



BEACH MONITORING HANDBOOK

Generic Version

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Call the laboratory before sampling, and to confirm samples have arrived.

DEC Approved Labs for Drinking Water Microbiological Analytes
(<http://dec.alaska.gov/eh/lab/certmicrolabs.aspx>)

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<i>MARINE WATER QUALITY INDICATOR STANDARDS</i>	
<i>Fecal Coliform Standard (Alaska's Limit)</i>	
Single-sample	Not more than 10% of samples may exceed 200 fecal coliforms per 100 mL
Geometric mean (average) of 5 samples within 30 days	100 fecal coliforms per 100 mL
<i>Enterococcus Standard¹ (EPA's Limit)</i>	
Single-sample	No sample may exceed 276 enterococci per 100 mL
Geometric mean (average) of 5 samples within 30 days	35 enterococci per 100 mL

¹ 40 CFR Part 131, Water Quality Standards for Coastal and Great Lakes Recreation Waters; Final Rule
(<http://www.epa.gov/fedrgstr/EPA-WATER/2004/November/Day-16/w25303.pdf>)

BEACH-MONITORING HANDBOOK

This handbook introduces the DEC Beach Monitoring Program. The goal of the program is to reduce or eliminate illness and disease due to contact with water at recreational-use beaches that are contaminated by human and animal waste (fecal pollution).

This handbook was designed to provide you with simple instructions for beach assessments, water-quality sampling, and public notification in the event recreational water becomes contaminated with fecal pollution. The book is divided into four main sections.

SECTION 1 provides background information about the Alaska Beach Program, disease-causing organisms (pathogens) and their indicators, and state and federal water-quality standards.

SECTION 2 gives you information about how to assess the risk of exposure to fecal contamination at beaches in your area. This section includes detailed information about how to collect, handle, and ship water samples for laboratory bacterial analysis, as well as how to conduct a beach survey.

SECTION 3 tells you whom you should notify when your beach assessment indicates marine water quality is unsafe for water-contact activities. It also provides information about how best to notify the public about the water quality at your beach(es).

SECTION 4 provides water sampling protocols and example field forms, press releases and signage.

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SECTION 1 - BACKGROUND

Nationwide the greatest cause of coastal water quality impairment is bacteria.²

Beaches are a valuable recreational resource in Alaska. They provide access to coastal recreation waters for swimming, surfing, fishing, playing, and many other water-contact activities. Alaskans do not limit their recreational activities to sandy beaches; gravelly, rocky, or mud-covered beaches are commonly used for recreation. What Alaskans may not know is that recreational activities involving water contact could make them sick if the water is contaminated with human or animal waste (e.g., sewage or other sources of fecal pollution).

A wide variety of sources can contribute to the presence of pathogens associated with fecal pollution in coastal areas. While some of the sources may be direct of “point” sources (e.g., discharge from a waste water treatment plant), others may be “nonpoint” sources which are much harder to track (e.g., failing septic systems). As rain washes over a watershed, it has the ability to gather pathogens from a number of different sources. Numerous sources makes the process of ruling out whether it is human related or not difficult. In many cases, birds, wildlife, and algae have been linked to being the sources of high levels of fecal bacteria.

People may get sick from recreating in water near possible fecal pollution sources, such as:

- sewage lagoons
- honey-bucket dumps
- sewage treatment plants
- septic tanks and leach fields
- small boats
- storm-water runoff
- landfills
- wildlife

Water contaminated with fecal pollution may contain disease-causing microbes (pathogenic bacteria, viruses, and protozoa). If people are directly exposed to or ingest this pollution, it can cause stomach aches, diarrhea, or ear, eye and skin infections. Water-quality monitoring at beaches near fecal-pollution sources can reveal conditions that indicate an elevated risk of becoming ill from water contact.

NATIONAL BEACH MONITORING PROGRAM

The U.S. Environmental Protection Agency (EPA) developed the concept of a Beach Sanitary Survey as a means for providing State and local beach managers with a technologically sound and consistent approach to identify pollution sources and share information.³ The survey tool provides a method for documenting historic as well as current records of beach and watershed water quality. It provides baseline information including land use, water quality, and pollutant source data. The survey document is meant to serve as a living record that is regularly updated and evaluated. The survey can be broken into two formats; routine and annual sanitary surveys, in order for temporal data to be evaluated in a more organized manner. The survey information is used by the DEC to prioritize beaches for monitoring and assist in development of models to predict daily bathing beach water quality, if appropriate. The survey also provides support for enforcement actions as it establishes a record of conditions and changes over time. The Beach Sanitary Survey assists beach managers meet the requirements of

² US EPA. 2002. National Water Quality Inventory 2000 Report. EPA-841-R-02-001. Washington DC: Environmental Protection Agency

³ US EPA. 2008. Great Lakes Beach Sanitary Survey User Manual. EPA-823-B-06-001 Washington DC. Environmental Protection Agency.

the BEACH Act Grant Program, as described in the *National Beach Guidance and Required Performance Criteria for Grants* (USEPA 2002b).

ALASKA BEACH PROGRAM

In response to the increasing incidence of water-borne illness at public beaches, the U.S. congress passed the Beaches Environmental Assessment and Coastal Health (BEACH) Act of 2000. The Act provides support for state programs to reduce the risk to beach users from contact with fecal contaminated water.

The Act authorized the U.S. Environmental Protection Agency (EPA) to award grants to states, and the Alaska Department of Environmental Conservation (DEC) Division of Water (DOW) has used these grants to create an Alaska BEACH Program.

To date, the Alaska BEACH Program has:

- Defined many of the unique aspects of Alaskan recreational beach use;
- Sent surveys to Alaskan coastal communities to assess the likelihood of fecal pollution at their beaches;
- Used the survey data to rank beaches according to their potential exposure risk;
- Developed a generic beach-monitoring plan;
- Developed a generic risk-communication plan; and
- Conducted pilot water-quality sampling at some Alaskan beaches the community surveys identified as having risks of fecal pollution.

The DEC encourages communities to create local beach-monitoring programs and work with the DEC in notifying the public if there is an elevated risk of becoming ill from the water. Local management of water-sampling and public-notification programs should provide the most effective means of protecting the community from exposure to disease-causing organisms in human and animal waste.

Disease-causing organisms come from a variety of sources and can be fairly complicated to track and monitor. As a result of this, the DEC has developed a BEACH Sanitary Survey, based on EPA's survey tool, to assign levels of risk in coastal areas where recreational activity takes place, to aid in the identification and remediation of pollution sources, and to protect marine water quality on Alaska's beaches. Use of surveys is just one part of a larger effort to protect water quality through appropriate and relevant management activities. The BEACH Monitoring process includes, and is not necessarily limited to:

- An initial risk assessment of the coastal area of concern;
- Development or improvement of a water quality monitoring plan specific to a particular area;
- A notification plan to communicate levels of risk to the public;
- Conducting a sanitary survey on a routine basis;
- Means for measuring and monitoring results
- Cooperation amongst land owners and resource managers to resolve or mitigate issues;
- Metrics to measure improvements over time; and
- Increases public awareness and cooperation in controlling water pollution

GRANT SPECIFIC BEACH INFORMATION

Every BEACH grant program requires the development of a formal relationship with the landowner of the beach being proposed for monitoring. The (GRANTEE) and (MUNI PARTNER/LANDOWNER) agree with the DEC to develop a local beach monitoring program, with the goal of protecting beach users from exposure to water contaminated by fecal pollution. The (COMMUNITY NAME) BEACH Monitoring Program receives support from the DEC in the form of training, limited funding for water-quality sampling, Standard Operating Procedures for sampling, a Quality Assurance Project Plan template, and a database template for data storage and sharing.

The (GRANTEE) BEACH Monitoring Program will consist of local individuals periodically conducting beach assessments and collecting water-quality samples for laboratory analysis. Their work will be coordinated by the (COMMUNITY NAME) BEACH Monitor who will keep in touch with the DEC BEACH Project Manager to keep him informed about sampling events.

The roles and responsibilities of the (COMMUNITY NAME) BEACH Monitor and DEC BEACH Project Manager are described in this section. Details about conducting sanitary surveys, collecting and shipping samples, and notifying the public about sample results are given in **Section 2** (Community Beach Assessments) and **Section 3** (Notifying the Public) of this handbook. Figure 1 shows a flow chart describing roles in project organizational structure. In many cases, it is likely that one person may fill more than one role.

(COMMUNITY NAME) BEACH Monitor Responsibilities

The main roles and responsibilities of the (COMMUNITY NAME) BEACH Monitor is to:

- Conduct beach assessments;
- Collect water-quality samples;
- Ship samples to a laboratory for bacterial analysis; and
- Notify the DEC and respective land owner in the event that water samples exceed acceptable bacteria limits.

The (COMMUNITY NAME) BEACH Monitor data analysis responsibilities include:

- Sending beach-sampling and sample identification information to the DEC BEACH Project Manager and DEC Quality Assurance Officer;
- Reviewing laboratory data results to ensure required Quality Assurance/Quality Control (QA/QC) criteria have been met;
- If QA/QC criteria have not been met, the (COMMUNITY) BEACH Monitor will notify the DEC project manager as soon as possible, and in consultation with DEC and other affected parties, develop a corrective action plan to resolve the problem/s;
- Comparing the laboratory results to Alaska and EPA water-quality standards;
- Conferring with the DEC BEACH Program Manager regarding water-quality standard exceedances and the possible need for re-sampling; and
- Submitting laboratory data to the DEC, after completing QA/QC protocols, using DEC provided template or DEC approved format.

DEC BEACH Project Manager Responsibilities

The roles and responsibilities of the DEC BEACH Project Manager are to:

- Provide recommendations to (COMMUNITY NAME) for BEACH survey activities;
- Provide recommendations to (COMMUNITY NAME) for water-quality monitoring;
- Assist with water-quality data assessment;
- Work with the land owner to notify the general public of an exceedance following re-sampling and data assessment, and;
- Report beach-assessment and sampling data to the EPA.

The DEC BEACH Project Manager is also responsible for keeping a record of activities associated with sampling events. This record will include information on the dates, locations, samplers, and results of the monitoring, and will be used to compile an annual report to the EPA on recreational beach water quality for Alaska.

Most important, the DEC BEACH Project Manager will have lead responsibility in working with the municipality or responsible landowner to develop a public notice and other press-related information advising the public of the risks from marine water when beach-sampling results exceed State or federal Water Quality Standards.

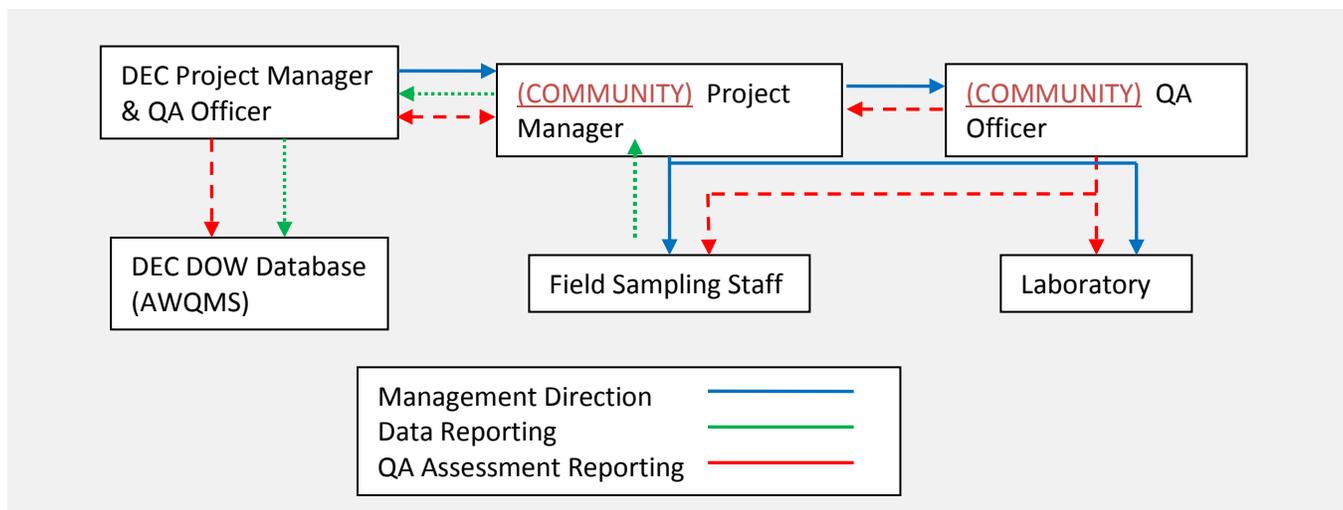


Figure 1: Project Organizational Structure

WATER QUALITY STANDARDS (WQS)

The BEACH program is concerned with fecal contamination. Bacteria can indicate the presence of fecal contamination, which itself may harbor disease-causing (pathogenic) microbes. The indicator bacteria most commonly used are called coliforms and enterococci. Federal and State Water Quality Standards (WQS) set limits for these parameters. Laboratory testing for the presence and abundance of these bacteria is required.

EPA’s Water Quality Standards

The EPA recommends the use of enterococcus bacteria, or enterococci (pronounced ěn'tĕ-rĕ-kĕk'sĭ) as indicators of fecal pollution in marine water. Enterococcus bacteria are found in the human intestine. They are a

subgroup of the fecal streptococci. Studies indicate that the enterococci portion of the streptococcus group is the most efficient bacterial indicator of fresh and marine water quality.

The EPA WQS for this organism’s population density vary depending on the level of use, qualitatively defined, seen at recreational beaches. For “high-use” beaches, the standard is that a single sample may not exceed 104 enterococci per 100 mL. For “moderately” or “lightly” used beaches, the single-sample standards are 158 and 276 enterococci per 100 mL, respectively.

Alaska’s Water Quality Standards

The State of Alaska’s water quality standard uses a group of coliform bacteria, called “fecal coliforms,” to assess marine-water quality. Coliform bacteria originate from soils, plants, human and animal waste. Not all coliforms are harmful to humans, but the presence of high numbers of coliforms is a good indicator that the water is polluted with harmful microorganisms and viruses. Fecal coliform is a specific kind of coliform bacteria found primarily in the digestive tracts of mammals and birds. They are released into the environment through feces.

Alaska’s water quality standard for pathogen indicators states, “in a 30-day period, the geometric mean of samples may not exceed 100 fecal coliform/100 mL, and not more than one sample, or more than 10% of the samples if there are more than 10 samples, may exceed 200 fecal coliform/100 mL.” This standard for fecal coliform bacteria is provided in the Alaska Administrative Code 18 AAC 70 for marine water contact recreation. Fecal coliform bacteria must be determined by the membrane filter technique or Most Probable Number procedure as detailed in Standard Methods for the Examination of Water and Wastewater (American Public Health Association), or by other methods approved by the DEC and EPA. The Alaska standard is tabulated below (Table 1), and on the cover of this handbook.

BEACH Program

The Alaska BEACH Program will monitor both types of bacteria against WQS set for Marine Water Recreation-contact recreation (Table 1; 18 AAC 70 amended 7-1-2008). For the EPA WQS, the DEC has determined that Alaska’s beaches are generally in the “lightly used” category; therefore, the DEC has adopted the single-sample standard of 276 enterococci per 100 mL for the BEACH program. In addition, the geometric mean of five samples collected within a 30-day period may not exceed 35 enterococci per 100 mL.

Table 1: Marine Water-Quality Indicator Standards

Sample Type	Fecal Coliform Standard (Alaska’s Limit)	Enterococcus Standard (EPA’s Limit)
Single-sample	Not more than 10% of samples may exceed 200 fecal coliforms per 100 mL	No sample may exceed 276 enterococci per 100 mL
30-day geometric mean (average) of samples	100 fecal coliforms per 100 mL	35 enterococci per 100 mL

SECTION 2 – COMMUNITY BEACH ASSESSMENTS

OVERVIEW

A Sanitary Survey is a type of beach assessment used to identify sources of pollution. It can be an effective tool for protecting human health at recreational-use beaches by providing information that can be used to design future or modify existing monitoring programs. The (COMMUNITY) BEACH Monitor should conduct surveys in suspected high-risk areas to confirm the presence or absence of fecal pollution. An Annual Survey should be conducted on all newly nominated beaches as well as the beginning of each season of on-going monitoring projects to document seasonal changes or new sources. Routine Surveys will be completed when a sample is collected for water-quality testing. Routine surveys are completed using the BEACH Survey Field Form provided in Section 4.

Annual BEACH Surveys collect information from area maps and land use plans, annual and seasonal trends, coastal geomorphic information, and additional potential sources of pollution at a watershed or sub-watershed level. In some cases Annual BEACH Surveys may be conducted at the end of a sampling season to determine whether changes to the monitoring program should take place in the following year. Information that should be considered during the survey process include:

- Freshwater inputs (river mouth, stream, storm drains);
- Properties with subsurface wastewater disposal systems;
- Significant wildlife habitat/wetlands;
- Agricultural operations;
- Impervious surfaces;
- Marinas/moorages/anchorages;
- Recreational areas and the availability of facilities (restrooms, trash cans, doggie bag disposal stations).

A Routine BEACH survey is conducted by visiting a beach of concern to answer questions and fill in blanks on the BEACH Survey Field Form. Since fecal coliform bacteria may originate from sources other than humans, the assessment will note the number of birds, dogs or other animals on the beach. Debris, vegetation, tide stage and murky water are also noteworthy. If animal waste sources are identified, (COMMUNITY) Project Managers should discuss their observations with the DEC BEACH Project Manager as soon as possible. The survey may include collecting a water quality sample if the DEC BEACH Project Manager and (COMMUNITY) Project Manager decide that beach users may be exposed to fecal pollution.

BEACH SURVEY FIELD FORM

The BEACH Survey Field Form is a data sheet used for collecting field information as part of the Routine and Annual BEACH survey process. It is designed to gather information that the (COMMUNITY) BEACH Monitor and the DEC BEACH Project Manager can use to make annual and routine comparisons of physical characteristics. It documents the physical conditions present during sampling events. These forms will be created and managed in a manner that will facilitate easy data entry into the Ambient Water Quality Monitoring System (AWQMS).

The BEACH Survey Field Form is made up of three parts:

1. The first part asks for a description of the beach including its location and the name of the person performing the assessment.
2. The second part asks for details about the water quality sample, if collected. These details include date, time sample number(s), and water temperature. The water temperature is determined by using a calibrated thermometer that reads to 0.1 degree centigrade (0.1°C). Record the temperature to 0.1°C. It is very important to allow time for the thermometer to stabilize before writing down the temperature reading.
3. The third part asks for information about the condition of the beach at the time of the assessment including the weather, levels of activity, and potential pollution sources.

To complete a BEACH survey, field staff must fill out all of the information on the Beach Survey Field Form including a sketch map of the sampling location. An example Beach Survey Field Form is located in Section 4.

BEACH SURVEY SCHEDULE AND LOCATIONS

The (COMMUNITY) BEACH Monitor should conduct BEACH surveys using the BEACH Survey Field Form at designated locations at the beginning of the sampling season and each time a water sample is collected for water-quality testing. These observations can help the (COMMUNITY) BEACH Monitor and the DEC BEACH Project Manager assess changes from year to year and modify the existing monitoring program by identifying times during the season with the highest risk of people getting sick from water contact.

The (COMMUNITY) BEACH Monitor may also conduct BEACH surveys at other suspected high-risk beaches to identify any persistent problems that may warrant a need for water-quality testing. The information gathered can be used by the (COMMUNITY) BEACH Monitor and the DEC BEACH Project Manager to design future monitoring programs to protect human health during the recreation season.

Sampling location data should be collected using a calibrated GPS unit to ensure accuracy. All latitude/longitude data should be collected and recorded in decimal form (12.3456) using the Horizontal Collection System datum **NAD83**. All future sampling events should take place within 100 feet of that site unless the DEC BEACH Project Manager and (COMMUNITY) BEACH Monitor determine that the site does not accurately represent background conditions of beach water quality.

COMMUNITY BEACH SAMPLING

The (COMMUNITY) BEACH Monitor will determine the sampling location and schedule in coordination with the DEC BEACH Project Manager. Once a sampling site has been determined, Project and Sampling Location ID numbers will be provided by the DEC BEACH Project Manager to ensure that the site has an EPA assigned PRAWN code and consistent with the Ambient Water Quality Monitoring System (AWQMS) template. Generally, the (COMMUNITY) BEACH Monitor will collect samples on a weekly basis over a two month period, unless monitoring indicates that Alaska's or EPA's water quality standards are exceeded. Currently, the plan is to collect one sample per week at a location where people get in the water unless physical conditions and prior sampling dictates a more rigorous sampling regime.

Samples must be sent to a laboratory that is approved by DEC for Fecal Coliform Bacteria (Method 9222D) and Enterococci by MPN (Method ASTM D-6503-99). A list of approved laboratories is attached at the end of this handbook (Appendix A). This list is updated periodically by DEC staff and found by visiting the DEC website (<http://dec.alaska.gov/eh/lab/certmicrolabs.aspx>).

The sample should be collected at a time during the day when flights are available to the pre-determined lab, so the 6-hour sample holding time won't be exceeded. The **(COMMUNITY)** BEACH Monitor will need to coordinate with the laboratory to make sure someone is at the laboratory and able to process the samples as soon as they arrive.

Sample Chain of Custody

The sample chain of custody form documents actions taken to ensure that samples are traceable from the time they are collected at the beach to the time the analytical laboratory reports the results. The laboratory usually supplies these forms with their field sampling kit. Generally, a completed chain-of-custody form will identify the samples, request analysis from the laboratory, note any special instructions, and document who handled the samples from the time they were shipped from the field to the time they reach the laboratory. The **(COMMUNITY)** BEACH Monitor is responsible for filling out the chain-of-custody form and keeping a copy for reference. The form must include the following information:

- Name and contact information of the person taking the samples;
- Sample identification, including the sample number, and date and time the sample was collected;
- The sample preservation method/s;
- The type of sample (e.g., water sample, sample replicates, field and temperature blanks) and the number of jars being submitted for analysis;
- The requested analysis (enterococcus and fecal coliform bacteria);
- The requested turn-around time (Note: the laboratory is requested to analyze the samples and present the results within 36 hours of sampling);
- Name and contact information for delivery of results (Note: the results should be sent to the DEC BEACH Project Manager and the **(COMMUNITY)** BEACH Monitor; and
- A relinquishment signature including printed name, date and time.

In addition to completing the chain-of-custody form the **(COMMUNITY)** BEACH Monitor needs to:

1. Put the completed chain-of-custody form into a plastic bag taped to the inside lid of the cooler;
2. Attach two completed chain-of-custody seals (stickers) to cross over the cooler lid seams;
3. Attach a clearly marked label with laboratory contact information on the top of the sample cooler,;
4. Hand deliver the samples to the airlines;
5. Keep a copy of the airlines' transportation documentation or other means of delivery for reference;
6. Contact the courier service to ensure pick-up and delivery of sample;
7. Contact the laboratory, again, to verify that someone will be there when the samples arrive; and
8. Fax or email a copy of the BEACH Survey Field Form to the DEC BEACH Project Manager.

Laboratory Responsibilities

The (COMMUNITY) BEACH Monitor will work with the pre-determined laboratory to complete analysis of samples and data submission. Laboratories are responsible to comply with the data quality objectives specified in the QAPP and as specified in the laboratory QAP and method specific Standard Operating Procedures (SOPs). Validated sample laboratory data results are reported to the (COMMUNITY) BEACH Monitor and DEC BEACH Project Manager. Electronic project data will be stored on a secure computer or on a removable hard drive that can be secured. All records will be retained by the contract laboratory for five years

Preliminary Quality Assurance/Quality Control (QA/QC) Review of Beach Sample Data

When the (COMMUNITY) BEACH Monitor receives sample results from the laboratory, the results need to be compared to the marine Water Quality Standards that are referenced in Section 1 of this handbook. The (COMMUNITY) BEACH Monitor should check to make sure the sample was analyzed within the 6 hour holding time and that the temperature was within the allowed range when the samples were received at the laboratory. Secondary reviewers (sampling coordinator/supervisor/project supervisor) are responsible for the review, verification and validation of field and laboratory data and data reformatting as appropriate for reporting to AWQMS. The secondary reviewer is also responsible for reporting validated data to the DEC Project Manager. The data management task will include keeping accurate records of field and laboratory QA/QC samples so that project managers and technical staff who use the data will have appropriate documentation to show that the required minimum data quality standards have been met.

The DEC BEACH Project Manager will provide a sample data submission template to the Grantee. The DEC DOW Project Manager, DEC QA Officer and Ambient Water Quality Monitoring System (AWQMS) data entry staff conduct final data reviews (tertiary review) and submits the validated data to AWQMS. See the flow chart in Figure 2 for detailed information on data management responsibilities.

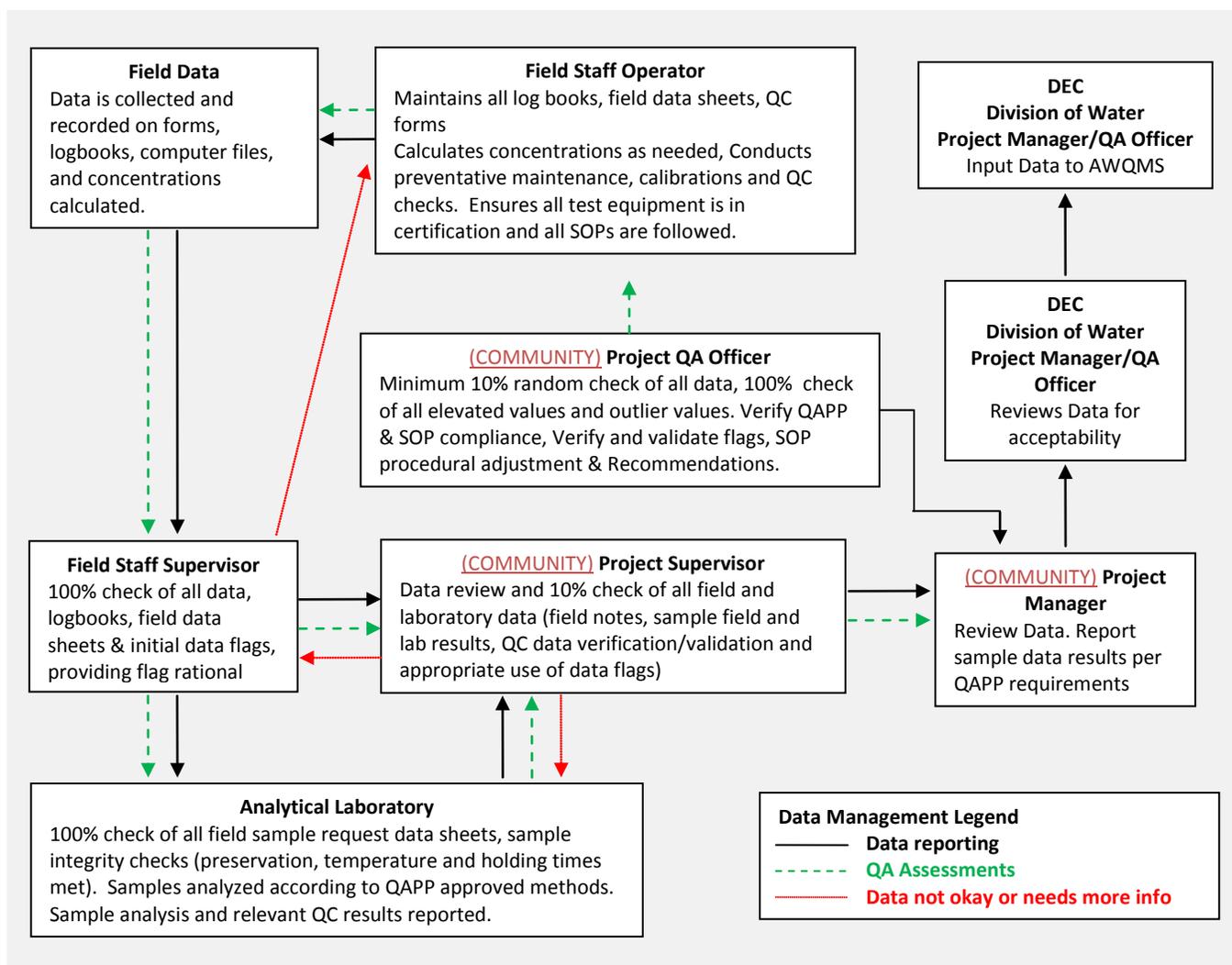


Figure 2: Data Management Responsibilities Chart

Communicating with DEC

After collecting and shipping samples to the laboratory, the (COMMUNITY) BEACH Monitor will let the DEC BEACH Project Manager know that the samples are on their way to the lab, and send the completed BEACH Survey Field Form.

After reviewing the sampling results from the laboratory, the (COMMUNITY) BEACH Monitor will need to talk to the DEC BEACH Project Manager to decide if additional sampling or public notification procedures should be initiated.

Re-Sampling

If a sample, after undergoing quality assurance review, is found to exceed BEACH program Water Quality Standards (WQS; Table 1), the (COMMUNITY) BEACH Monitor is required to initiate an additional sampling event to confirm that the exceedence is an on-going issue (See Figure 3). Re-sample protocols will be consistent with those of routine events. If the re-sample event determines that the exceedence is on-going, a Beach Advisory

(see Section 3) will be issued by the landowner and DEC. Routine sampling events will continue according to schedule and the Beach Advisory will remain in place until samples are below WQS.

BEACH Project Final Reports

As part of the grant process, **(COMMUNITY)** BEACH Monitors are required to submit a Final Report. These reports are due by July 31st. The Final Report allows for various types of data to be assimilated into one comprehensive document describing the nature of the beach and the conditions it is subject to, and the results of the past year's sampling events. Reports will be made available to decision makers and the community-at-large to attract attention and draw support for the reduction of sources of water pollution. Besides containing survey findings and monitoring data, a summary evaluation of the quality of data collected will be included. Final Reports will also include an action plan that identifies:

- Specific actions to be taken in the future;
- Specific responsibility of agencies or individuals;
- Potential sources of funding;
- Timeline for completing recommendations; and
- A system of measuring success.

Sanitary Survey Final Reports⁴ Suggested Format

The following format is suggested by the DEC for use in Final Reports.

1. Abstract
2. Introduction
3. Scope of the Survey
 - a. Beach and Watershed Characteristics (e.g. beaches, shellfish growing areas, watershed boundaries, land use, environmental factors, anthropogenic influences (e.g. treatment plants))
 - b. Need for the assessment (summarize water quality history, local level value, annual use)
4. Specific studies, survey work, and initial risk assessment information
5. Potential sources of bacteria
 - a. Land based sources
 - b. Offshore sources and activities
6. Known sources of bacteria (known sources)
 - a. Land based sources
 - b. Offshore sources and activities
7. Accomplishments and results (e.g. work completed, remediation efforts, education campaigns, etc.)
8. Recommendations and next steps based on survey findings, data collection, and data quality,
9. Missing information
10. Appendices (e.g., field datasheets, compliance records, plat maps, etc.)

⁴ Adapted from the Municipal Guide to Clean Water. 2010 Maine Healthy Beaches Program. University of Maine Cooperative Extension

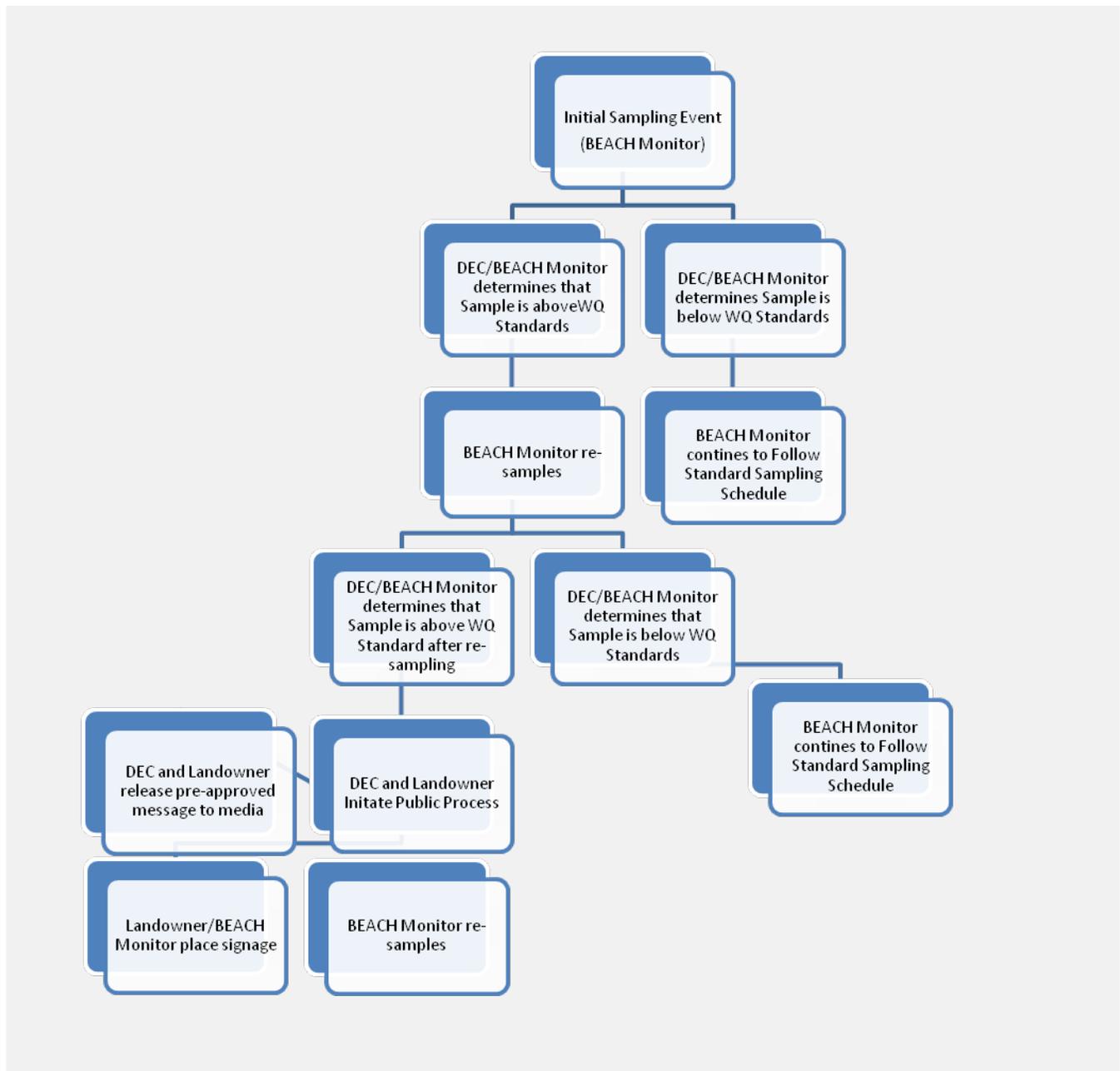


Figure 3: Sample Decision Tree

SECTION 3 – NOTIFYING THE PUBLIC

Communicating with the public regarding the nature of the BEACH program, sampling results, and potential responses to Water Quality Standards exceedances is very important. The DEC will work with the respective land owner to distribute public information about sampling results that may require actions such as a Beach Advisory or Beach Closure. Communication plans and specific actions taken will be developed between the DEC, landowner (s) and the BEACH Monitor on a case by case basis.

BEACH ADVISORY

DEC recommends an advisory be issued to the public that warns of health risks from recreation in coastal water when beach-sampling results indicate potential fecal bacteria contamination. The advisory will be based on the bacterial counts and the information from the Beach Survey Field Form.

A Beach advisory provides recommendations to the public to avoid swimming in water that has exceeded the marine WQS referenced in Section 1 (Table 1) of this handbook. Sampling events are scheduled to take place throughout the recreational season. If a sample demonstrates an exceedance for fecal bacteria, a re-sampling event will be triggered to verify that the presence of the bacteria is ongoing. A Beach Advisory may be issued by the respective land owner and DEC upon receipt of water quality re-sampling results that demonstrate a continued exceedance of water quality standards for bacteria.

The advisory should include:

- general heading (“ADVISORY” or “WARNING”);
- reason for the advisory;;
- time of the advisory;
- duration of the advisory;
- location of the affected beach; and
- number to contact local beach manager for further information.

Advisories should be issued in the form of press releases, signs at the affected beach, and fact sheets (informative flyers). The DEC will act as the lead in developing advisory information and signage. The press releases should be distributed to local media outlets, government offices, and emergency response entities, and advisory signs should be posted at the beach until additional assessments (sampling) indicate the water quality is acceptable. Contacts for public notification should be developed and verified at the beginning of each season. Table 2 is a framework for organizing possible contacts.

Table 2: Contacts for Public Notification During a Beach Advisory

Community Entity	Contact Person	Phone Number	Fax Number	Email Address
Radio Stations				
Newspaper				
City Manager				
Borough Representative				
Police Department				
Fire Department				
Note: This information will vary by community and should be verified prior to sample collection				

These media outlets, local governments and emergency response entities can initiate their existing communication protocols to notify the public of potential health risks at your local beach(es). A standard-format press release public service announcement is included in Section 4.

BEACH SIGNS

If a re-sampling event has been triggered and water quality standards continue to show exceedances, a sign should be posted at major beach access points to alert beach users of their risk of illness from water-contact recreation. A sign should also be posted on the beach near the location where the fecal contamination was detected so recreational users know it is not safe to swim there. This advisory should recommend that the public avoid water contact activities at the beach until further analyses reveal safe conditions. Signs will be in place until re-sampling determines that water quality standards are being met. An example of a Beach advisory sign is located in Section 4.

FACT SHEETS OR FLYERS

Distributing informative flyers in public areas can also communicate potential health risks to local beach users. A flyer could be used as an advisory by passing out press release information to people in public places. It also could be used to educate the community about the BEACH Project. The Alaska BEACH Program produced a generic one page fact sheet about the BEACH project that answers commonly asked questions. It can be found at the DEC Alaska BEACH Grant Program website by clicking on the "What is BEACH Grant" quick link. The website address is (<http://www.dec.state.ak.us/water/wqsar/wqs/beachprogram.htm>).

PRESS RELEASE

A press release is likely the fastest way to spread the news about water quality at recreational use beaches in Alaskan communities. The DEC and landowner will act as the lead agents in providing public information.

SECTION 4: PROTOCOLS AND EXAMPLE FORMS

WATER SAMPLING COLLECTION PROTOCOLS

Water Sample Collection

Water sampling involves wading into the water adjacent to a beach commonly used for water recreation to collect water from below the surface into sample jars. The sample should be collected in the general recreational beach area, or near locations expected to be influenced by fecal contamination (e.g., adjacent to sewage lagoons, near small boat harbors, etc.). The (COMMUNITY) BEACH Monitor will complete sampling after the following steps have been accomplished:

- Each sample jar is filled with water;
- Each sample jar is labeled;
- Each sample jar is placed in a cooler kept chilled with artificial ice (artificial ice reduces potential for cross contamination);
- The Beach Survey Field Form is filled out;
- A chain-of-custody form is filled out;
- The cooler is transported to the laboratory responsible for determining fecal coliform and enterococcus populations;
- A copy of the Beach Survey Field Form is sent to the DEC BEACH Project Manager; and
- A copy of the Beach Survey Field Form is sent to DEC BEACH Manager.

Detailed directions for water sample collection, sample handling and delivery are given in the following subsections.

Sample Collection Method

A good water sample is collected by avoiding cross-contamination, which can happen when the sampler inadvertently contaminates the sample. To reduce the potential for cross-contamination the sampler must follow a standard sample-collection method. Step-by-step sample-collection instructions are provided below:

1. Request a sample kit from the laboratory. The kit should include:
 - A cooler;
 - The appropriate sample bottles for marine water-quality sampling (enterococcus and fecal coliform bacteria);
 - Artificial ice to keep the cooler chilled to the appropriate temperature (<10°C);
 - The appropriate container for the field blank;
 - Temperature blank;
 - Chain-of custody form;
 - Custody seal;
 - Sample jar labels;
 - An extra set of sample bottles;
 - An extra set of sample bottles for a replicate sample;
 - Shipping labels; and

- Packing material.
2. **Call the laboratory prior to sampling to make sure there will be someone at the laboratory to receive and process the samples within 6 hours of sampling.**
 3. **Consult flight schedules to make sure there will be a flight that can get the samples to the laboratory within 6 hours of sampling.**
 4. Write the beach sampling location on the bottle label and Beach Survey Field Form.
 5. Put on clean waders and gloves. Wade into the water to a depth of approximately 3 feet. Try to avoid kicking up sediment or wait until any sediment that has been kicked up settles. Stand downstream of the water current and wait for sediment to clear.
 6. Remove the bottle cap just before collecting the sample. Protect the cap from contamination. Do not touch the inside of the bottle, or the inside of the cap.
 7. Open the sampling bottle and hold onto the base with one hand. Plunge the top of the bottle downward into the water. Avoid introducing surface scum. Point the mouth of the bottle into the current. Hold the bottle about one (1) foot below the water surface and tip it slightly upward to allow air to exit and the bottle to fill.
 8. Remove the bottle from the water. Pour out a little water to leave airspace at the top of the jar.
 9. Tightly close each bottle.

Collect one (1) replicate BEACH measurement for every five (5) field measurements. A minimum of one replicate must be collected per BEACH monitoring project/sample collection day if less than five (5) samples are collected. To collect a replicate sample, you must first have requested extra bottles from the laboratory. Repeat Steps 2 through 9 at the same location to complete collection of field replicates.

10. Submit field blanks for a every sampling event during a sampling season. Every cooler will contain a field blank and a temperature blank. To submit a field blank you must first obtain the appropriate sample bottles from the laboratory. Remove one bottle cap at a time. Do not touch the inside of the bottles or the inside of the caps. Pour distilledwater into each sample bottle. Be careful not to pour the distilled water over your hands when filling the bottles. Replace each bottle cap, and label each bottle (e.g., "BB01").
11. Complete bottle labels and attach them to each sample jar. Labels should be clean, waterproof, non-smearing, and large enough for all the information. Information on the label should include:
 - Sample identifier (e.g., "city-date-sample" = "HOM-051507-01");
 - Sample location (e.g., beach name);
 - Sampling date and time; and
 - Name of sampler.

12. When finished sampling, wash your hands and arms with soap and water or waterless antimicrobial cleanser, or disinfectant lotion to reduce exposure to potentially harmful bacteria or microorganisms.

Sample Handling

Sample handling involves packing the samples in a cooler and shipping them to the laboratory. After sample collection is complete the samples must be handled with care so that they arrive to the laboratory in good condition. Step-by-step sample handling instructions are provided below:

1. Place the sample(s) in a pre-chilled cooler containing artificial ice to maintain a temperature from 1° to 10°C. Ask the laboratory ahead of time how much ice will be needed. **Do not allow the samples to freeze. Samples must remain below 10°C until receipt by qualified staff at the laboratory, otherwise samples are determined invalid so ensure sufficient cold artificial ice is added.**
2. Place enough packing material inside the cooler to protect the sample bottles from breaking during transport to the laboratory.
3. Complete the chain-of-custody form. Put the form in a plastic bag and tape it to the inside of the cooler lid.
 - Write a note in the “Special Instructions” box requesting that the laboratory results be sent without delay (within 36 hours of sampling) to three people: the DEC BEACH Project Manager, the DEC BEACH Quality Assurance Officer, and you.
4. Fill out two custody seals and attach one to the front and one to the back of the cooler to span the lid seam. You want them to tear when the cooler is opened.
5. Securely tape the cooler shut prior to shipment. Attach shipping labels that identify the shipping destination and say: “keep cool,” “do not freeze,” and “fragile.”
6. Ship the samples to (Laboratory Name and Phone Number)
7. **Remember that samples have to be collected, shipped and received by the laboratory in 6 hours. Consult flight schedules, and call the laboratory prior to sampling to make sure there will be a flight that can get the samples to the laboratory within 6 hours of sampling, and that there will be someone at the laboratory to receive the samples and begin the analyses.**

EXAMPLE FORMS

Example Beach Sampling Field Form

Name of Beach _____ Date _____

Nearest Town _____

Describe Sampling Location (Note location on map and attach) _____

Latitude N _____ Longitude _____

SAMPLES

Sample(s) ID: _____ **Time:** _____

Replicate ID: _____ **Time:** _____

Field Blank ID: _____ **Time:** _____

Weather Conditions:

- Sunny & Clear Rain
 Cloudy / Overcast Fog
 Other (describe): _____
 Water Temperature: _____ °C
 Air Temperature: _____ °F °C
 Wind Speed (approx): _____ Mph
 Wind Direction: _____ On Shore Off Shore
 Precipitation in the last 24 hours: _____ in

Tidal Conditions:

- Low Tide Ebbing
 High Tide Flooding
- | | | |
|-------------|--|---------------|
| Tide | Height | Time |
| Low: _____ | <input type="checkbox"/> ft <input type="checkbox"/> m | _____ (am/pm) |
| High: _____ | <input type="checkbox"/> ft <input type="checkbox"/> m | _____ (am/pm) |

Condition of the beach:

	Debris (Describe)	Vegetation (% Coverage)
On shore		
In water		

Activity on the Beach

Adults _____ Dogs _____
 Children _____
 Other _____
 (describe): _____

Type of Activity

- Swimmers Walkers Fishermen Boaters
 Other
 (describe): _____

Condition of the Water

- Clear Cloudy & Murky Oily Film
 Other
 (describe): _____

Potential Sources of Pollution

- Water Fowl (approx #): _____ Boats (approx #): _____
 Other
 (describe): _____
 Sanitary Facilities (describe): _____
 Sewage odor/presence (describe): _____
 Presence of stormwater pipes or other flow across the beach (describe): _____

Additional comments, noteworthy unusual conditions:

Sampler Name (Printed)

Signature

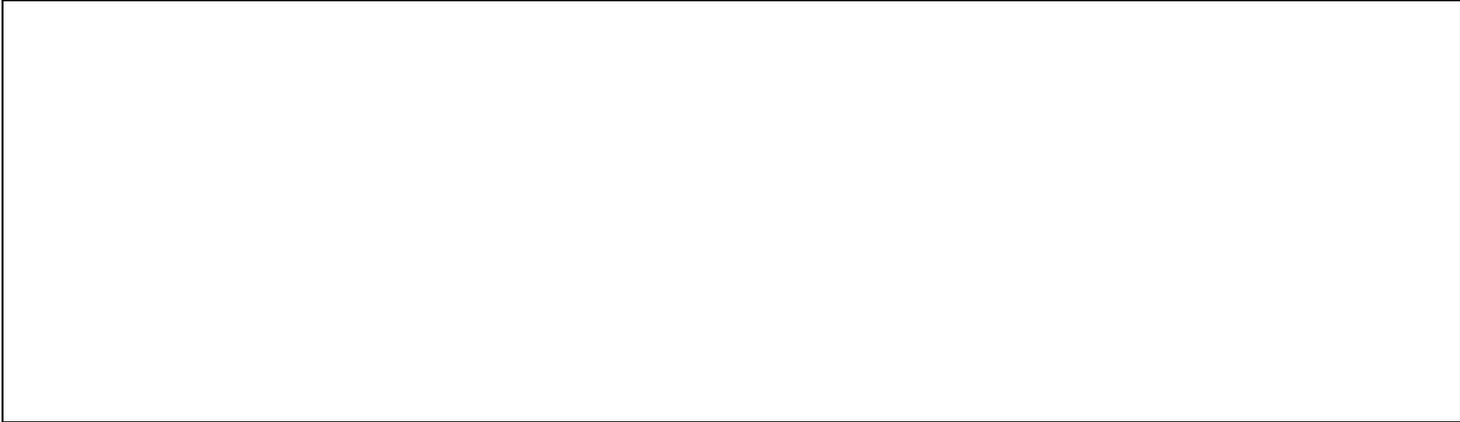
INSERT A MAP OF BEACH HERE

Sampling Notes: *(Put a mark on the map where you collected the sample)*

Date:

Sample Number:

Additional Comments:



CAUTION

Swimming May Cause Illness

**WATER CONTACT AND INGESTION OF BEACH WATER MAY BE A HEALTH RISK
DUE TO HIGH LEVELS OF BACTERIA**

*Swallowing contaminated water may cause nausea, vomiting, diarrhea, and fever,
and contact may lead to ear ache or skin rashes.*

Wash after contact with water and avoid swallowing it or swimming.

Fish should be rinsed in clean water and cooked before eating.

Water quality samples with elevated enterococci bacteria levels were collected at
[Beach Name] on [sampling dates].

The water quality will continue to be monitored.

For more information about the results of sampling, please contact:

(FIRST and LAST NAME) at (PHONE NUMBER) or (EMAIL ADDRESS)

FOR IMMEDIATE RELEASE: [DATE]

CONTACT: [NAME, TITLE, PHONE, EMAIL]

Elevated Levels of [ENTEROCOCCI/FECAL COLIFORM] Bacteria Found at [BEACH NAME]

[COMMUNITY], Alaska – [MONTH DAY, YEAR] – Recent water quality samples collected at [BEACH NAME] indicate elevated levels of [ENTEROCOCCI/FECAL COLIFORM] bacteria in the water. The Alaska Department of Environmental Conservation (DEC) is collecting the samples this summer to determine if the water is safe for recreation.

Contact with water that has high levels of [ENTEROCOCCI/FECAL COLIFORM] may cause people to have stomach aches, diarrhea, or ear, eye and skin infections.

DEC suggests that beach users take normal precautions to avoid exposure, such as avoiding drinking or swimming in the water; washing after contact with the water, and rinsing fish harvested from the area with clean water. As always, people should cook seafood to a minimum of 145 degrees Fahrenheit internal temperature to destroy pathogens.

[BEACH NAME] is located at the [location description]. Water quality samples were collected [DATE(S)]. DEC continues to monitor water quality. If bacteria levels increase significantly, the [landowner] may post advisory signs at the beach until additional sampling indicates that bacteria numbers have dropped to safe levels.

[ENTEROCOCCI/FECAL COLIFORM] bacteria can come from any warm blooded animal including birds, seals, and humans. [The reason for the currently elevated levels is unknown. List any information know about potential sources, e.g. monitoring from nearby wastewater treatment plants.]

The beach sampling program is being funded and implemented by DEC with cooperation of [GRANTEE AND/OR LANDOWNER]. It is part of a nationwide effort to decrease the incidence of water-borne illness at public beaches under the federal BEACH Act.

For more information about the Alaska beach monitoring program contact the Alaska BEACH Project Manager (XXXX) (907-XXX-XXXX) or visit the Alaska BEACH Grant Program Website (<http://www.dec.state.ak.us/water/wqsar/wqs/beachprogram.htm>)

APPENDIX A

DEC APPROVED LABS FOR DRINKING WATER MICROBIOLOGICAL ANALYTES

(<http://dec.alaska.gov/eh/lab/certmicrolabs.aspx>)

Laboratory	Contact	Approved Methods of Analysis
AK00976 Admiralty Environmental 431 N. Franklin St., Suite 301 Juneau, AK 99801	David Wetzel (907) 463-4415 Fax: (480) 247-4476 dwetzel@admiraltyenv.com	TOTAL COLIFORM ANALYSIS: Membrane Filter (SM 9222 B) m-endo Enzyme Substrate (SM 9223 B) Colilert™ FECAL COLIFORM OR E. COLI ANALYSIS: Enzyme Substrate (SM 9223 B) Colilert™ Fermentation Technique (SM 9221 E) EC ENTROCOCCUS ANALYSIS: Enterolert (ASTM D6503-99) HETEROTROPHIC PLATE COUNT: Heterotrophic Plate Count (SM 9215 B)
AK00969 Analytica International, Inc. Anchorage 4307 Arctic Boulevard Anchorage, AK 99503	Danny Compton (907) 258-2155 x 231 Fax: (907) 258-6634 dcompton@analyticagroup.com http://www.analyticagroup.com	TOTAL COLIFORM ANALYSIS: Membrane Filter (SM 9222 B) m-endo Enzyme Substrate (SM 9223 B) Colilert™ Enzyme Substrate (SM 9223 B) Colisure® FECAL COLIFORM OR E. COLI ANALYSIS: Enzyme Substrate (SM 9223 B) Colilert™ Enzyme Substrate (SM 9223 B) Colisure® Fermentation Technique (SM 9221 E) EC Membrane Filter (SM 9222 D) ENTROCOCCUS ANALYSIS: Enterolert (ASTM D6503-99) HETEROTROPHIC PLATE COUNT: Heterotrophic Plate Count (SM 9215 B)
AK00017 Anchorage Water & Wastewater Utility Point Woronzof Laboratory 3000 Arctic Boulevard Anchorage, AK 995033898	Mark Spano (907) 751-2217 Fax: (907) 248-6836 mark.spano@awwu.biz	TOTAL COLIFORM ANALYSIS: Enzyme Substrate (SM 9223 B) Colilert™ FECAL COLIFORM OR E. COLI ANALYSIS: Enzyme Substrate (SM 9223 B) Colilert™ ENTROCOCCUS ANALYSIS: Enterolert (ASTM D6503-99)
AK00012 DEC Environmental Health Laboratory Services 5251 Hinkle Road Anchorage, AK 99507	Sherri Trask (907) 375-8209 Fax: (907) 929-7335 sherri.trask@alaska.gov http://www.dec.state.ak.us/eh/lab/	TOTAL COLIFORM ANALYSIS: Membrane Filter (SM 9222 B) m-endo Presence Absence Fermentation (SM 9221 D) Fermentation Technique (SM 9221 B) Enzyme Substrate (SM 9223 B) Colilert™ FECAL COLIFORM OR E. COLI ANALYSIS: Enzyme Substrate (SM 9223 B) Colilert™ Fermentation Technique (SM 9221 E) EC HETEROTROPHIC PLATE COUNT: Heterotrophic Plate Count (SM 9215 B)
AK00971 SGS Environmental Services, Inc	Chuck Homestead (907) 562-2343	TOTAL COLIFORM ANALYSIS: Membrane Filter (SM 9222 B) m-endo

<p>200 W. Potter Drive Anchorage, AK 995181605</p>	<p>Fax: (907) 561-5301 charles.homestead@sgs.com</p>	<p>Enzyme Substrate (SM 9223 B) Colilert™ Enzyme Substrate (SM 9223 B) Colisure®</p> <p>FECAL COLIFORM OR E. COLI ANALYSIS: Enzyme Substrate (SM 9223 B) Colilert™ Enzyme Substrate (SM 9223 B) Colisure® Fermentation Technique (SM 9221 E) EC Membrane Filter (SM 9222 D)</p> <p>HETEROTROPHIC PLATE COUNT: Heterotrophic Plate Count (SM 9215 B)</p>
<p>AK00975 TestAmerica-Anchorage 2000 West International Airport Road Suite A10 Anchorage, AK 99502</p>	<p>Rachel James (907) 563-9200 Fax: (907) 563-9210 rjames@testamericainc.com</p>	<p>TOTAL COLIFORM ANALYSIS: Enzyme Substrate (SM 9223 B) Colilert™</p> <p>FECAL COLIFORM OR E. COLI ANALYSIS: Enzyme Substrate (SM 9223 B) Colilert™</p>