine condition due to Alaska's size, sparse population, and the remote character of the state. Alaska's immense size and great number of waterbodies pose logistical and budgetary considerations when designing a statewide water monitoring strategy. Therefore, DEC must prioritize how to apply available financial resources when assessing the ecological health of Alaska's abundant water resources.

**Table 1. Alaska’s Aquatic Resources (AOW, 2002; DEC 2004b).**

<b>Atlas Topic</b>	<b>Value</b>
State surface area (square miles)	656,425
Total miles of rivers and streams	365,000
Number of lakes/reservoirs/ponds	3,000,000+
Acres of lakes/reservoirs/ponds	12,787,200
Square miles of estuaries	3,331
Miles of coastal shoreline	47,000
Acres of freshwater wetlands	174,683,900
Acres of tidal wetlands	2,180,500

DEC requires both regional information and waterbody specific information to assess the health of Alaska’s aquatic resources. Regional information is used for describing the current status, the long-term trends, as well as the benchmark ecological conditions of Alaska’s water resources. Regional information is generally obtained from multiple waterbodies or locations within the same eco-region or similar geographic province. Waterbody specific information is required to assess whether a waterbody is attaining its designated use(s) or whether it requires active stewardship or restoration, and serves as a basis for making permitting decisions.

DEC employs three basic monitoring approaches to accomplish its monitoring and assessment objectives.

1. ***Probabilistic/Randomized Designs*** in which all waters of a certain category (lakes, streams, rivers, coastal areas, etc.), and located within a specific eco-region, make up a population from which an unbiased subset are randomly selected for monitoring. DEC follows certain criteria for defining the population and selecting sample sites in order to generate a data set with a known level of statistical confidence. DEC is utilizing probabilistic monitoring in its Environmental Monitoring and Assessment Program (EMAP) to assess the overall status and trends of Alaska’s marine and freshwater resources. DEC is encouraging other agencies to adopt the EMAP approach for establishing regional baseline information. Elements of DEC’s EMAP are described throughout the Strategy.
  
2. ***Targeted Approach*** in which a waterbody is specifically selected for monitoring based on impairment concerns or the need to establish its current attainment status, a TMDL, long-term trends or permit conditions and limits. DEC utilizes a targeted approach in its Wastewater Discharge Program and ACWA initiative when assessing point source and non-point source water pollution, respectively. Elements of these programs are described throughout the Strategy.
  
3. ***Census Designs*** in which all waters in a category, such as designated bathing beaches, are sampled at a defined frequency. Census designs are utilized in DEC’s Beach Monitoring Program and Fish Monitoring Safety Project as described in Sections 3.7 and 3.8, respectively.

Information objectives influence water quality monitoring design selection. All of the information developed through assessments employing these three approaches can be evaluated to provide a comprehensive summary on the condition of the Alaska's water resources. Programs within the Division of Water use a mix of these three monitoring approaches to meet their information objectives as described in the following sections.

### **3.2 Alaska's Water Quality Standards**

The Division's Water Quality Assessment & Monitoring Program (WQAMP) is responsible for developing and implementing Alaska's statewide WQS, which are documented in Alaska Administrative Code (AAC) at 18 AAC 70. Alaska's WQS are an essential tool that enables the Division and others to assess the health of Alaska's waters. DEC has established WQS to protect both marine and freshwater for water supply, water recreation, growth and propagation of shellfish and harvesting for consumption of raw mollusks or other raw aquatic life. For each designated use, DEC has established explicit water quality criteria for color, fecal coliform bacteria, dissolved oxygen or gas, dissolved inorganic substances or total dissolved solids (TDS), petroleum hydrocarbons, oil and grease, pH, radioactivity, residues, sediment, temperature, turbidity, and toxic or deleterious organic and inorganic substances. These WQS do not apply to cleanup of groundwater at state or federally controlled contaminated or hazardous waste sites.

For the protection of aquatic life, DEC has adopted EPA's recommended acute and chronic criteria for toxic and other deleterious organic and inorganic substances for both fresh and marine waters. These criteria are found in Alaska's Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances, adopted by Alaska into the WQS in 18 AAC 70.020(b). In a mixing zone, acute aquatic life-based criteria apply at and beyond the boundaries of the zone of initial dilution (ZID), but may be exceeded within the ZID. The mixing zone must be sized to prevent lethality to passing organisms (18 AAC 70.255(d)). Human health and chronic aquatic life-based criteria apply at and beyond the boundaries of the mixing zone.

For the protection of human health, DEC has adopted water quality criteria for non-carcinogenic substances which apply to fresh water uses of drinking, culinary, and food processing, and growth and propagation of fish, shellfish, other aquatic life, and wildlife; and marine water uses of aquaculture, growth and propagation of fish, shellfish, other aquatic life, and wildlife (18 AAC 70.020(b)(11)(23)). There are currently no Alaskan surface WQS for carcinogenic substances based on the protection of human health. There are groundwater cleanup levels for non-carcinogens and carcinogens that apply to cleanup of contaminated sites. DEC's WQS also have an established anti-degradation policy (18 AAC 70.015), whole effluent toxicity limits (18 AAC 70.030), and exceptions to statewide standards. Exceptions to statewide standards are implemented through Short Term Variances; Zones of Deposit; Thermal Discharges; Reclassification of Waters; Site Specific Criteria; and Mixing Zones (18 AAC 70.200-270).

**Triennial WQS Review:** DEC is currently in the process of considering new narrative and numeric water quality criteria and standards to protect Alaska's waters and aquatic biota. EPA requires DEC to review and update Alaska's WQS every three years. During the current triennial review process (2003-2006), DEC is considering adopting EPA's recommended bacteria criteria for enterococci and *E. coli*; revising the residue criteria for zones of deposits near log transfer and seafood processing facilities; revising the Petroleum Hydrocarbon WQS; and revising the mixing zone standards with respect to salmonid spawning beds and low flow conditions. Under DEC's five-year (2001-2006) WQS Program Plan, the agency is also considering adopting the drinking water maximum contaminant levels and human health criteria for arsenic; developing nutrient criteria; developing bio-criteria; developing human health criteria for carcinogens using revised fish consumption factors; developing groundwater standards; and revising the anti-degradation and implementation policy. More information about Alaska's WQS and the triennial review process can be found at <http://www.dec.state.ak.us/water/wqsar/wqs/wqs.htm> .

### **3.3 305(b) & 303(d) "Integrated Report"**

DEC's 305(b) Water Quality Assessment Report and 303(d) list of impaired waters are required by the CWA, and rely on water quality information obtained from DEC's in-house programs as well as other natural resource agencies, industry, non-profit and Native organizations. Since 2002, DEC has been compiling the 305(b) and 303(d) assessment results in a common report known as the "Integrated Report". DEC's 2002/2003 Integrated Report represents the most current summary of existing data analyzed by DEC for assessing compliance with Alaska's WQS. DEC's Integrated Report describes the nature, status and health of Alaska's waters and identifies impaired waters in need of action to recover water quality or habitat. The Integrated Report is an important tool for allowing Alaskans to understand the health of Alaska's waters and for identifying actions Alaskans can undertake to improve water quality in Alaska. The Integrated Report is updated every two years.

For purposes of the Integrated Report, the term "assessment" means the process of collecting and evaluating available water quality data to determine if an individual waterbody meets Alaska's WQS criteria or should be considered for inclusion on the Section 303(d) impaired waterbody list. The assessment process relies on information obtained generally within the last five years. The process of gathering and analyzing data for inclusion within the Integrated Report is described throughout the Strategy. DEC's Integrated Report is found at <http://www.dec.state.ak.us/water/wqsar/waterbody/integratedreport.htm> .

**TMDL Waters:** According to the CWA §303(d), and EPA's implementing regulations, 303(d) designated waters include impaired surface waters that do not or are not anticipated to meet applicable water quality standards solely through the implementation of existing technology-based or similar controls by the next listing cycle (currently every two years). Impaired waterbodies are surface waters with documentation of actual or imminent persistent exceedances of water quality criteria, and/or adverse impacts to designated uses, as defined in Alaska's WQS. CWA §303(d) requires that each state identify those

waters within its boundaries for which effluent limitations are not stringent enough to implement any water quality standard applicable to such waters. Each state is also required to establish a priority ranking for such waters, taking into account the severity of pollution and the designated uses of such waters. A Total Maximum Daily Load (TMDL) describes the process and steps to be taken to restore an impaired water to a condition that meets the applicable water quality standards for the pollutant parameters of concern. A current list of impaired waters in Alaska is found at <http://www.dec.state.ak.us/water/wqsar/waterbody/integratedreport.htm> .

In Alaska, impaired waters are priority ranked based on the severity of the pollution, the feasibility of implementing a waterbody recovery plan and other factors, using the ACWA stewardship analysis, as described in Section 3.5. The development of a TMDL, or equivalent waterbody recovery plan, for an impaired water is scheduled by DEC eight to thirteen years into the future. A waterbody recovery plan may include a TMDL, described in accordance with Section 303(d)(4)(A) of the CWA, and include effluent limitations based on wasteload allocations from point sources and/or load allocations from non-point sources. When possible, the ACWA assessment process identifies the specific segment that is impaired and the corresponding pollutant parameters of concern. The list of approved TMDLs for Alaska's impaired waters is found at <http://www.dec.state.ak.us/water/tmdl/approvedtmdls.htm> .

There are no laws or regulations that require the actual implementation of the TMDL. EPA is not required to and does not approve TMDL implementation plans. Therefore, once a TMDL document is prepared for a waterbody there is no guarantee that the TMDL will be implemented. However, once a TMDL has been implemented, monitoring and assessment are necessary to determine if the pollutant control technology and BMPs are achieving prescribed load reductions. ACWA grant proposals may be solicited to establish TMDLs for pollutants of concern on impaired waters as well as to monitor the success of their implementation, as described in Section 3.5.

### **3.4 Environmental Monitoring & Assessment Program**

DEC is the lead implementation agency for Alaska's Environmental Monitoring and Assessment Program (EMAP). EMAP protocol was developed by EPA, and EMAP activities in Alaska are funded primarily through EPA. EMAP protocol provides two essential tools for DEC: 1) the bioassessment framework which integrates physical, chemical and biological measurements; and 2) statistically based design procedures (EPA, 2001). This statistical design is critical to being able to make inferences of the aquatic ecological condition and to assess trends over time to *all waters* in a region from a sub-set of waters actually sampled. EMAP protocols are designed to provide general conclusions about the biotic and abiotic conditions within a study area, which can then be used for comparison with other regions of Alaska and the United States. This type of information cannot be obtained from targeted sampling programs, principally focused on specific "problem" areas. EMAP's probabilistic survey sampling provides a more practical and cost effective method to characterize Alaska's abundant coastal and fresh water resources. EMAP protocols are standardized and are used by all participating states. This improves the comparability of data among the EMAP participants, and

allows for better regional assessment and prioritization of stressors and impacts. In addition, EMAP protocol provides standard methods and procedures for sharing and managing comparable data sets held in a quality controlled data management system.

The main goals of EMAP from a national perspective include monitoring the condition of the nation's ecological resources, evaluating the cumulative success of current policies and programs, and identifying emerging problems before they become widespread or irreversible. These same goals are applicable at the state level. Data obtained from EMAP is envisioned as the beginning of DEC's statewide, ambient, water monitoring program that will include Alaska's coastal as well as fresh water resources.

As EMAP data are collected, compiled, and evaluated, DEC can describe Alaska's coastal and freshwater benchmark conditions for water chemistry; for toxic compounds in sediment and fish tissue; for benthic infauna and demersal fish distribution and abundance. These data may be used in future studies to target specific locations that exhibit elevated levels of toxic compounds in sediment or fish tissue, or which show anomalies in benthic infauna distribution and abundance, fish pathology, or fish distribution and abundance. Data gathered by the EMAP may eventually be used to:

- Determine the extent to which Alaska's surface waters meet Alaska's WQS.
- Revise, develop or modify existing WQS & criteria. Help develop new water quality criteria for nutrients and other water quality parameters.
- Determine if an association exists between the status of aquatic resources and the most important natural or anthropogenic stresses.
- Determine the effectiveness of DEC's pollution control measures & evaluate if DEC is making the correct regulatory decisions for protecting Alaska's aquatic resources.

DEC is currently involved in implementing both Coastal EMAP and Wadeable Streams EMAP activities in Alaska. In 2001, DEC developed a Cooperative Agreement with EPA to join collaboratively in the Western States Coastal EMAP. The Western States Coastal EMAP was initiated as one component of a national program called the National Coastal Assessment (NCA) which is led by EPA to survey the condition of the nation's coastal resources (EPA, 2001). This agreement has led to completion of field surveys in two of the five Alaskan coastal provinces, as described in more detail below. DEC's "Draft Phase I Project Plan for Coastal EMAP" is depicted in Figure 1 (Appendix A). The Division of Water is also involved in assessing the health of Alaska's fresh water resources employing EPA's EMAP protocol for wadeable streams and small rivers (EPA, 2004a). In 2004, EPA funded the first Alaskan Wadeable Stream EMAP survey in the Upper Tanana River Basin, as described in more detail below.



### 3.4.1 DEC's Coastal Environmental Monitoring & Assessment Program

Alaska's coastline constitutes over 50% of the total United States coastline covering approximately 47,000 miles. DEC is utilizing EMAP protocol to monitor and assess the status and trends of Alaska's estuarine and coastal ecological resources, and to develop an integrated and comprehensive coastal monitoring program (EPA, 2001). DEC and EPA have established five coastal regions or provinces in Alaska to facilitate planning and execution of coastal EMAP: 1) Southeast; 2) South-central; 3) Aleutians; 4) Bering; and 5) Arctic, as depicted in Figure 2 (Appendix A).

The first, Alaskan, coastal EMAP field survey was conducted in the south-central Alaska province during the summer of 2002 (report in progress). EMAP sampling was conducted in the northern Gulf of Alaska in an area that encompassed the coastline and estuaries located between Unimak Pass and Cape St. Elias, including Cook Inlet, Prince William Sound, and several bays adjacent to Kodiak Island. There were 50 core EMAP sites sampled in addition to 25 sites that the DEC added to further characterize the two major waterbodies of the south-central Alaskan coast (Cook Inlet and Prince William Sound). These sampling sites are depicted in Figure 3 (Appendix A). The entire geographic, linear range across the study area was more than 800 miles.

The Southeast Alaska coastal EMAP field survey was completed during the summer of 2004 in an area extending from Prince of Wales Island to Yakutat. A total of 40 core sites and ten cruise ship docking locations were sampled using EMAP protocol. These sampling locations are depicted in Figure 4 (Appendix A). DEC is currently conducting its evaluation and assessment of the data and expects to complete the final report in 2006.

DEC's current focus is to complete an initial EMAP survey for each coastal province, thereby providing a water quality and ecological benchmark for each region. Proposed sampling sites for the remaining three coastal provinces are presented in Figures 5, 6 & 7 (Appendix A). In the national coastal EMAP program five years has been considered the potential recurring sampling interval, but alternative sampling schemes are currently being developed and assessed. Once DEC, EPA and other partners have had the chance to assess the results of the south-central and southeast Coastal EMAP sampling efforts, a long-term, integrated, probabilistic and targeted monitoring program will be implemented. Monitoring frequency cannot yet be determined, but will not be less than every five years. Monitoring frequency will also be dependent on establishing the infrastructure, stable financial resources and partnerships required to implement a comprehensive statewide EMAP program.

### 3.4.2 DEC's Wadeable Streams Environmental Monitoring & Assessment Program

Another component of EMAP is assessing the condition of the nation's wadeable streams and small rivers. In order to determine the extent to which Alaska's surface waters support healthy aquatic communities, DEC is currently involved in implementing an EMAP protocol for Alaska's wadeable streams and small rivers.

The first Alaskan, Wadeable Stream EMAP study was conducted during the summer of 2004 and encompassed a 47,000 square mile area within Alaska's Boreal Forest Level II Ecoregion. The Tanana River and its tributaries were the focus of the 2004 wadeable streams EMAP study. The University of Alaska Anchorage (UAA), Environmental and Natural Resources Institute (ENRI) conducted the field sampling and analysis activities under contract to the Department. Water quality monitoring, physical habitat assessment and macroinvertebrate collection were conducted at 27 sample locations using EPA's Wadeable Streams Assessment protocols (EPA, 2004a). Due to extreme fire conditions, only 27 sites were sampled during the summer of 2004. Another 23 sites will be sampled during the summer 2005. The report will be issued in 2006. The Tanana River Basin sampling sites are presented in Figure 8 (Appendix A).

### **3.5 Alaska's Clean Water Actions (ACWA) Initiative**

DEC participates in the implementation of Alaska's Clean Water Actions (ACWA) initiative, established through an Administrative Order on October 2, 2002, to address all waters in Alaska requiring monitoring, assessment and restoration. DEC, the Alaska Department of Natural Resources (DNR), and the Alaska Department of Fish and Game (DFG) work together to focus state and federal resources on the waters of greatest need. The ACWA initiative addresses priority waters having water quality, water quantity or habitat problems. ACWA uses a targeted design approach to address those state watersheds, waterbodies, or waterbody segments requiring monitoring, assessment or possible stewardship action(s). ACWA currently encompasses rivers, streams, lakes, reservoirs, estuaries, coastal areas, and wetlands and may address groundwater in the future.

**ACWA Decision Tree:** The ACWA Decision Tree is a diagram that depicts the flow of information, pathways and critical decision points for the application of key criteria associated with the ACWA waterbody decision process. The ACWA Decision Tree process starts with the waterbody nomination. Once a waterbody has been nominated, an analysis is conducted and each nominated water is then placed into one of four categories using stewardship criteria and sufficient and credible data tables as described below. Those waters which are placed into the Data Collection and Monitoring Track, Protection & Maintenance of Waterbodies at Risk Track, or Waterbody Recovery Track are then further scored using ranking criteria to prioritize monitoring, assessment and restoration activities, as described below. The ACWA Decision Tree is depicted in Figure 9 (Appendix A).

**ACWA Waterbody Nomination Process:** Cooperating state resource agencies (DEC, DNR, DFG) have developed a waterbody nomination and ranking process which prioritizes stewardship and corrective action for waters at risk of pollution and polluted waters. All waters in Alaska may be nominated for consideration in the ACWA process. Nominations may be made by any public or private entity by submitting a nomination form to DEC on an ongoing basis and during the formal solicitation period, which is every two years. Nomination forms are available at DEC's website [http://www.dec.state.ak.us/water/acwa/acwa\\_index.htm](http://www.dec.state.ak.us/water/acwa/acwa_index.htm). Once nominated, individual

waters are reviewed and either entered into the ACWA database or returned to the nominator for additional information. The waterbody nomination process is the first step in the ACWA evaluation process and is a prerequisite for eventual reporting in the Integrated Report.

**ACWA Analysis Phase:** In the analysis phase, each successfully nominated waterbody is studied to determine whether existing stewardship programs are adequate to maintain and protect the waterbody, and whether available data is sufficient to determine the existence or extent of a current or potential problem. The purpose of the analysis is to determine if existing stewardship programs (BMPs, federal regulations, WQS, and Alaska State Statutes) are adequate to address the water quantity, water quality or aquatic habitat support issue(s) identified in the ACWA nomination process. The analysis phase directs each nominated waterbody into one of four possible tracks:

- Data Collection & Monitoring Track (equivalent to category 2 or 3 in the Integrated Report).
- Protection & Maintenance of Waterbodies At Risk Track (no equivalent category in the Integrated Report).
- Waterbody Recovery Track (equivalent to category 4 or 5 in the Integrated Report).
- Adequately Protected (equivalent to category 1 in the Integrated Report).

Sufficient and credible data criteria tables are used during the “Analysis Phase” to determine whether available data is sufficient to establish the existence or extent of a current or potential problem. A sufficient and credible support table exists for each component (water quality, water quantity, habitat) of ACWA. The ACWA sufficient and credible data tables are found at

<http://info.dec.state.ak.us/awq/awca/waterbody/sufficientcredible.htm>.

**ACWA Ranking Criteria:** The ACWA Ranking Criteria were developed to assign a numeric value to waters placed in the Data Collection & Monitoring Track; Protection & Maintenance of Waterbodies at Risk Track; or in the Waterbody Recovery Track. The ACWA Ranking Criteria consist of three components (Habitat; Water Quality; Water Quantity) for each evaluated waterbody. Ranking each waterbody provides a means to assign a relative priority and to focus attention on the waters of highest priority within each category. The ACWA Ranking Criteria are found at

<http://info.dec.state.ak.us/awq/awca/waterbody/documents/rankingcriteria.htm> .

**ACWA Action Phase:** Waters placed into the Data Collection & Monitoring Track, Protection & Maintenance of Waterbodies at Risk Track, or in the Waterbody Recovery Track are addressed in the “Action Phase” by prioritizing individual waters for action; identifying and implementing monitoring, protection or recovery actions; evaluating the success of protection and recovery actions, or directing the waterbody for additional information, continued monitoring or additional protection and recovery actions. The

identification and ranking of ACWA priority waters serves as the basis for allocation of financial and staff resources to implement monitoring, assessment and restoration actions.

DEC currently does not maintain an ambient, fixed or rotating station water quality monitoring program. Water quality monitoring for high priority waters is solicited through the ACWA grant process and through the use of selected term contractors. Funding to support ACWA waterbody monitoring, assessment, restoration and stewardship comes from state resource agencies through which requests for proposals are publicly solicited annually on a competitive basis. Each of these funding sources has a unique set of obligations and conditions for use. Projects may be implemented directly by agency staff through term contracts or through ACWA grants as determined by resource agencies.

In 2003, a single, integrated request for proposal (RFP) process that captures the requirements associated with each of the potential funding sources was developed. The consolidated RFP process reduces the burden on applicants by providing a “one-stop shopping” approach to their funding search. This practice also facilitates the project evaluation and award process of the agencies by providing the ability to optimally match projects with the best funding source and provide all of the information required to make the funding awards. Project evaluations and matches to funding sources are accomplished by an interagency team representing the primary ACWA natural resource funding agencies.

The ACWA partners (DEC, DNR and DFG) award grant dollars for projects which ensure that available resources are focused on those waters in greatest need for monitoring and restoration. The ACWA program awards grant dollars obtained from EPA’s CWA 319 funds, the Sustainable Salmon Fund and other monetary resources to coordinate state efforts for targeted cleanup of lakes and streams with the greatest pollution problems. Since 2001, approximately 6.7 million dollars have been awarded for approximately 88 projects to help achieve the state's goal of healthy water quality, water quantity and aquatic habitat. In fiscal year 2004, ACWA awarded over \$900,000 in grants to fund water protection and restoration projects throughout Alaska. A complete listing of ACWA funded projects, associated quality assurance plans, and monitoring parameters can be found at <http://www.dec.state.ak.us/water/acwa/acwagrantsproject.htm>.

ACWA funded projects have included implementation of TMDLs; establishing biomonitoring protocols for specific ecoregions of Alaska; establishing the Anchorage Citizen’s Environmental Monitoring Program; establishing stormwater management plans for Fairbanks, Anchorage and Juneau; implementation of numerous watershed restoration projects; restoring fish habitat; and for lake monitoring. Funding may be used in the future to evaluate the effectiveness of non-point source water pollution control BMPs.

DEC works with many local government and non-profit groups throughout Alaska, providing financial and technical assistance for the monitoring, assessment and restoration of 303(d) listed and other high priority waters requiring additional monitoring or protection. The continued support of local monitoring programs, when possible,

results in cost-effective monitoring and restoration, thereby helping to implement DEC's monitoring strategy. Each ACWA grantee is required to submit their monitoring data electronically to DEC so that these data can be uploaded into EPA's national water quality database called STORET.

**ACWA Development:** In the future, to assure that individual, ACWA funded, monitoring projects provide valid and useful data, DEC will require these six elements in any projects it funds or oversees, and also will encourage other organizations to include in their efforts:

- Objectives that clearly describe the purpose of the monitoring and how the data will be used.
- Strategy and design that clearly and logically provide data that will meet those objectives.
- Indicators that provide the appropriate physical, chemical, and biological measurements.
- Quality Assurance protocols that ensure adequate steps are taken so the data is valid and useful.
- Data Management and reporting processes that manage and report data so the data has maximum short and long-term usefulness.
- Evaluation processes to ensure the results are adequately reviewed to determine next steps.

### **3.6 Wastewater Discharge Program**

DEC's Wastewater Discharge Program is administered by the Division of Water. Its mission is to protect water resources and public health by regulating wastewater discharges. DEC's Wastewater Discharge Program is responsible for issuing general and individual state wastewater permits and monitoring compliance with state issued permits for wastewater discharges outside the jurisdiction of the National Pollutant Discharge Elimination System (NPDES) Program. DEC's Wastewater Discharge Program staff certify, under authority of the CWA §401, that NPDES permits issued by EPA comply with Alaska's WQS, as described below. More information about DEC's Wastewater Discharge Program is found at <http://www.dec.state.ak.us/water/wwdp/index.htm>.

#### **3.6.1 NPDES Program in Alaska**

In Alaska, EPA administers the NPDES Program. All NPDES permits are issued and enforced by EPA. EPA has issued general NPDES permits in Alaska for oil and gas exploration and development, placer mining, seafood processing, log transfer and storage facilities, stormwater discharges and publicly owned treatment works (POTWs). EPA

also issues individual NPDES permits to facilities that request or that require special conditions or do not fall within the parameters of a general permit. There are numerous individual NPDES permits issued by EPA for each industrial category in Alaska. Individual NPDES permits issued by EPA can be viewed using the following EPA search engine: <http://cfpub.epa.gov/npdes/permitissuance/genpermits.cfm#individual> . General NPDES permits issued by EPA in Alaska can be viewed at EPA's website: <http://yosemite.epa.gov/R10/WATER.NSF/NPDES+General+Permits/General+NPDES+Permits>.

DEC has recently gained legislative authority to pursue primacy of the NPDES permitting program for Alaska. Senate Bill 110 was passed in May 2005 which authorizes DEC to submit a primacy application to EPA and, upon approval, implement an NPDES program. DEC intends to submit an application to EPA by June 2006.

As a demonstration of capacity building in the Wastewater Discharge Program, DEC and EPA negotiated a Work Share Agreement that designates DEC as the lead agency responsible for drafting the renewed pre- and post 1985 NPDES Log Transfer Facility General Permit (GP). EPA will be responsible for issuing the public notice for the draft permit and ultimately issuing the GP under its authority. The goal is to issue the GP by June 2006.

### *3.6.2 DEC Wastewater Permitting Activities*

Alaska State Statutes require permits for discharges to all lands and waters of the state (AS 46.03.100). DEC issues state wastewater discharge permits for discharges outside the jurisdiction of the NPDES Program and for discharges that EPA is unable to permit due to lack of resources. DEC has issued general discharge permits for the following types of activities: excavation dewatering; domestic wastewater discharge from waste stabilization ponds; contaminated groundwater discharge to surface waters; secondary treated domestic wastewater up to 25,000 gallons per day; primary treated domestic discharges in coastal communities with Clean Water Act 301(h) Waivers; domestic wastewater discharges from seasonal or temporary camps in southeast and south central Alaska. In addition, DEC issues individual permits for both domestic and non-domestic wastewater discharges. DEC has issued and is responsible for the compliance and enforcement of approximately 139 individual state waste disposal permits and has authorized approximately 78 discharges under one of eight state general permits (DEC, 2004a). More information about state issued wastewater permits can be found at <http://www.dec.state.ak.us/water/wwdp/index.htm> .

Currently, the process for obtaining the appropriate state or federal wastewater discharge permit in Alaska is somewhat complex. DEC has recently generated process maps which outline the permitting procedures for individual and general state issued permits as well as for NPDES permits in Alaska. These process maps are being finalized and will be made available in DEC's Permit Writers Handbook (Work In Progress). The Department also intends to develop pre-permit monitoring guidance to facilitate collection of data and to support permitting decisions.

DEC's Water Division also administers the Commercial Passenger Vessel Environmental Compliance (CPVEC) Program for cruise ships discharging to state waters. State law (AS 46.03.460-490), and 18 Alaska Administrative Code (AAC) 69, sets standards and sampling requirements for the underway discharge of blackwater and graywater, as well as hazardous and solid waste disposal standards. The CPVEC Program applies to both large (>250 passengers) and small commercial passenger vessels within state waters. The CPVEC Program monitors discharge requirements as well as conducts independent monitoring to assess cruise ship impacts to marine waters. More information about DEC's CPVEC Program can be found at [http://www.dec.state.ak.us/water/cruise\\_ships/index.htm](http://www.dec.state.ak.us/water/cruise_ships/index.htm).

### 3.6.3 CWA §401 Certification

**NPDES Certifications:** DEC certifies all of the general and individual NPDES permits issued by EPA to insure that these permits are protective of designated use(s) based on Alaska's WQS. DEC's certification entails direct involvement in the development of all proposed NPDES permit limits and conditions and in the full-range of compliance monitoring activities required of a state issued permit. Alaska's state statutes (AS 46.03.110(e)) allow the state's certification of NPDES permits to serve as the required state permit. When DEC certifies an NPDES permit, it can enforce the certification requirements under state law (18 AAC 15.120).

The CWA requires that NPDES permit effluent limits for a particular pollutant be the more stringent of either technology-based limits (limits based on the available technology to treat the pollutants) or water quality-based limits (limits that are protective of the designated uses of the receiving water). EPA must consider including WQBELs in the NPDES permit if there is a reasonable potential to exceed any of Alaska's WQS based on the application of TBELs. EPA does not have the authority under the CWA to authorize a mixing zone and looks to DEC to interpret Alaska's WQS and provisions for protecting the receiving water through the application of a mixing zone. The application of a mixing zone insures that all designated uses are protected while allowing the facility some operational flexibility. Without DEC's application of a mixing zone, EPA could require operators to meet WQS at the end of the discharge pipe.

When there is reasonable potential to exceed Alaska's WQS the permittee can choose to apply to DEC for a mixing zone. The permittee may also apply to DEC for an individual wastewater discharge permit for discharges to land and for other discharges not covered under the NPDES permit. The burden of proof for justifying a mixing zone and the information required for establishing a mixing zone rests with the permittee (18 AAC 70.240-270). DEC establishes the mixing zone dimensions to protect the designated use(s) of the receiving water. Generally, DEC designs the mixing zone so that chronic aquatic life-based criteria for the pollutants of concern are met at the edge of the mixing zone. The final proposed NPDES permit effluent limits will reflect which ever requirements (technology- or water quality-based limits) are more stringent. Mixing zone monitoring is required by DEC to ensure compliance with chronic aquatic life-based and human health criteria. DEC has begun to develop a mixing zone guidance document

which describes the information required by DEC to design a mixing zone and establish WQBELs (DEC, 2004c).

The entire process for developing WQBELs is complex. Some states like Florida, for example, have documented the procedures for establishing WQBELs into their state administrative code (FAC Chapter 62-650). In EPA Region 10, both Washington and Oregon have written guidance for performing a Reasonable Potential Analysis and procedures for establishing WQBELs (DEQ, 2004; DOE, 2002). The process for developing WQBELs in Alaska has not yet been fully documented in guidance or by regulation. DEC will likely have to develop similar regulations or guidance for establishing WQBELs as DEC proceeds with gaining primacy of the NPDES Program.

**Certification of Dredge & Fill Permits:** Dredging and filling of wetlands and surface waters of Alaska occur when navigable channels require deepening, and during new construction of piers, harbors, bridges, dams, levees, breakwaters, oil platforms and roads. Dredge and fill activities can result in reduction and loss of salmonid spawning beds and juvenile salmonid rearing habitat, disturb migratory timing and channel preferences, impact available juvenile salmonid food resources, and potentially result in salmonid mortality by the very nature of the activity.

The Army Corps of Engineers (ACOE) issues permits for the dredging and filling of navigable waters under the authority of the Rivers and Harbors Act of 1899, and under the authority of the CWA §404. DEC participates in the management and protection of navigable waters and wetlands by reviewing ACOE dredge and fill permits under the authority of the CWA §401. Under CWA §401(d), any state certification, under this section, shall set forth any effluent limitations, other limitations, and monitoring requirements necessary to assure that any applicant for a Federal license or permit will comply with any applicable effluent limitations and other limitations under §301 or §302 of the CWA. Although DEC has the authority to require monitoring, DEC generally waives the right to require any monitoring as part of the §401 dredge and fill certification process.

**Stormwater Permitting Activities:** Stormwater related pollutants are the primary source of pollution for impaired waters in Alaska (DEC, 2004b). In Alaska, stormwater related impacts are regulated by EPA and DEC under two NPDES GPs: the Multi-Sector GP for Industrial Activities and the Construction GP. In addition, there are four individual Municipal Separate Storm Sewer System (MS4) permits in Alaska. The Municipality of Anchorage and the Port of Anchorage are both covered under the Phase I of the MS4 GP. The City of Fairbanks and portions of the North Star Borough are covered under Phase II of this same permit. Monitoring requirements for these permits are negotiated with EPA during the permitting process. DEC funds municipalities, utilizing ACWA monies, to develop stormwater management plans. Projects funded by DEC include the City of Fairbanks Stormwater System Mapping; City and Borough of Juneau Stormwater Program and the City of Anchorage Storm Water Utility Study.

Nationally, NPDES Construction GPs are required for every new development site greater than one acre in size, however, there are no monitoring requirements for construction sites under this GP. Compliance with Alaska's WQS is achieved through



implementation of BMPs during and after construction to reduce sediment and erosion related impacts. DEC reviews stormwater pollution prevention plans (SWPPP) and post-construction engineering plans for compliance with recommended BMPs. However, DEC does not have the manpower resources necessary to review every SWPPP or engineering plan, and currently, only reviews those plans and SWPPPs for projects greater than five acres in size (pers. com. Drzewiecki, 2004). In Alaska, many new construction sites encompass wetlands and require both a dredge and fill permit and stormwater construction GP. Currently, however, there is no formal process through which the applicant is informed that a stormwater permit is required.

### **3.7 Beach Act & Bacteria Monitoring**

Alaska has 47,000 miles of coastline most of which remains undeveloped. Alaskans use their public beaches for recreational purposes such as for fishing, shell fishing and boating. However, limited, *intentional* swimming occurs in Alaska's cold, coastal waters. The Beaches Environmental Assessment and Coastal Health Act (BEACH Act) signed into law on October 10, 2000, seeks to reduce the risk of disease to recreational users of the nation's waters. The BEACH Act authorizes EPA to award grants to eligible coastal states and Tribes for the development and implementation of programs to monitor coastal recreational waters for disease-causing microorganisms and to notify the public if monitoring indicates a public health hazard.

Previous Beach Grant work, funded through DEC, established the statewide extent of beaches used for recreational purposes, the degree of use, and the proximity of pollution sources to these beaches. Currently, DEC is developing a short term program which will: 1) fund follow-up baseline/pilot monitoring of selected beaches identified to be high risk locations; 2) fund local governments through the ACWA grant process to conduct pilot beach monitoring at their beaches; and 3) evaluate new field test methods for bacteria. DEC is also currently developing Alaska-appropriate bacteria criteria; notification protocols for beach contamination situations; and new sampling and analytical methods for marine beaches. Sampling of selected beaches for *Escherichia coli* (*E. coli*) and enterococci is scheduled to commence during the spring and summer of 2005. Long term monitoring, where necessary, will be a local government responsibility.

### **3.8 Fish Safety Monitoring Project**

DEC's Division of Environmental Health is responsible for the Fish Safety Monitoring Project. It is estimated that over fifty percent of the seafood processed in the U.S. comes from Alaskan waters (NMFS, 2003). Based on high contaminant levels in other states, federal agencies have issued national consumption advisories for some fish species. Information about the quality of Alaskan fish species is being compiled to reduce concerns for Alaskans - especially for Native Alaskans who harvest local food as an integral part of their culture.

To ensure that Alaskan seafood is safe to eat, DEC's Seafood and Food Safety Laboratory has analyzed marine, anadromous, and freshwater fish tissue for heavy metals

and persistent organic pollutants (POPs). Samples are being collected primarily in marine waters throughout Alaska by DFG, National Oceanic and Atmospheric Administration's (NOAA) Sablefish Survey, International Pacific Halibut Commission (IPHC), commercial and Native fishermen. Peer reviewers include researchers at NOAA, EPA, IPHC and the Alaska Department Health and Social Services (DHSS). After evaluation of the results the DHSS', Division of Public Health, Epidemiology Section will determine if any consumption advice should be given by comparing results to national health standards set by EPA and the U.S. Food and Drug Administration (FDA). More information about DEC's Fish Safety Monitoring Project is found at [http://www.st.nmfs.gov/st1/commercial/landings/annual\\_landings.html](http://www.st.nmfs.gov/st1/commercial/landings/annual_landings.html).

DEC began the fish safety monitoring program in the fall of 2001. DEC has completed collecting fish for the 2004 summer fishing season. The skinless fillets of salmon (all five species), halibut, Pacific cod, sablefish, rockfish, lingcod, pollock, northern pike and sheefish are being analyzed at the State's Environmental Health Laboratory for heavy metals: methyl mercury, arsenic, chromium, nickel, selenium, lead, and cadmium. A subset of these species was analyzed for dioxins and furans, pesticides, polychlorinated biphenyls (PCB) congeners, brominated fire retardants (PBDEs), and inorganic arsenic at AXYS Analytical Laboratories. The data available for the first two years (2001-2002) of heavy metal testing indicate that the concentration of methyl mercury in salmon and resident freshwater fish is below the FDA level of concern (1.0 part per million).

Results of the PCB analysis indicate that PCB levels in chinook and sockeye salmon were above the EPA screening guideline of 5.9 parts per billion wet weight but well below the FDA limit of 2 parts per million (DEC, 2004d). Other POPs were also found to be present in skinless, edible fillets taken from salmon, halibut, sheefish and sablefish, but in concentrations below EPA's screening levels. Data analysis by DHSS indicates that the benefits of eating Alaskan fishes far outweigh any risk associated with the low concentration of contaminants present. DHSS continues to recommend unrestricted consumption of fish from Alaskan waters.

### **3.9 Collaborative Opportunities**

Alaska is divided into federal land holdings totaling about 235 million acres (64%), state land holdings totaling 90.6 million acres (25%), and native corporate and private land holdings totaling 11% (BLM, 2002). The federal government administers about two-thirds of the land in Alaska and employs at least twelve federal agencies which carry out environmental monitoring and assessment activities in Alaska. The need for state and federal coordination of these activities is even greater in a large state like Alaska, the majority of which is administered by the federal government. Much of the data and informational reports produced by each federal agency can be obtained on-line at their respective website locations. Some statewide monitoring coordination is accomplished through the Interagency Hydrology Committee of Alaska (IHCA), which is federally chartered and composed of state and federal representatives who meet twice a year to discuss their respective monitoring initiatives. The IHCA website can be accessed at <http://ak.water.usgs.gov/ihca/>.

Many public and private entities conduct water quality monitoring and assessment activities in Alaska, including federal land management agencies, Tribes and Native organizations, local government, citizen monitoring groups and academia. While there has been much collaboration and data sharing in the past, the opportunity exists to strengthen existing relationships and initiate new ones. A number of public agencies and private institutions were interviewed for background information on their monitoring activities and objectives as part of the research for developing Alaska's monitoring strategy. One strategy implementation task will be to develop a document which identifies and summarizes statewide monitoring and assessment efforts and identifies steps which DEC could take to obtain data and coordinate monitoring efforts.

## 4.0 Division of Water -Water Quality Indicators

EPA recommends that the monitoring strategy define a **core** set of indicators (e.g., water quality parameters) for each water resource type that include physical/habitat, chemical/toxicological, and biological/ecological endpoints as appropriate, that reflect designated uses, and that can be used routinely to assess attainment with applicable water quality standards throughout the state (EPA, 2003). EPA further recommends that this core set of indicators be monitored to provide statewide or watershed level information on the fundamental attributes of the aquatic environment and to assess water quality standards attainment/impairment status. Previously, chemical and physical indicators were emphasized, however, EPA now recommends that biological monitoring and assessment should assume a more prominent role in state monitoring (EPA, 2003).

EPA also recommends that the monitoring strategy describe a process for identifying **supplemental** indicators to monitor when there is a reasonable expectation that a specific pollutant may be present in a watershed, when core indicators indicate impairment, or to support a special study such as screening for potential pollutants of concern (EPA, 2003). Supplemental indicators are important when identifying causes and sources of impairments and targeting appropriate source controls. Supplemental indicators may include each water quality criteria in the state's water quality standards, any pollutants controlled by the National Pollutant Discharge Elimination System (NPDES), and any other indicators of concern (EPA, 2003). Core and supplemental indicators for projects funded through ACWA and EMAP are presented in Table 2. A partial listing of core and supplemental indicators for municipal and industrial wastewater discharges permitted through EPA's NPDES Program and DEC's wastewater permitting program are also presented in Table 2.

### 4.1 EMAP Indicators

#### 4.1.1 Coastal EMAP Indicators

EMAP relies on a probabilistic, stratified, random sampling design, with the sample locations distributed across pre-selected strata and sample sites randomly selected

within each stratum (EPA, 2001). The general ecological health of large areas of Alaska’s coastline can be assessed with a relatively small number of sampling sites using EPA’s standardized, EMAP sampling protocol. Alaska’s coastal EMAP is based on the same principles used for national EMAP with a monitoring design that features multi-

**Table 2. Core & Supplemental Monitoring Indicators.**

<b>Water Column Physical &amp; Chemical Indicators</b>	<b>ACWA</b>	<b>Coastal EMAP</b>	<b>Freshwater EMAP</b>	<b>EPA NPDES &amp; DEC Wastewater Permits</b>	<b>Cruise Ship Program</b>
Dissolved Oxygen	C	C	C	C	NR
Temperature	C	C	C	C	NR
Turbidity	C	S	NR	C	NR
PAR/Light Transmittance	S	C	NR	S	NR
Conductivity or Salinity	C	C	C	C	C
pH	C	C	C	C	C
Secchi Depth	S	C	NR	S	NR
Nutrients	S	C	C	S	C
Chlorophyll a	S	C	C	S	NR
TSS & TDS	S	NR	C	C	C
Alkalinity	S	NR	C	S	C
BOD/COD	S	NR	NR	C	C
Total Residual Chlorine	S	NR	NR	C	C
Fecal Coliforms	C	NR	NR	C	C
Dissolved Organic Carbon	S	NR	S	S	NR
Cations & Anions	S	NR	S	NR	NR
Total Aqueous & Aromatic Hydrocarbons	S	NR	NR	C	S
Oil & Grease/Oily Sheen	S	NR	NR	C	C
VOCs & Semi-VOCs	C	NR	NR	S	S
Heavy Metals	C	NR	NR	S	S
Cyanide	S	NR	NR	S	S
Flow or Discharge	S	NR	C	C	C
<b>Sediment Physical &amp; Chemical Indicators</b>					
Grain Size	S	C	NR	S	NR
Total Organic Carbon	S	C	NR	S	NR
Sediment Bioassays	S	C	NR	S	NR
Heavy Metal analysis	S	C	NR	S	NR
Semi-VOC analysis	S	C	NR	S	NR
<b>Biological Indicators</b>					
Macroinvertebrate Diversity/Abundance	C	C	C	S	NR
Fish Diversity/Abundance	S	C	NR	S	NR
Whole Effluent Toxicity	S	NR	NR	C	NR
Fish Tissue Analysis	S	C	NR	S	NR
Habitat Assessment	S	NR	C	NR	NR
Marine Mammal & Avian Monitoring	S	NR	NR	S	NR

C = Core Indicator; S = Supplemental Indicator; NR = Not Required.

tiered, integrated monitoring of selected environmental indicators. Data are integrated from multiple media, following a modified-Sediment Quality Triad (SQT) design. Integrating water quality data, sediment chemistry, sediment toxicity, and biotic parameters provides a more thorough evaluation of ecosystem “health” than more traditional monitoring, which typically emphasizes single media and a stand-alone approach.

Estuarine conditions are assessed using biological indicators such as plankton abundance, benthic invertebrate community structure, fish diversity and abundance, and the incidence of disease or other pathologies in fish. Stressors are evaluated by assessing water quality parameters, sediment contamination and toxicity, and the presence of contaminants in fish tissue. These stressor indicators are used to interpret the most likely cause of observed poor condition in biological indicators. Core Alaskan EMAP coastal indicators include: water quality (pH, nutrients, chlorophyll, dissolved oxygen, salinity, temperature, depth); sediment quality (sediment grain size, total organic carbon, sediment chemistry; sediment toxicity utilizing bioassays); benthic infauna community structure; fish community structure; fish external pathology, and fish tissue analyses (Table 2).

#### *4.1.2 Freshwater EMAP Indicators*

Indicators for the 2004 Wadeable Streams EMAP study in the Tanana River basin included water chemistry (pH, dissolved oxygen, temperature, conductivity, chlorophyll a), stream discharge, physical stream habitat assessment, macroinvertebrate identification and enumeration (Table 2). Fish distribution and abundance were not studied as part of this pilot project. The U.S. Geologic Survey is also analyzing water samples for dissolved organic carbon, major cations and anions, and alkalinity.

## **4.2 ACWA Indicators**

Environmental indicators for waters monitored and assessed through ACWA are selected on a case-by-case basis and may include chemical, physical and biological parameters for assessing water quality, water quantity and habitat. These same indicators are applied to waters requiring monitoring and assessment under DEC’s TMDL Program. A complete listing of ACWA funded projects, associated quality assurance plans and monitoring indicators can be found at <http://www.dec.state.ak.us/water/acwa/acwagrantsproject.htm>. ACWA monies have been used for establishing TMDLs; establishing biomonitoring protocols for specific ecoregions of Alaska; establishing the Anchorage Citizen’s Environmental Monitoring Program; establishing stormwater monitoring programs; assessing and restoring fish habitat, among many other projects. Some examples of ACWA funded projects and associated monitoring indicators are described below.

**Cottonwood Creek:** In order to establish the TMDL for residue on Cottonwood Creek in south central Alaska, ACWA is currently funding the Matanuska-Susitna Valley Aquatic Research & Restoration Institute to conduct surveys to determine whether residues are increasing at different times of the year or at different locations along the stream. Conductivity, pH and temperature will be measured to determine if any changes

in foam are related to any gross changes in water chemistry. Concentrations of fecal coliforms will be measured to determine if there is an input of organics from septic systems. Finally, juvenile salmon will be captured and examined for signs of lesions.

**Anchorage CEMP:** In the past, ACWA funding has been granted to the Anchorage Citizens' Environmental Monitoring Program (CEMP) to collect field, biological and analytical baseline data from Anchorage streams identified on the ACWA list of priority waters. Monitoring activities included collecting fecal coliform bacteria samples on Little Survival Creek and Little Campbell Creek. This project also continued the volunteer monitoring program's collection of water quality baseline data from eight Anchorage creeks. Water quality parameters included water temperature, dissolved oxygen, pH, conductivity, turbidity, total dissolved solids (TDS), phosphate, nitrate-nitrogen and bacteria. This grant included costs for the annual training and re-certification of all monitors, although funding of this particular grant has been discontinued.

**Biomonitoring:** ACWA has also previously funded the University of Alaska Environmental and Natural Resource Institute (ENRI) to collect physical, chemical and habitat data, and macroinvertebrates from 50 streams across southeast Alaska. ENRI will eventually use these data to characterize regional reference conditions and to calibrate a macroinvertebrate biological monitoring index for quantifying biotic integrity in southeast Alaska streams. The proposed index will be used to monitor stream restoration efforts, BMP effectiveness, and long-term water quality trends.

### **4.3 Wastewater Discharge Indicators**

#### **4.3.1 Technology-Based Effluent Limits**

Technology-based effluent limits (TBELs) for NPDES permits may be based on: Best Professional Judgment (BPJ); control of toxic pollutants and non-conventional pollutants through the use of "best available technology economically achievable" (BAT); or represent "best conventional pollutant control technology" (BCT) for conventional pollutants. In no case may BCT or BAT be less stringent than "best practical control technology currently achievable" (BPT), which is the minimum level of control required by section 301(b)(1)(A) of the CWA. New discharges may also be subject to the New Source Performance Standards (NSPS). BAT, BCT, BPT and NSPS effluent limitation guidelines for the primary industries are found at 40 CFR Parts 405-499.

At a minimum, all NPDES permitted discharges must be sampled for conventional pollutants which includes 5-day Biochemical Oxygen Demand (BOD<sub>5</sub>), Chemical Oxygen Demand (COD), Total Organic Carbon (TOC), Total Suspended Solids (TSS), Ammonia as Nitrogen, temperature and pH (40 CFR Part 122.21 (g)(7)(iii)). The effluent testing requirements for organic, *toxic* pollutants by industrial category for NPDES discharges are found in 40 CFR, Part 122, Appendix D.

### 4.3.2 Water Quality-Based Effluent Limits

EPA recommends an integrated approach to implementing water quality standards and developing water quality-based effluent limits (WQBELs). This integrated approach includes three elements: a chemical-specific approach, a whole effluent toxicity (WET) approach, and a biological criteria or bioassessment approach (EPA, 1996). DEC uses a combination of these approaches when issuing or authorizing state and NPDES wastewater permits. Each approach requires identifying or developing environmental data to support permitting decisions.

**Chemical Specific Approach:** Alaska's WQS are used to apply the chemical-specific approach for establishing WQBELs. The mixing zone must be designed to meet the acute and chronic aquatic life criteria as well as the human health criteria, whichever is the more stringent, for fresh or salt water. These criteria are found in Alaska's Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances, adopted by Alaska into the WQS in 18 AAC 70.020(b). In a mixing zone, acute aquatic life-based criteria apply at and beyond the boundaries of the zone of initial dilution (ZID), but may be exceeded within the ZID. The mixing zone must be sized to prevent lethality to passing organisms (18 AAC 70.255(d)). Human health and chronic aquatic life-based criteria apply at and beyond the boundaries of the mixing zone.

**WET Approach:** The second approach to developing WQBELs is based on WET testing procedures. EPA's WET testing procedures have been adopted by reference in Alaska's WQS at 18 AAC 70.030. DEC's WQS for the WET limit state that "an effluent discharged to a water may not impart chronic toxicity to aquatic organisms, expressed as 1.0 chronic toxic unit, at the point of discharge, or if the department authorizes a mixing zone in a permit, approval, or certification, at or beyond the mixing zone boundary, based on the minimum effluent dilution achieved in the mixing zone (18 AAC 70.030(a)). DEC's WQS define "chronic toxic unit" as an expression of the chronic toxicity of an effluent, determined as (100/NOEC), where NOEC, the "No Observed Effects Concentration," is the highest tested percentage concentration of an effluent, established by direct testing of toxicity to aquatic organisms, that causes no observable adverse effects, including effects on growth, development, behavior, reproduction, or survival, over a test duration that generally is one-tenth or more of the lifespan of the test organism (18 AAC 70.030(b)).

WET testing is incorporated into NPDES and state issued wastewater permits for hard rock mines, oil and gas exploration and development, and for other industries on a case-by-case basis. POTWs with design flow rates greater than one million gallons per day or with approved pretreatment programs are also required by law to submit WET test results (40 CFR Part 122.21(j)(5)).

**Biological Approach:** The third approach to water quality-based toxics control is assessing and protecting the overall health of the resident biological community when developing WQBELs. At the present time, DEC's WQS do not incorporate biological numeric or narrative WQS criteria, except for WET testing requirements. However, biological monitoring is incorporated into some NPDES wastewater permits. For example, the Freshwater Monitoring Plan for a hard rock mine in southeast Alaska

includes assessing the distribution and abundance of juvenile salmonids, quantifying whole body metal concentrations in juvenile fish, measuring periphyton biomass, assessing the benthic invertebrate community structure and standard WET testing procedures (Kennecott, 2000).

#### 4.3.3 Site Specific Conditions

Alaska's WQS also allow for the development of site specific criteria. If the natural condition of a waterbody is demonstrated to be of lower quality than the applicable water quality criterion, then the natural condition constitutes the applicable water quality criterion (18 AAC 70.235 (a)(b)). Alaska's WQS allow the permittee to establish the natural or ambient water quality conditions for one or more seasons or shorter time periods prior to or after permit authorization or issuance (18 AAC 70.235 (b)(1)). Alaska's WQS allow the permittee, in some instances, to perform monitoring concurrent with the discharge in order to establish natural conditions. All natural conditions monitoring requirements and the language establishing a site specific criterion based on concurrently monitored natural conditions must be included in the public notice for the permit. DEC is currently drafting written guidance which will outline the information required to establish natural conditions and site specific water quality criteria.

## 5.0 Division of Water- Quality Assurance Practices

The Division of Water has developed a Water Division Quality Assurance Management Plan (QAMP) which outlines a systematic approach to quality assurance that has been adopted by the Division. It provides the foundation for ensuring that data collected by DEC, funded by DEC, or provided by permittees is controlled for quality and can be used as a basis for making environmental decisions.

### 5.1 Quality Assurance Documents

Quality assurance templates are used by DEC's point source and non-point source pollution programs by permitted dischargers and ACWA grantees respectively as written guidelines for proper collection, handling and analysis of water quality samples. DEC's quality assurance documents generally insure that field sample collection and analytical procedures are consistent for DEC funded projects being conducted throughout the state. The Division of Water has developed the following documents which provide detailed quality assurance and quality control procedures for performing Division related water quality monitoring and assessment activities:

- *Water Programs Quality Management Plan.*
- *Quality Assurance/Quality Control Plan for Sampling and Analysis of Treated Sewage and Gray Water from Commercial Passenger Vessels.*
- *Quality Assurance Program Plan (QAPP) Checklist for Water Sampling.*



- *Quality Assurance Project Plan Review Checklist.*
- *Elements of a Good Quality Assurance Project Plan.*
- *Quality Assurance Project Plan Template.*
- *Generic Quality Assurance Project Plan for Water Program Staff Sampling & Analysis Activities.*

All of these documents can be viewed and downloaded at DEC's Water Quality Assessment and Monitoring Program website  
[http://www.dec.state.ak.us/water/wqapp/wqapp\\_index.htm](http://www.dec.state.ak.us/water/wqapp/wqapp_index.htm) .

## **5.2 Quality Assurance Assistance**

The Division of Water's Quality Assurance Officer provides oversight and technical assistance to Department staff, as well as to Alaska's boroughs, municipalities and non-profit groups developing Quality Assurance Plans (QAPs). The Quality Assurance Officer has reviewed and approved QAP templates for water quality monitoring plans developed by non-profit organizations such as the Native American Fish and Wildlife Service and Cook Inlet Keepers (NAFWS, 2004; CIK, 1998). The QAP templates developed by the Native American Fish and Wildlife Service and the Cook Inlet Keeper serve as templates which can be used by other non-profit monitoring groups when developing their own QAPs. QAPs are also developed with regional expertise and peer review being provided by resource agency and non-profit group members throughout Alaska.

## **5.3 Integrated Report**

***How does DEC obtain data for making attainment decisions in the 305(b)/303(d) Integrated Report?*** DEC accepts data on an ongoing basis. However, prior to preparing the Integrated Report, a formal request is made through a Public Notice which is placed in newspapers and issued on-line to solicit data from the public. Phone calls are also made to federal and state resource agencies as well as to non-profit groups to acquire data for the Integrated Report. Generally, only waters nominated through the ACWA process are considered for inclusion in the Integrated Report. The data collected during the ACWA scoring and ranking process are used in the Integrated Report to categorize each waterbody.

**Consolidated Assessment & Listing Methodology:** Currently, DEC does not employ detailed written guidelines for acceptance, review and analysis of data that are used in making designated use determinations in the Integrated Report. Several states have adopted policies or legislation specifically addressing how the state defines and assess attainment with aquatic-life based WQS. EPA recommends that states develop a Consolidated Assessment and Listing Methodology (CALM) which clearly documents how attainment decisions are made and defines the indicators and thresholds that are used to assess attainment status for each WQS (EPA, 2002). EPA recommends that a state's CALM clearly define adequate statistical and other implementation procedures to ensure

that all parties are aware of the minimum data set and statistical analysis requirements to show attainment.

#### **5.4 Environmental Monitoring & Assessment Program**

Studies conducted under EMAP are subject to rigorous quality assurance planning and oversight. A QAP was developed by the Cook Inlet Regional Citizens Advisory Council (CIRCAC) in conjunction with DEC and EPA, for both the 2002 and 2004 Alaska, coastal EMAP field studies (Saupe, 2002; Saupe, 2004). Each QAP includes field sampling locations, field sampling methodologies, sample holding times, preservation techniques, data quality objectives and logistical concerns. An EPA representative also oversees the collection and handling of all EMAP samples during the initial phase of each EMAP cruise to ensure consistency with EMAP protocols. The QAP will serve as the basis for future coastal Alaskan EMAP projects. A freshwater oriented QAP was developed for the Wadeable Streams Demonstration Project and will serve as the basis with appropriate modifications for future freshwater EMAP assessment work.

#### **5.5 Alaska's Clean Water Actions Initiative**

Project managers within DEC's Non Point Source Water Pollution Program work with ACWA grantees providing technical assistance during the development and implementation of QAPs, water quality monitoring and biomonitoring plans. All QAPs for ACWA funded monitoring and assessment projects are maintained electronically and in hardcopy at the ACWA Project Manager's offices located in Juneau, Fairbanks and Anchorage. A complete listing of ACWA funded projects and associated quality assurance plans can be found at

<http://www.dec.state.ak.us/water/acwa/acwagrantsproject.htm> .

#### **5.6 Wastewater Discharge Permitting**

The federal regulations at 40 CFR 122.41(e) require all NPDES permitted facilities to develop a QAP to ensure that the monitoring data submitted is accurate and to explain data anomalies if they occur. The permittee is required to develop a QAP within 90 days of the effective date of the final permit. The QAP must consist of standard operating procedures the permittee must follow for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting. QAPs are also routinely required for state issued wastewater discharge permits in order to provide more consistency in data collection and assessment techniques. QAPs are permit specific and are available at DEC's regional offices for both NPDES and state issued wastewater permits.

### **6.0 Division of Water- Data Management**

DEC is committed to develop, build and maintain an information management infrastructure that:

- Provides for efficient storage and retrieval of water quality assessment information of Alaskan waters.
- Improves water quality management decision making and water quality data analysis.
- Improves the quality and consistency of water quality reporting.
- Complies with CWA reporting requirements.

Water quality monitoring in Alaska relies upon diverse sources of information and data generated both within DEC and outside of the agency. DEC staff network with governmental agencies across local, state and federal boundaries, as well as Native entities, volunteer and non-profit organizations. Sources of water quality data and information in Alaska are extensive. The problem is identifying its location, organizing its availability and making it readily accessible, both to the general public, as well as statewide professional resource agency staff in an effort to target limited resources towards the state's highest water resource priorities.

In addition to more traditional means of identifying information through professional networking using telephone, email and professional meetings/conferences, the Cooperatively Implemented Information Management System (CIIMS), a web-based tool, can help users find and share information about Alaska's Natural Resources (<http://info.dec.state.ak.us/ciimms/>). Although CIIMS is hosted by DEC servers, it is only passively maintained.

The CIIMS site also provides links to Alaska's Legacy STORET, an historical EPA relational database of water quality data extending as far back as the 1950s. The modernized STORET data system, developed and maintained by EPA, is also employed by DEC to capture water quality data generated since 1999. The Assessment Database (ADB), also developed and maintained by EPA, and the ACWA applications are data management tools used by DEC to synthesize the assessed results of water quality information for making management decisions and reporting purposes. Additional DEC management tools used to locate waterbodies statewide rely upon the availability of the National Hydrography Dataset (NHD) and various geographic information system technologies. An Alaskan data exchange node is under development to expedite the movement of water quality data into STORET from around the state. The Division plans to revise the water monitoring, assessment and reporting web pages in the near future to provide additional information and links in a more organized manner.

## **6.1 ACWA Application**

The ACWA application consists of a database and a collection of web-based user interfaces physically hosted at DEC within the State of Alaska network. The system will provide direct links to Legacy STORET and modernized STORET. The ADB database is directly interfaced with ACWA and waterbodies in ADB and ACWA are synchronized as an on-going routine operation. The general public and organizations outside the state

network will access the ACWA application through a public user interface that will be available over the Internet. The ACWA Program and supporting application were conceived and designed to:

- Support the activities of grant managers responsible for obtaining funding to implement protection or recovery actions for assessed waters by making ranking information available through queries and reports.
- Provide resource agency staff the tools to support an existing, formalized process for targeting limited resources towards the state's highest water resource priorities. The process involves the ranking of waters in Alaska according to their assessed needs for data collection, protection, or recovery actions.
- Streamline the process for identifying waters for consideration under ACWA.
- Provide the ability to query information about waterbodies and rankings to the public over the internet.

Internal resource agency staff and managers have access to additional interfaces over an Intranet. Information is compiled and shared to analyze and rank individual waterbodies. Processes for evaluating the credibility and sufficiency of information, stewardship effectiveness and assignment of appropriate actions are incorporated, along with a criteria-based ranking system applied across the three state resource agencies responsible for water resource management in Alaska. The system will eventually include a geographic information system (GIS) component to support a web-based map browser for Internet users to identify the nomination status of waterbodies and query information.

## **6.2 STORET Water Quality Database**

DEC has adopted modernized STORET (STOrage and RETrival) version 2.0 as the repository for water quality data and water quality monitoring activities conducted within Alaska. STORET is a national EPA water quality data management system that has been in use since the 1960s and modernized in 1999. STORET is a repository for all water quality, biological, and physical data gathered by agencies, grantees, contractors, and permittees. A copy of the database and associated programs is installed at DEC and contains historical sampling data. Legacy STORET provides access to pre-1999 water quality data for Alaska. ACWA ranking and monitoring staff may query water quality information from STORET to determine if sufficient and credible data exists for ranking and monitoring under ACWA. DEC periodically uploads data for Alaskan waters to the national STORET database. These data can be viewed by anyone with STORET access.

### **6.2.1 Data Entry into STORET**

DEC has developed standardized electronic data deliverable (EDD) documents to facilitate entry of data into STORET by data generators. The EDD was developed as a

standard operating procedure for submission of data collected in support of monitoring plans and applies to grantees, contractors or agency staff directed by DEC to collect water quality data in support of monitoring projects statewide. The EDD is posted on the DEC website at: <http://www.dec.state.ak.us/water/wqsar/storetdocumentation.htm>.

The EDD provides a series of options for data providers to manage water quality data and assure that it is reported in a STORET compatible format. These options include:

- MS EXCEL templates designed for organizations to enter their data in a format compatible with STORET.
- Desktop MS ACCESS applications that create STORET compatible export files.
- Desktop STORET and Personal Oracle or other applications that produce STORET compatible files.

DEC participates in the development of MS ACCESS database tools for data generators. DEC's DASLER-X application is a cost effective alternative that addresses the need for simple data entry and a water quality data exporting feature that exports data in a STORET compatible format. DEC also maintains Personal ORACLE for temporary distribution to organizations responsible for collecting water quality data in fulfilling their grant objectives. With Personal ORACLE, data collectors may elect to run Desktop STORET for data management and reporting purposes in a STORET compatible format.

DEC, in concert with other EPA Region 10 exchange network member states, is designing, developing and implementing a data exchange node in support of the National Environmental Information Exchange Network. DEC's participation in the consortium includes establishing an actual network node for the purpose of moving water quality data into the national STORET database and sharing this data with members of the consortium. DEC's data exchange node was established in early 2005 and testing is underway.

## **6.3 Assessment Database**

### **6.3.1 Assessment Data Base & the Integrated Report**

The Assessment Database (ADB) (version 2.0) is a relational database application for tracking water quality assessment results and generating reports, particularly useful for CWA Section 305(b) and 303(d) reporting and listing functions. DEC uses this database for individual waterbodies for which there is assessment information, and reports the status of water quality for these waters and the status of water quality in Alaska on a statewide basis. Assessments that show impairments (e.g., non-supporting uses or persistent exceedances of water quality standards, Section 303(d) listed waters), or assessments that report waters are maintaining and attaining water quality standards, are entered into the database. In addition, the causes (pollutants) and sources of pollution may also be entered into the database. Alaska regularly tracks and reports to EPA on this

information. It allows for custom queries enabling the review of data in a variety of ways. The ADB is designed to make this process accurate and straightforward, yet flexible and user-friendly. It also allows Alaska to meet its water quality reporting requirements to EPA under the CWA.

### **6.3.2 Reach Indexing Tool**

The ADB Reach Indexing Tool will define the geographic regions associated with the waterbodies that are tracked in the ACWA system. The application will provide tools to define geographical regions or segments relative to the National Hydrography Dataset (see below) and correspond to locational segments for ACWA waterbodies. The tool creates appropriate database records with locational information in the ADB database and will share it with the ACWA application.

## **6.4 National Hydrography Dataset**

The National Hydrographic Dataset (NHD) is a collection of digital line data representing waters throughout the United States. The Alaska Watershed and Stream Hydrography Enhanced Datasets (AWSHED) project is analyzing and incorporating the data representing Alaska waters into the NHD. This work is scheduled to be completed by June, 2005. When completed, the Alaska portion of the NHD will provide a uniform and consistent GIS base layer for water and standard database keys (unique identifiers) representing all streams and lakes in Alaska. NHD will provide underlying spatial information supporting the ADB Reach Indexing Tool described above.

## **6.5 Wastewater Discharge Program Data Management**

### **6.5.1 EPA's PCS & TRI Databases**

EPA's Permit Compliance System (PCS) is the national NPDES database that is used to compile all NPDES facility's permit conditions, self-monitoring data, inspection and enforcement action information. PCS is maintained by EPA's Office of Enforcement and Compliance Assurance and was created to track permit, compliance, and enforcement status of NPDES facilities. All major NPDES facilities in Alaska must report compliance with permit limits via monthly Discharge Monitoring Reports (DMRs) which are submitted to EPA Region 10. Parameters in PCS include water quality parameters (such as pH and temperature), specific chemicals, bulk parameters, such as BOD<sub>5</sub>, total suspended solids (TSS), and discharge flow rate. Although other pollutants may be discharged, PCS contains only data for the parameters identified in the facility's NPDES permit. Facilities typically report monthly average pounds per day discharged, but also report daily maxima and pollutant concentrations. Information is available by facility for each parameter. Quarterly Noncompliance Reports (QNCR) are generated for each major NPDES facility using PCS. QNCR are available for all major NPDES facilities in Alaska

through EPA Region 10, Office of Water, NPDES Compliance Unit in Seattle, Washington.

Under Section 313 of the Emergency Planning and Community Right-to-Know Act each facility, that meets certain thresholds, must report quantities of 650 toxic chemicals that were recycled, collected, combusted, destroyed and released into the environment every year. The annual report issued by EPA has become known as the Toxic Release Inventory (TRI). Two compound categories particularly important to EPA due to their relatively high toxicity are polycyclic aromatic compounds and dioxin or dioxin-like compounds. A separate report must be filed for each chemical that exceeds the reporting threshold. The PCS and TRI databases are used to generate EPA's effluent guidelines for industry (EPA, 2004b). The 2003 TRI for Alaska is available at <http://www.dec.state.ak.us/spar/perp/tri/tri.htm>.

### 6.5.2 DEC's AKPERMIT & DROPS Databases

DEC presently does not track violations of state issued wastewater permit limits electronically and currently lacks a data management system to track compliance and enforcement actions for its state issued wastewater permits. DEC's AKPERMIT database does include general information for each wastewater facility in Alaska, including: facility description; current permits in place; outfall points; facility contacts; inspection information; and receipt (yes or no) of DMRs.

DEC is currently developing a database called Discharge Permits and Online Permit System (DROPS). DROPS when fully completed will allow permitted discharge facilities to submit a DMR electronically to DEC and include the ability for the DEC permit writer to view the data. The development of DROPS together with the development of a more comprehensive CALM will enhance DEC's ability to utilize the DMR data in making water quality standard designated use determinations. DROPS should also boost DEC's ability to prescribe targeted water quality and biological monitoring and assessment for waters with multiple DMR exceedances based on the improved DMR review process. DROPS is scheduled to be online by August 2005.

## 7.0 Division of Water- Data Analysis

## 7.1 Integrated Report

The Integrated Report is submitted to EPA to comply with the CWA §305(b) (State Report on Water Quality) and §303(d) (Identification of Impaired Waters). Beginning with the 2002/2003 reporting cycle, the CWA impaired waters list (“303(d) list”) and the statewide water quality assessment report (“305(b) report”) were integrated into one report. In the Integrated Report, all waterbodies are grouped into one of five categories based on available information and the degree to which a waterbody attains water quality goals. EPA has approval authority over Category 5 waters which are those waters that are CWA Section 303(d) listed also know as “impaired” waters. These new waterbody categories and their definitions also meet the needs of the ACWA initiative for an approach to describe the status and health of state waters and prioritize actions for recovery. The five waterbody categories are summarized in Table 3.

**Table 3. DEC’s Integrated Report Waterbody Category Descriptions (DEC, 2004b).**

Listing Category	Category Definition	Number of Waters Currently in Category
1	Attaining WQS for all designated uses. This category requires that all data and information show that the waterbody is available for all uses.	0
2	Attaining some designated uses. Insufficient or no data to determine if remaining uses are being attained. Includes waters removed from Category 5.	1
3	Insufficient or no data and information to determine if any designated use is attained.	161
4	Impaired for one or more designated uses but not needing a TMDL.	
4a	TMDL has been completed	16
4b	Expected to meet standards in a reasonable time.	8
4c	Not impaired by a pollutant.	None
5	Impaired by pollutant(s) for one or more designated uses and requiring a TMDL.	48

One of the core performance measures of the 305(b) portion of the Integrated Report is reporting the number and percent of assessed river miles, lake acres and estuary square miles that have water quality supporting designated beneficial uses (EPA, 1997). A comparison of river and stream miles assessed in Pacific Northwest states shows that the total number of river and stream miles assessed in Alaska is relatively low (Table 4). A review of EPA’s database for assessed waters in Alaska by watershed indicates that 16,376 acres of lakes in Alaska have been assessed and 30% of these acres are impaired; only 28 acres of estuaries in Alaska have been assessed and 89% of these are impaired; only 25 miles of coastal waters have been assessed and 38% of these are impaired. These relatively high percentages reflect DEC’s need to focus its limited monetary resources on high priority waters identified through the ACWA process.

**Table 4. Number & Percent (%) of Rivers & Streams Assessed Comparison (EPA, 2004c).**



	Alaska	Idaho	Oregon	Washington
Total Miles Rivers & Streams	365,000	115,595	114,823	70,439
Percent (%) Assessed	0.4%	15%	47%	6%
#Miles Assessed	1,421	36,000	53,735	4,000
#Miles Impaired	511	21,000	13,971	1,443
Impaired Miles as % of Total Miles	0.1%	18%	12%	2%
Impaired Miles as % of Assessed Miles	36%	58%	26%	36%

Alaska’s waterbody assessments consider all existing and readily available data and information, as required by EPA. Currently, however, only those waters nominated and evaluated through the ACWA process are considered for inclusion in the Integrated Report. DEC maintains an ongoing solicitation for waterbody information year-round and continuously strives to identify, access and make available information that may be used to describe the total number of un-impaired river miles, lake acres or estuary square miles assessed throughout Alaska.

Another core performance measure of the Integrated Report is the percent of total river miles and lake acres that have been assessed for the need for fish consumption advisories and compilation of state-issued fish consumption advisory methodologies as reported through the National listing of Fish and Wildlife Advisories (EPA, 1997). Many states issue fish consumption advisories. Currently, DEC’s Environmental Health Division is collecting data on heavy metals and persistent organic pollutant concentrations in Alaska’s anadromous and resident fish populations (Section 3.8). To date, Alaska has not found it necessary to issue fish consumption advisories.

A key purpose of the Integrated Report is to determine whether a TMDL is needed for waters that are not attaining water quality goals. The preparation of a TMDL document for an impaired water is required by law (CWA§303(d)). A list of DEC’s approved TMDLs can be found at <http://www.dec.state.ak.us/water/tmdl/approvedtmdls.htm> . Once a TMDL has been implemented, follow-up monitoring and assessment are required for Category 4a waters to verify that the water quality standards and designated uses are being met. Monitoring is also required for category 3 waters where little or no information exists to make a designated use determination.

## 7.2 Alaska’s Clean Water Actions Initiative

The ACWA agencies (DEC, DNR and DFG) perform a “Stewardship Analysis” and review existing data in order to categorize and rank each waterbody. ACWA identifies impaired waterbodies as surface waters with documentation of actual or imminent “*persistent exceedances*” of water quality criteria, or with adverse impacts to designated uses, as defined in the state’s water quality standards. These waters are entered into the Waterbody Recovery Track. Designation of a waterbody as "impaired" does not necessarily indicate that the entire waterbody is affected. In most cases only a segment of

the waterbody is affected. The assessment process identifies the specific segment that is impaired and the corresponding pollutant parameters of concern.

The term "persistent" is key to help determine if a surface waterbody is impaired. Determining "persistent" exceedances of water quality standards is a waterbody-specific decision that requires the application of *best professional judgment*. This includes discussion and analysis of a variety of factors including pollutant characteristics (for instance, consideration of the magnitude, frequency, and duration of the pollution event(s)), pollutant sources, size of the waterbody, and the degree of remediation response required. Impairment determinations are based on credible data. "Credible data" means scientifically valid chemical, physical, or biological monitoring data collected under a scientifically accepted sampling and analysis plan, including quality control and quality assurance procedures that are consistent with Alaska's water quality standards in 18 AAC 70. DEC's sufficient and credible data tables used for evaluating water quality data are presented at <http://info.dec.state.ak.us/awq/awca/waterbody/sufficientcredible.htm>.

### **7.3 Wastewater Permitting**

#### **7.3.1 Technology-Based Effluent Limits**

Compliance with TBELs are measured at the end of pipe, whereas compliance with QBELs are measured at the edge of the mixing zone. TBELs must be applied in NPDES permits without the benefit of a compliance schedule (EPA, 1996). EPA determines compliance status for NPDES dischargers by electronically comparing DMRs to permitted TBELs. DMR data submitted to EPA are entered into PCS, where violations of permit effluent limits for major individual and general NPDES permits are recorded and tracked. Minor discharges are not tracked unless requested by the state. Information is available by facility for each parameter within PCS. Quarterly Noncompliance Reports (QNCR) are generated for each major NPDES facility using PCS. QNCR are available for all major NPDES facilities in Alaska through EPA Region 10, Office of Water, NPDES Compliance Unit in Seattle, Washington.

#### **7.3.2 Water Quality-Based Effluent Limits & Mixing Zone Analysis**

EPA recommends that both acute and chronic aquatic life criteria for toxics not be exceeded more than once during a three-year period on average (EPA, 2002). An NPDES permit may, when appropriate, specify a schedule of compliance leading to compliance with the CWA and all applicable regulations (40 CFR §122.47). Compliance with chronic aquatic life and human health criteria are required to be measured at the edge of the mixing zone by the permittee (18 AAC 70.255(c)). DEC requires all mixing zone monitoring to be performed at the outer edge of the mixing zone and evaluates wastewater discharge permits for compliance with chronic aquatic life-based and human health criteria on a case-by-case basis.

## **8.0 Division of Water- Reporting Requirements**

### **8.1 Integrated Report & TMDL Reporting**

DEC's Integrated Report describes the nature, status and health of Alaska's waters and identifies impaired waters in need of action to recover water quality (DEC, 2004b). The submission of the bi-annual Integrated Report to EPA is required by the CWA. DEC's 2002-2003 Integrated Report is found at

<http://www.dec.state.ak.us/water/wqsar/waterbody/integratedreport.htm> .

The listing of Alaska's impaired waters and the preparation of TMDL document for an impaired water are also required by law (CWA§303(d)). A list of DEC's approved TMDLs can be found at <http://www.dec.state.ak.us/water/tmdl/approvedtmdls.htm> .

There are currently twenty-nine approved TMDL documents.

### **8.2 Environmental Monitoring & Assessment Program**

Data collected during the 2002 South Central Alaska Coastal EMAP study are being compiled by DEC and CIRCAC for submittal to EPA. A final report is due to EPA in 2005. Data collected during the 2004 Southeast Alaska Coastal EMAP study are being compiled by DEC for eventual submittal to EPA. The final report is expected to be issued in 2006.

The Upper Tanana River and its tributaries were the main focus of the 2004 wadeable streams EMAP study. The University of Alaska in Anchorage (UAA) Environmental and Natural Resources Institute (ENRI) conducted the field sampling and analysis under contract to the Department. The report will be issued by DEC in 2006.

### **8.3 Alaska's Clean Water Actions Initiative**

A complete listing of ACWA funded projects, associated quality assurance plans, and monitoring indicators can be found at <http://www.dec.state.ak.us/water/acwa/acwagrantsproject.htm> . All monitoring and assessment reports generated through the ACWA/319 grant process are also available at DEC's regional offices located in Juneau, Fairbanks and Anchorage. Each ACWA contractor and grantee is required to submit their data electronically to DEC so that the data can be uploaded eventually into STORET. The process by which data, received through ACWA, is uploaded into STORET is currently being streamlined.

### **8.4 Wastewater Discharge Program**

Currently, DEC does not compile information or generate reports regarding exceedance of state or federal wastewater permit discharge limits. As mentioned previously, EPA tracks and reports violations of NPDES permit limits using its PCS database. Quarterly Noncompliance Reports (QNCR) are generated for each major NPDES facility using PCS. QNCR are available for all major NPDES facilities in Alaska through EPA Region 10, Office of Water, NPDES Compliance Unit in Seattle, Washington. EPA also generates an annual report on the amount of toxic compounds being discharged by each industry within Alaska. The 2003 TRI for Alaska is available at <http://www.dec.state.ak.us/spar/perp/tri/tri.htm>.

## **8.5 Beach Monitoring Program**

The proposed project under Phase IV (State Fiscal Year 03-04; Federal Fiscal Year 04-05) of the Beach Grant will include pass-through grant funds for pilot beach monitoring programs implemented by local government. The funds will be distributed using the ACWA grant application process which will prioritize and select local government monitoring projects that meet the requirements for the BEACH grant funding. Local governments that want to conduct pilot monitoring of beaches in their jurisdictions can apply for funding to assist their programs. DEC funding is not planned for long-term beach monitoring, which is considered a local government function. Monitoring results will be stored in the existing state beach database for submittal to EPA and entered into the DEC's STORET database. Additional proposed work would include further evaluation of field test methods for pathogen detection, preferably to be conducted by the local government as part of their monitoring program. The results and deliverables for the SFY 03-SFY 04 (FFY04-FFY05) work will be presented to EPA before release of Phase IV funding.

## **9.0 Division of Water- Program Evaluation**

EPA recommends that states conduct periodic reviews of each aspect of its monitoring program to determine how well each program serves its water quality objectives as outlined in their respective monitoring strategies. EPA also recommends that states have a feedback mechanism for reporting useful information to water quality managers and incorporating their input on future data needs (EPA, 2003). Information needs may include site-specific criteria modification studies, support for enforcement actions, validation of success of control measures, modeling for TMDLs, monitoring un-assessed waters and other activities.

Periodic reviews of the Division of Water's program activities are undertaken to determine how well each program is meeting its water quality decision needs for all state waters. This evaluation is partially accomplished through an annual Performance Partnership Grant (PPG) work plan, developed in conjunction with EPA, which details the objectives and activities to be accomplished under each program within the Water Division. DEC reports to EPA every six months on the status of PPG funded activities.

## **9.1 Integrated Report**

In an effort to provide clear and concise guidance on what constitutes an impaired water, DEC is committed to revising and updating its existing listing methodology on a case-by-case basis when there is a specific need. In such instances, DEC will refer to EPA's CALM, among other sources, in the development of new methodology or where our existing methodology is in need of revision (EPA, 2002).

In Alaska, there is a need to develop a process by which the written TMDL is implemented. Under ACWA, DEC plans to identify and schedule both recovery and monitoring actions assigned to Category 4a and 4b waters. These actions will be implemented and tracked over time to verify that the water quality standards and designated use(s) are achieved according to the TMDL. Adjustments will be made periodically, as necessary to assure continued progress towards eventual recovery.

## **9.2 Environmental Monitoring & Assessment Program**

The first round of the EMAP coastal and wadeable stream sampling programs includes testing the EMAP assessment strategy. For DEC, this represents a "proof of concept" or a chance to test, further develop and tailor EMAP's protocol (sampling design, indicators of condition, sampling procedures, standardized assessment methods) to Alaska's environment. Once the initial benchmark EMAP surveys are completed, DEC will then assess the results and then, when and where appropriate, adapt the future EMAP sampling design. The results assessment is especially important in regards to having proper indicator conditions and sampling procedures for Alaska. For example, while it is useful to have a single test species for the west coast EMAP sediment toxicity test, the test organism may or may not reflect the toxicity of the sediments to Alaska organisms. After this initial test period, the repeated EMAP activities can be integrated as a primary component of the statewide monitoring and assessment network.

## **9.3 Alaska's Clean Water Actions Initiative**

Annual milestones for ACWA monitoring objectives are established through the ACWA Water Experts Group (WEG) and the ACWA Workgroup. The ACWA Workgroup meets regularly to coordinate and assess ACWA implementation activities. The Workgroup meets at least annually to -coordinate water resource priorities for the next fiscal year. The ability to meet ACWA objectives is largely influenced by federal funding allocated to DEC through Sections 106 and 319 of the CWA, which is provided to DEC through the EPA PPG.

## **9.4 Wastewater Discharge Program**

DEC plans to develop and finish writing the Permit Writers Handbook for Alaska (work-in-progress). The Permit Writers Handbook will include procedures for obtaining the

appropriate wastewater permit and permit process maps, procedures for performing a Reasonable Potential Analysis and establishing WQBELs, procedures for designing and sampling a mixing zone, procedures for determining compliance with acute and chronic aquatic life-based, among other procedures.

The Division of Water is also currently developing a database called DROPS. DROPS will eventually allow permitted discharge facilities to submit DMR data electronically to DEC and include the ability for the DEC permit writer to view the data. The development of DROPS and a more detailed CALM will enhance DEC's ability to utilize the DMR data in making water quality standard designated use determinations. DROPS should also boost DEC's ability to prescribe targeted water quality and biological monitoring and assessment for waters with multiple DMR exceedances based on the improved DMR review process. DROPS is scheduled to be online by January 2006.

### **9.5 Beach Monitoring Program**

Local governments conducting beach monitoring will be required, as a condition to receive grant funding, to supply the monitoring data in a format that can be incorporated into the existing database and supplied to EPA via the required data submission protocols. State/contractor-conducted baseline monitoring data of high-risk beaches will be integrated into the database. Further evaluation of field test methods will be presented in a report and will include recommendations for applying results to any future monitoring projects.

## **10.0 Division of Water- General Support & Infrastructure**

The Division of Water implements the Strategy largely through the WQAMP and the NPS Program. The WQAMP has one supervisory position responsible for leading the implementation of ACWA waterbody evaluation and reporting activities; one position which is responsible for managing the ADB and water quality reporting; one QA officer; one full-time EMAP project manager with a part time assistant. The NPS Program has one supervisor and four full-time staff who perform ACWA waterbody evaluations, manage ACWA projects and contracts which includes waterbody specific monitoring activities. The Strategy is based on the premise that staffing levels will remain static with the possible addition of seasonal staff or college interns to assist with EMAP projects. Future EMAP assessment projects are dependent upon EPA funding. ACWA activities may be expanded or reduced based upon the level of EPA CWA Section 106 and 319 funding under the Performance Partnership Agreement.

## **11.0 Bibliography**

AOW. 2002. Alaska's Oceans and Watersheds. Two-day symposium held in Anchorage, Alaska, June 18 & 19, 2002.

ASIWPCA. 2002. Water Quality Monitoring Programs Survey Report, Status and Future of State Ambient Water Quality Monitoring Programs, prepared by the Association of State and Interstate Pollution Control Administrators, 750 1<sup>st</sup> St. NE, Suite 1010, Washington, DC.

Atkinson, K. 2004. Personal communication with Kathy Atkinson, April 2004; Navigable Waters Program, Alaska Department of Natural Resources, Juneau, Alaska.

BLM. 2002. Alaska Land Distribution Statistics, Bureau of Land Management, U.S. Department of Interior, <http://www.ak.blm.gov/aklandown>.

CIK. 1998. Quality Assurance Project Plan for Cook Inlet Keeper Citizens Environmental Monitoring Program, 1<sup>st</sup> edition, August, 1998, prepared by Cook Inlet Keeper for the U.S. EPA Region 10 and the Alaska Department of Environmental Conservation.

DEC. 2001. Alaska's Clean Water Actions, Protecting Our Waters. Prepared by the Department of Environmental Conservation, Department of Natural Resources, Department of Fish and Game, Division of Governmental Coordination, March 2001.

DEC. 2004a. State of Alaska's Assumption of the National Pollutant Discharge Elimination System. A Report to the Alaska Legislature. Prepared by the Alaska Department of Environmental Conservation, Juneau, Alaska, January 2004.

DEC. 2004b. Alaska's Final 2002/2003 Integrated Water Quality Monitoring and Assessment Report. Prepared by the Water Quality Assessment and Monitoring Program, Water Division, Alaska Department of Environmental Conservation, Juneau, Alaska. March, 2003.

DEC. 2004c. DEC's Mixing Zone and Zone of Deposit Information/Regulations, Draft, dated December, 4, 2004.

DEC. 2004d. Fish Monitoring Program: Analysis of Organic Contaminants, August 2004, prepared by the Alaska State Veterinary Office, Environmental Health Division, Alaska Department of Environmental Conservation, Anchorage, Alaska.

DEQ. 2004. Oregon Department of Environmental Quality, Water Division, Reasonable Potential Analysis, Internal Management Directive, November 2004.

DOE. 2002. Washington Department of Ecology, Water Quality Program Permit Writers Manual, Publication #92-109, July 2002.

Drzewiecki, G. 2004. Personal communication with Gregory Drzewiecki, April 2004; Stormwater Permitting Engineer, Non-Point Source Water Pollution Control Program, Division of Water, Alaska Department of Environmental Conservation, Anchorage, Alaska.

EPA. 1991. U.S. Environmental Protection Agency's Office of Water, Technical Support Document for Water Quality-based Toxics Control, EPA/505/2-90-001, March 1991.

EPA. 1996. U.S. Environmental Protection Agency's, Office of Water, NPDES Permit Writers Manual, EPA-833-B-96-003, December 1996.

EPA. 1997. Guidelines for Preparation of the Comprehensive State Water Quality Assessments (305(b) Reports) and Electronic Updates; Report Contents, Supplement, and Appendices; prepared by the Assessment and Watershed Protection Division, Office of Wetlands, Oceans and Watersheds, Office of Water, U.S. Environmental Protection Agency, 401 M St., SW, Washington, DC.

EPA. 2001. National Coastal Assessment Field Operations Manual, Environmental Monitoring and Assessment Program, Office of Research and Development, U.S. Environmental Protection Agency, Washington, DC. EPA/620/R-01-003, June 2001.

EPA. 2002. Consolidated Assessment and Listing Methodology, Toward a Compendium of Best Practices, 1<sup>st</sup> Edition, prepared by Office of Wetlands, Oceans and Watersheds, U.S. Environmental Protection Agency, 401 M St., SW, Washington, DC, July, 2002.

EPA. 2003. Elements of a State Water Monitoring and Assessment Program, prepared by Assessment and Watershed Protection Division, Office of Wetlands, Oceans and Watersheds, U.S. Environmental Protection Agency, (EPA 841-B-03-003), March, 2003.

EPA. 2004a. Wadeable Streams Assessment, Field Operations Manual. Office of Water, U.S. Environmental Protection Agency, Washington, DC. EPA-841-B-04-004, July 2004.

EPA. 2004b. U.S. Environmental Protection Agency's Office of Water, Engineering and Analysis Division, Technical Support Document for the 2004 Effluent Guidelines Program Plan, EPA-821-R-04-014, August 2004.

EPA. 2004c. U.S. Environmental Protection Agency's website:  
[http://oaspub.epa.gov/waters/w305b\\_report.state?p\\_state=AK](http://oaspub.epa.gov/waters/w305b_report.state?p_state=AK).

Kennecott. 2000. Kennecott Greens Creek Mining Company, General Plan of Operations, Appendix 1- Fresh Water Monitoring Program, Revision No. 5, October 6, 2000.

NAFWS. 2004. Native American Fish and Wildlife Society- Alaska Region. "Template for Alaska Tribal Quality Assurance Project Plan for Water Quality" for the Tribal Water Quality Training Program. NAFWS, 131 West 6<sup>th</sup> Ave., Suite #3, Anchorage, Alaska.

NMFS. 2003. Fisheries of the United States 2002, prepared by National Marine Fisheries Service, National Oceanic and Atmospheric Administration, U.S. Department of Commerce, September 2003.

NPS. 2001. Ecological Subsections of Yukon-Charley Rivers National Preserve, prepared by D. Swanson and S. Swanson, Inventory & Monitoring Program, National Park Service Alaska Region, 2525 Gambell St., Anchorage, Alaska.

Saupe, S. 2002. Research Plan and Quality Assurance Project Plan for 2002 Alaska Environmental Monitoring & Assessment Program for Northern Gulf of Alaska.

Saupe, S. 2004. Sampling and Quality Assurance Project Plan for 2004 Alaska Environmental Monitoring & Assessment Program for Southeast Alaska.

## Appendix A- Figures





**Environmental Monitoring and Assessment Program (EMAP)  
Project Plan for Alaska: Phase I**

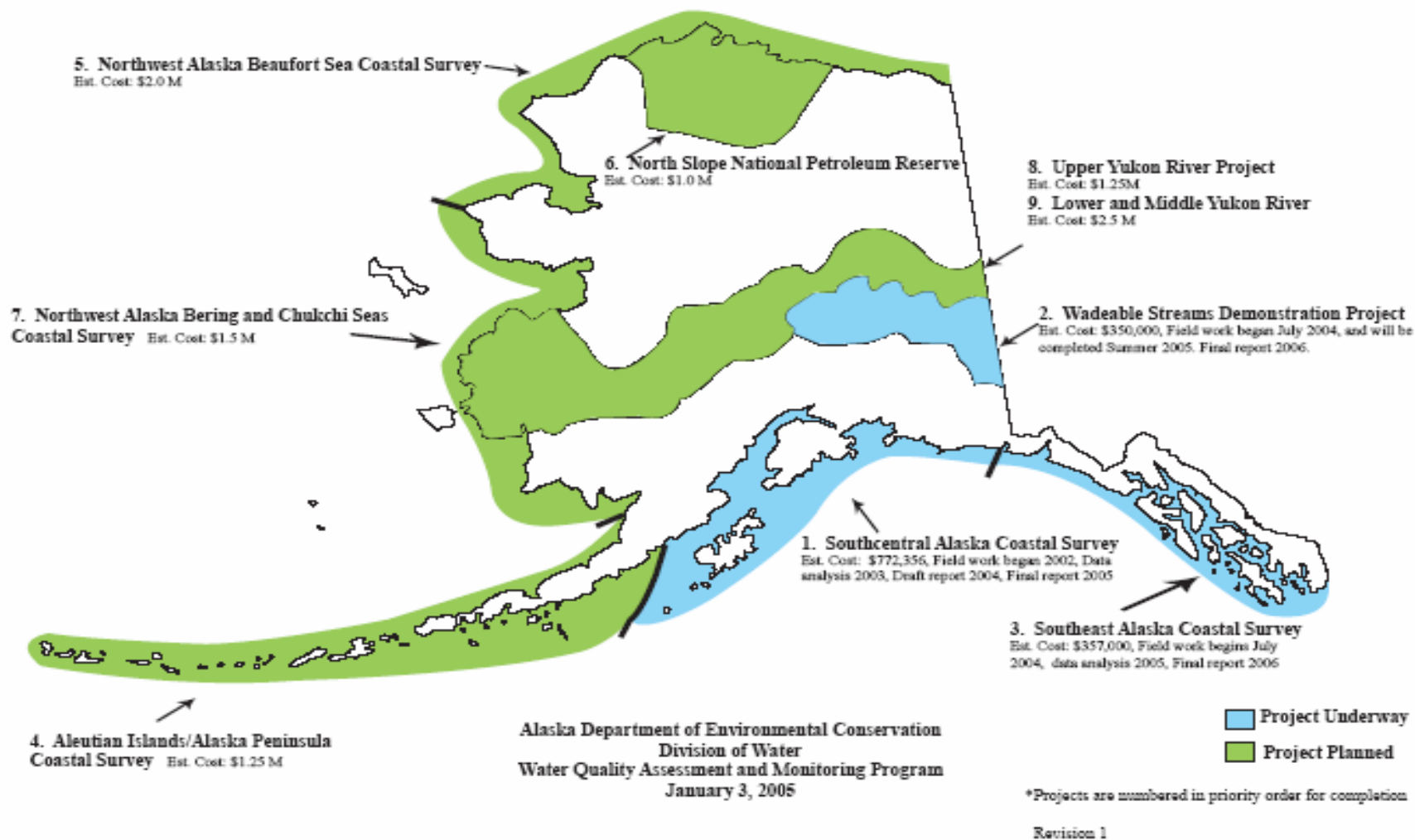


Figure 1. EMAP Project Plan for Alaska: Phase I.



©1994 Maxwell Geographical, Santa Barbara, CA

Figure 2. Alaska's Coastal EMAP Regions.

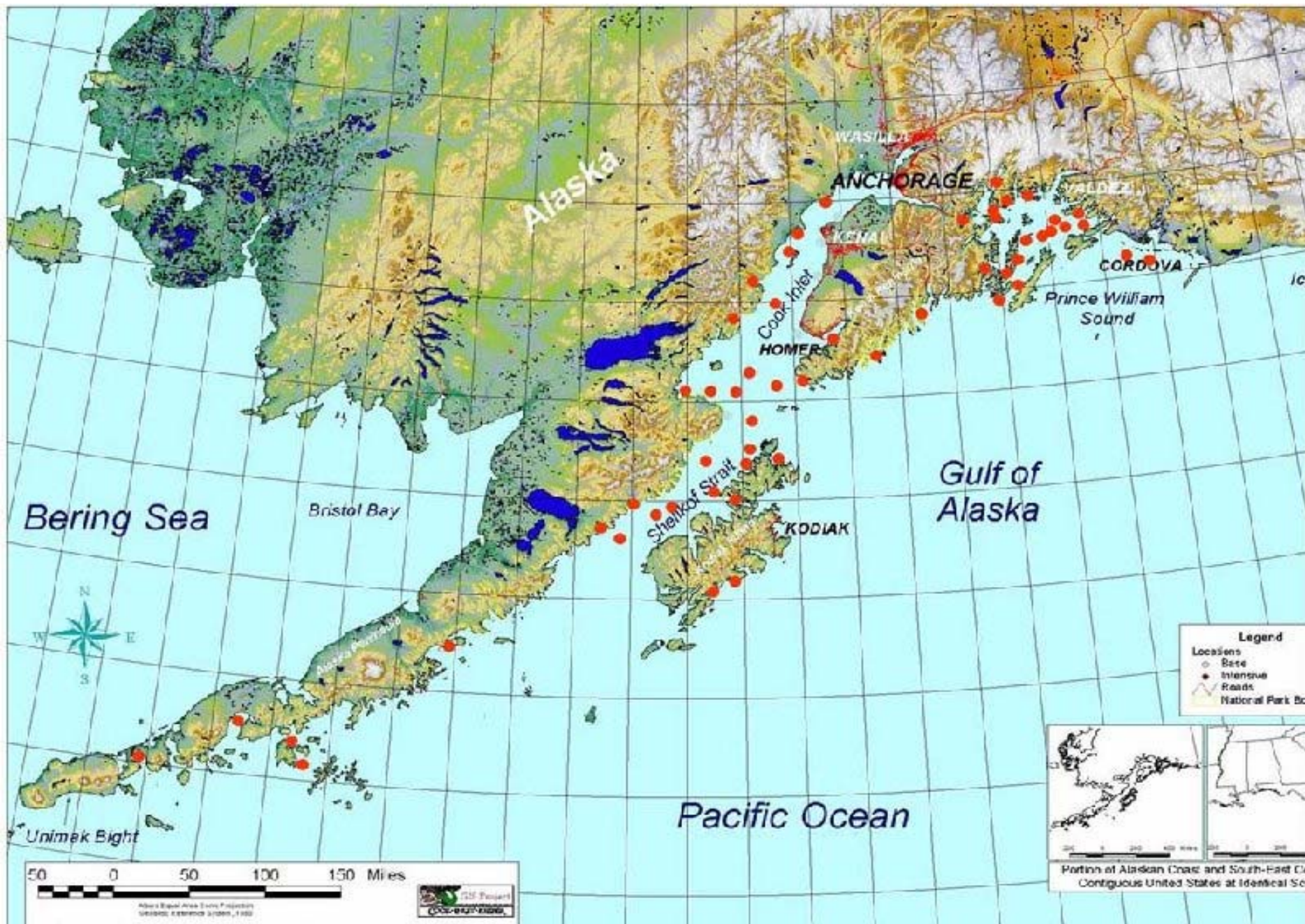


Figure 3. EMAP Established Sampling Sites for South-Central Alaska Coastal Region.

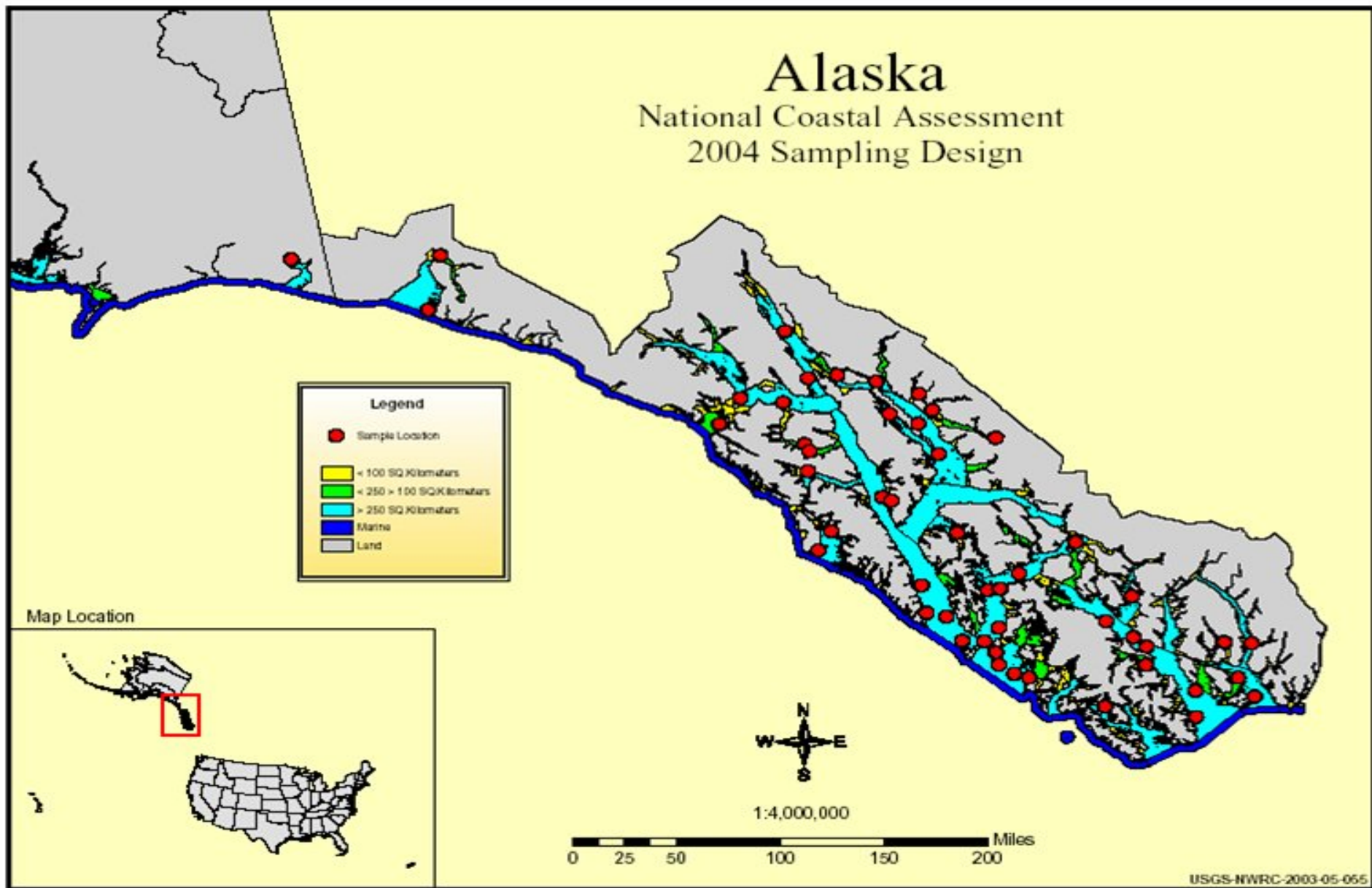


Figure 4. EMAP Established Sampling Sites for Southeast Alaska Coastal Region.

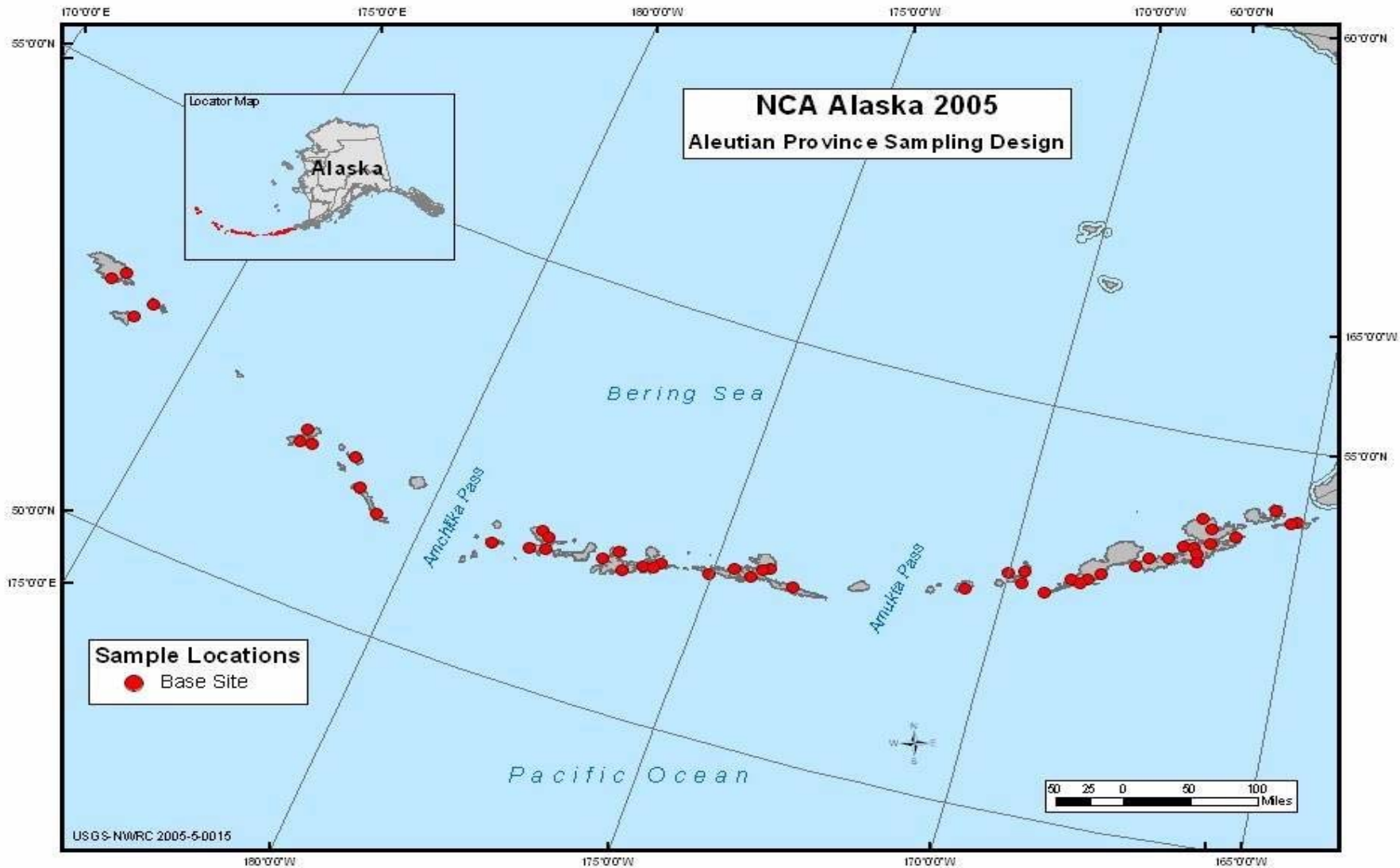


Figure 5. EMAP Proposed Sampling Sites for Aleutian Islands Coastal Region.

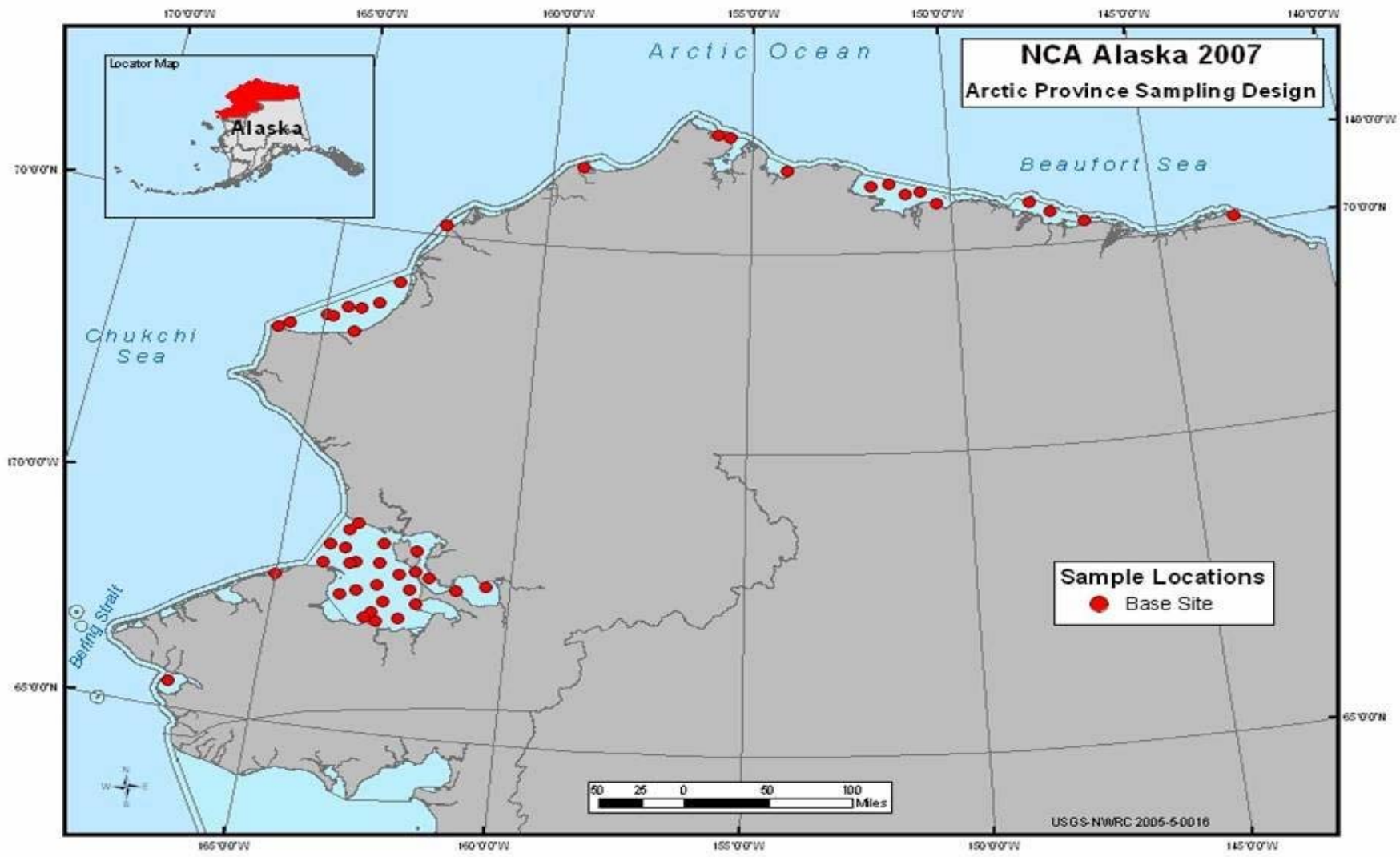


Figure 6. EMAP Proposed Sampling Sites for Arctic Coastal Region.

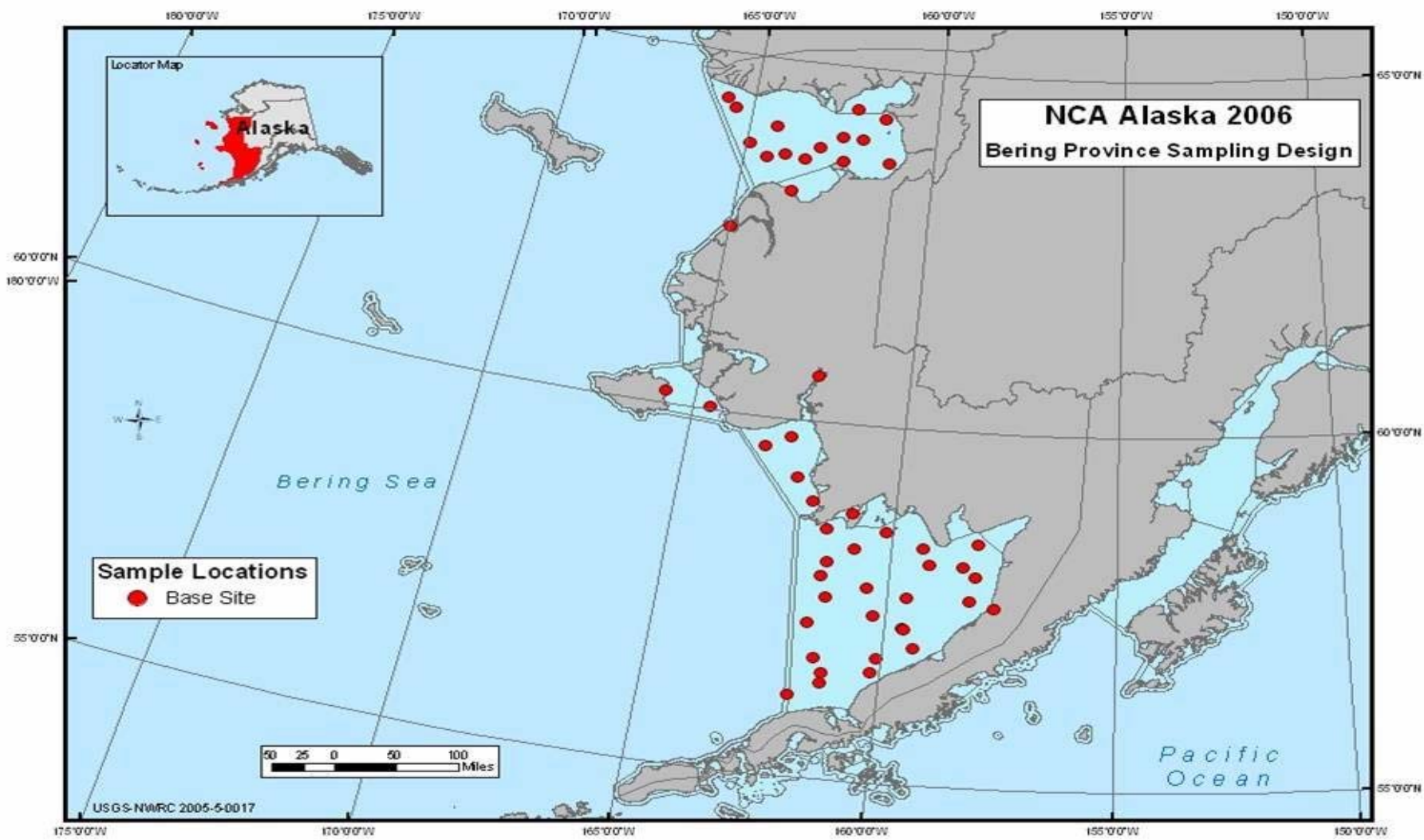


Figure 7. EMAP Proposed Sampling Sites for Bering Sea Coastal Region.



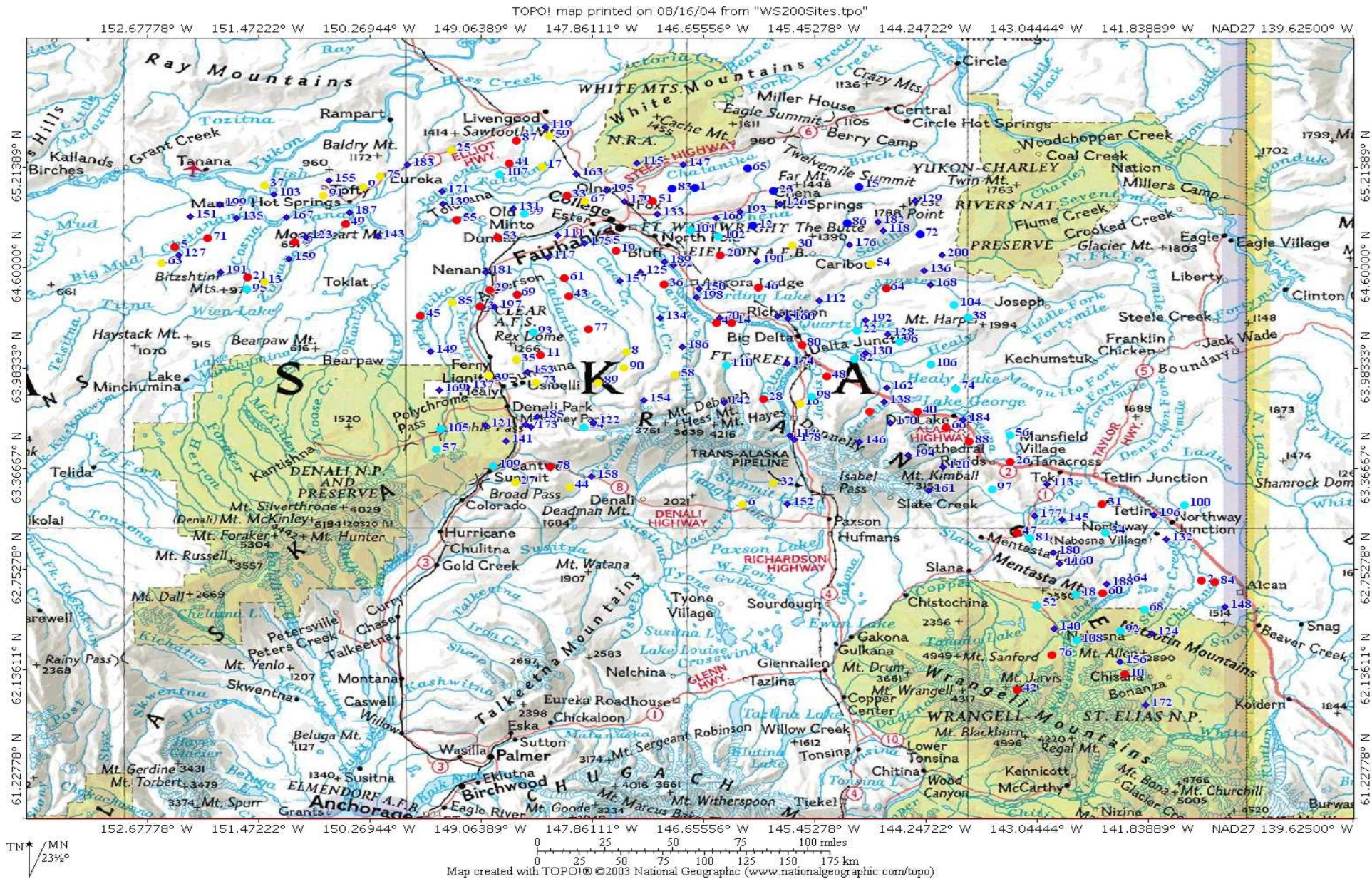


Figure 8. EMAP, Wadeable Streams, Tanana River Basin Established Sampling Locations.

# Alaska's Clean Water Actions (ACWA) Decision Tree

Thursday, January 23, 2003

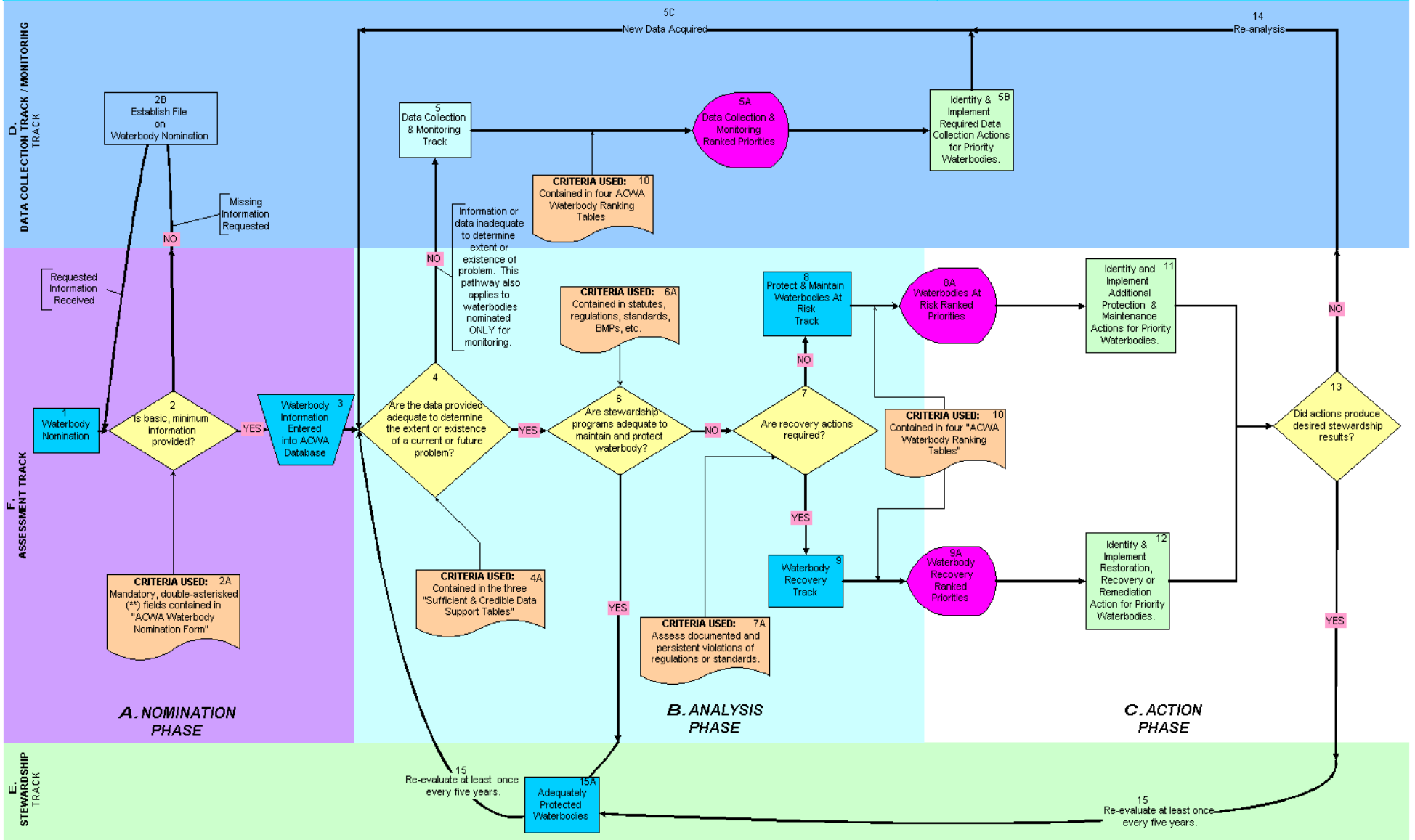


Figure 9. ACWA Decision Tree.

