Alaska BEACH Program

Beach Monitoring Handbook, Haines, AK

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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 handbook 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.[1]

Beaches are a valuable recreational resource in Alaska. They provide access to coastal recreation waters for swimming, surfing, fishing, playing, marine food harvesting 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, or "point" sources (e.g., discharge from a wastewater 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 can gather pathogens from several different sources. Numerous sources make the process of ruling out whether it is human-related difficult. In many cases, birds, wildlife, and dogs have been linked to being the sources of elevated 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 systems
- small boats
- stormwater
- 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 gastrointestinal illness, respiratory illnesses, skin rashes, and ear, eye, and wound infections. Water quality monitoring at beaches near fecal pollution sources can reveal conditions that indicate an elevated risk of becoming ill from water contact.

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

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.[2] 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, for temporal data to be evaluated in a more organized manner.

The Beach Sanitary Survey information is used by the Alaska Department of Environmental Conservation (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 helps beach managers meet the requirements of the BEACH Act Grant Program, as described in the 2014 National Beach Guidance and Required Performance Criteria for Grants.

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 EPA to award grants to states and tribes, and DEC Division of Water 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.

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

- Used the survey data to rank beaches according to their potential exposure risk.
- Developed a generic beach Quality Assurance Project Plan and monitoring plan.
- Developed a generic risk-communication plan.
- Conducted pilot water quality sampling at some Alaska beaches the community surveys identified as having risks of fecal pollution.
- Conducted 2-year water quality sampling programs at 18 Tier 1 Alaska beaches.

DEC encourages communities to create local beach monitoring programs and work with the beach steward(s)[3] 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 complicated to track and monitor. As a result of this, 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 landowners and resource managers to resolve or mitigate issues.
- Metrics to measure improvements over time.
- Increase public awareness and cooperation in controlling water pollution.

[3] Stewards may include local landowners, resource managers, non-governmental organizations, etc.

- The Alaska Beach Program follows requirements set out in the 2014 National Beach Guidance and Required Performance Criteria for Grants.

Haines 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 Takshanuk Watershed Council (TWC), Haines Borough, and DEC have developed a local beach monitoring program, with the goal of protecting beach users from exposure to water contaminated by fecal pollution. The Haines BEACH Monitoring Program receives support from DEC in the form of training, limited funding for water quality sampling, Standard Operating Procedures for sampling, a Quality Assurance Project Plan template, a database template for data storage and sharing, and technical assistance.

The Haines 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 Grantee Lead Field Sampler who will coordinate with the DEC and Grantee Project Managers to keep them informed about sampling events.

The roles and responsibilities of the Grantee Lead Field Sampler, and DEC and Grantee Project Managers 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.

Grantee BEACH Grantee Lead Field Sampler Responsibilities

The main roles and responsibilities of the Grantee Lead Field Sampler are to:

- Conduct beach assessments.
- Collect water quality samples.
- Ship samples to a laboratory for bacterial analysis.

The Grantee Lead Field Sampler data analysis responsibilities include:

- Provide beach sampling and sample identification information to the Grantee and DEC BEACH Project Managers and DEC Quality Assurance Officer.

Grantee BEACH Project Manager Responsibilities

The roles and responsibilities of Grantee Project Manager are to:

- Review laboratory data results to ensure required Quality Assurance/Quality Control (QA/QC) criteria have been met.
- If QA/QC criteria have not been met, notify 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).
- Compare the laboratory results to Alaska and EPA water quality standards.
- Confer with DEC BEACH Program Manager regarding water quality standard exceedances.
- Submit laboratory data to DEC, after completing QA/QC protocols, using DEC-provided template or DEC-approved format.
- Provide recommendations for BEACH survey activities.
- Provide recommendations for water quality monitoring.
- Assist with water quality data assessment.
- Prepare data for submission to the EPA/AWQMS.

The Grantee 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.

DEC BEACH Project Manager Responsibilities

The roles and responsibilities of DEC Project Manager are to:

- Provide recommendations to Grantee for BEACH survey activities.
- Provide recommendations to Grantee for water quality monitoring.
- Assist with water quality data assessment.
- Work with the landowner to notify the public of an exceedance and data assessment.
- Report beach assessment and sampling data to the EPA.

Most important, DEC 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.

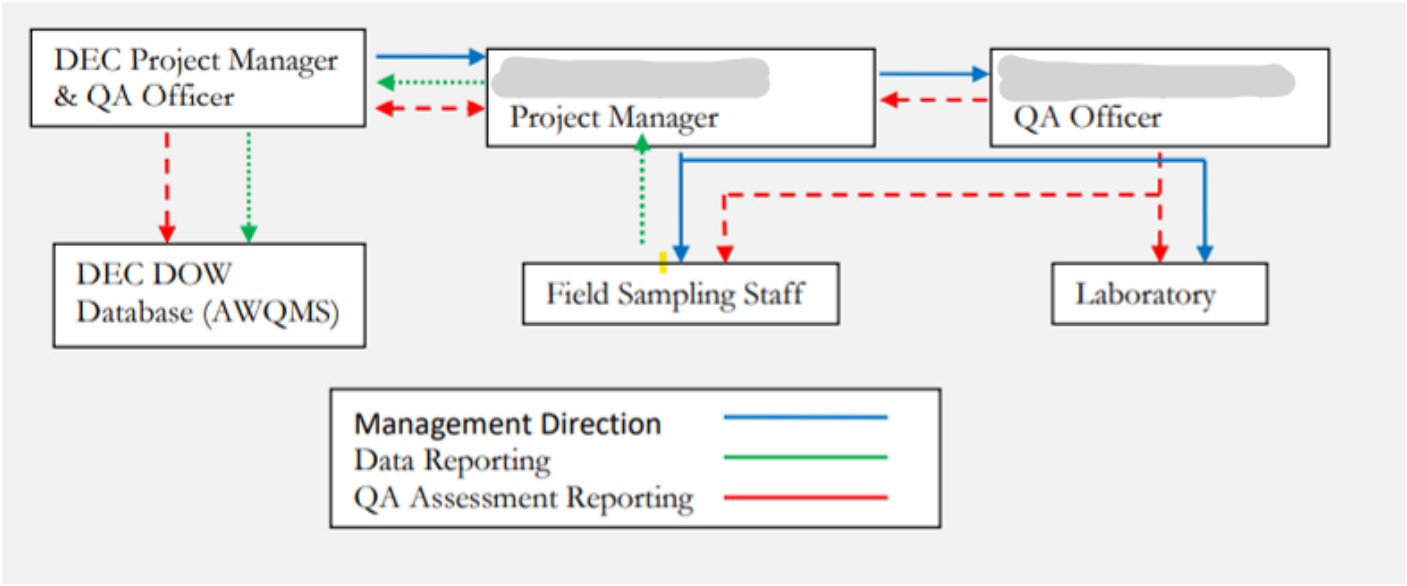


FIGURE 1. PROJECT ORGANIZATIONAL STRUCTURE

Water Quality Standards (WQS)

The BEACH program's objective is to monitor for fecal contamination. Bacteria can indicate the presence of fecal contamination, which itself may harbor disease-causing (pathogenic) microbes. The indicator bacteria most 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 ĕn'tə-rō-kŏk'sī') as indicators of fecal pollution in marine water. Enterococcus bacteria are found in the human intestine and warm-blooded animals. They are 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.

Alaska's single sample criteria is equal to the EPA's 2012 Recommended Recreational Water Quality Criteria's Statistical Threshold Value of 130 CFU/100 mL for enterococci [4,5] . The 130 CFU/100 ml value corresponds to the 90th percentile of the water quality distribution associated with the same level of public health protection (in this case, 36 per 1000 recreators'). This criterion is equivalent to Alaska's EPA approved water quality standards for marine pathogens, primary contact criteria (18 AAC 70, see Table 1).

Alaska's Water Quality Standards

The State of Alaska's water quality standard also uses enterococcus bacteria as indicators of fecal pollution in marine water for recreational use. Data was compared to the contact recreation standard of "In a 30-day period, the geometric mean of samples may not exceed 35 enterococci CFU/100 ml, and not more than 10% of the samples may exceed a STV of 130 enterococci CFU/100 ml" (18 AAC 70 (14)(B)(i)). The two criteria (i.e., the "geometric mean" and the "10% of samples") in this standard must both be met. If either criterion is exceeded, then the water at that location fails the standard. The Alaska standard is tabulated below (Table 1).

The most stringent of the criteria for fecal coliform bacteria protects harvesting for consumption of raw mollusks or other raw aquatic life (harvesting use). This harvesting use criteria states that "the geometric mean of samples may not exceed 14 fecal coliform/100 ml" (geometric mean criterion), and "not more than 10% of the samples may exceed 31 colony forming units (CFU) per 100 ml for a membrane filtration test" (10% of samples criterion) in 18 AAC 70 (14)(D). The two criteria (i.e., the "geometric mean" and the "10% of samples") in this standard must both be met. If either criterion is exceeded, then the water at that location fails the standard.

[4] U.S. EPA. 2014. National Beach Guidance and Required Performance Criteria for Grants, 2014 Edition. EPA-823-B-14-001. Environmental Protection Agency. Washington, D.C.

[5] U.S. EPA. 2012. Recreational Water Quality Criteria. 820-F-12-058. Office of Water. Environmental Protection Agency. Washington, D.C.

Haines BEACH Program

The program will monitor both types of bacteria against WQS set for Marine Water Recreation-contact recreation. DEC will report in-season exceedances when enterococci levels exceed 130 CFU/100 m for a single sample.

The program will also report when conditions exceed the WQS for the harvest for consumption of raw mollusks or other raw aquatic life (Table 1, section 14, part D). This information will be provided alongside monitoring results but will not necessitate a separate advisory.

TABLE 1. ALASKA MARINE WATER QUALITY INDICATOR STANDARDS[6]

Designated Use	Description of Criteria
(14) Bacteria, For Marine Water Uses (B) Water Recreation	
Contact Recreation	In a 30-day period, the geometric mean of samples may not exceed 35 enterococci CFU / 100 mL, and not more than 10% of the samples may exceed a statistical threshold value (STV) of 130 enterococci CFU / 100 ml.
Secondary Contact Recreation	In a 30-day period, the geometric mean of samples may not exceed 200 fecal coliform/100 mL, and not more than 10% of the samples may exceed 400 fecal coliform / 100 ml.
(D) Harvesting for Consumption of Raw Mollusks or Other Raw Aquatic Life	The geometric mean of samples may not exceed 14 fecal coliform / 100 mL; and not more than 10% of the samples may exceed. • 42 MPN per 100 ml for a five-tube decimal dilution test • 49 MPN per 100 ml for a three-tube decimal dilution test • 28 MPN per 100 ml for a twelve-tube single dilution test • 31 CFU per 100 ml for a membrane filtration test (see note 14 in 18 AAC 70.020 Water Quality Standards)

[6] Source: 18 AAC 70.020 Water Quality Standards, amended as of January 8, 2025

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 Grantee Lead Field Sampler should conduct surveys at each sampling event at all monitored beaches; detailed in Section 4.

Sanitary 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. 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 Sanitary survey is conducted by visiting a beach of concern to answer questions and fill in blanks on the BEACH Survey 123. 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, Grantee Lead Field Sampler should discuss their observations with DEC and Grantee Project Managers as soon as possible. The survey may include collecting a water quality sample if DEC and Grantee Project Managers decide that beach users may be exposed to fecal pollution.

Beach Survey Field Survey

The BEACH Survey 123 is a digital survey used for collecting field information as part of the BEACH survey process. It is designed to gather information that the Grantee Lead Field Sampler and the Grantee and DEC Project Managers can use to make comparisons of physical characteristics. It documents the physical conditions present during sampling events. These surveys will be created and managed in a manner that will facilitate easy data entry into the Ambient Water Quality Monitoring System (AWQMS). An example BEACH Survey 123 is in Section 4.

Beach Survey Schedule and Locations

The Grantee Lead Field Sampler should conduct BEACH surveys using the BEACH Survey 123 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 Grantee and DEC Project Managers 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 Grantee Lead Field Sampler may also conduct BEACH Survey 123 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 Grantee and DEC Project Managers to design future monitoring programs to protect human health during the recreation season. Additional sampling must be discussed and approved by the DEC Project Manager before water samples are collected.

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 Grantee and DEC Project Managers determine that the site does not accurately represent background conditions of beach water quality.

The Grantee Lead Field Sampler will determine the sampling location and schedule in coordination with the Grantee and DEC Project Managers. Once a sampling site has been determined, Project and Sampling Location ID numbers will be provided by DEC Project Manager to ensure that the site has an EPA assigned PRAWN code and consistent with the AWQMS template.

Samples must be sent to a laboratory that is approved by DEC for Fecal Coliform Bacteria (Method 9222D) and Enterococci by MPN (Method ASTMD-6503-99). A list of approved laboratories can be found on the DEC website (https://dec.alaska.gov/eh/lab/micro-lab-cert-status).

The sample collection should follow the tide/sampling schedule provided by the Grantee Project Manager, to target low tides or flight schedules, and be transported to DEC-approved laboratory within the 6-hour sample holding time. The Grantee Lead Field Sampler 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.

See the current site-specific Beach QAPP and sampling plan for information on sample frequency, locations, and any special instructions.

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 Grantee Lead Field Sampler 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 enterococcus results within 36 hours of sampling**).
- Name and contact information for delivery of results (Note: the results should be sent to the Grantee Lead Field Sampler and the Grantee and DEC Project Managers; and
- A relinquishment signature including printed name, date, and time.

In addition to completing the chain-of-custody form the Grantee Lead Field Sampler 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 or local laboratory.
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. Provide the BEACH Survey 123 to the Grantee and DEC Project Managers.

Laboratory Responsibilities

The Grantee Lead Field Sampler 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

Grantee Lead Field Sampler and the Grantee and DEC Project Managers. 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 Grantee Lead Field Sampler 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 Grantee Lead Field Sampler should check to make sure the sample was analyzed within the 8-hour holding time and that the temperature was within the allowed range when the samples were received at the laboratory. Secondary reviewers (Grantee Project Manager/DEC Project Manager/DEC Program Manager) are responsible for the review, verification and validation of field and laboratory data and data reformatting as appropriate for reporting to AWQMS.

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. DEC Project Manager will provide a sample data submission template to the Grantee Project Manager. DEC Beach Program Manager, DEC QA Officer and AWQMS data entry staff conduct final data reviews (tertiary review) and submit the validated data to AWQMS. See the flow chart in Figure 2 for detailed information on data management responsibilities.

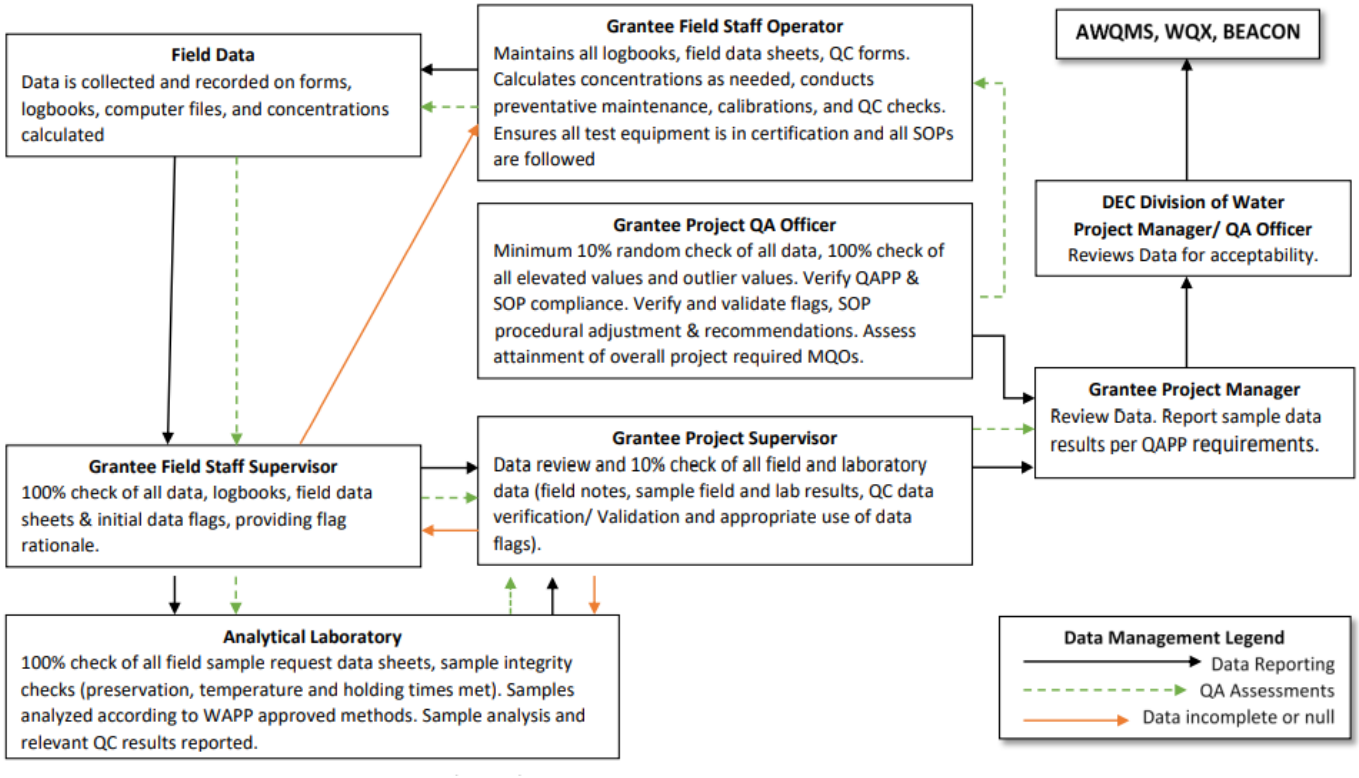


FIGURE 2. DATA MANAGEMENT FLOW CHART

Communicating with DEC

After collecting and shipping samples to the laboratory, the Grantee Lead Field Sampler will let the Grantee and DEC Project Managers know that the samples are on their way to the laboratory and send the completed BEACH Survey 123.

After reviewing the sampling results from the laboratory, the Grantee Lead Field Sampler will need to talk to the Grantee and DEC Project Managers to decide if public notification procedures should be initiated.

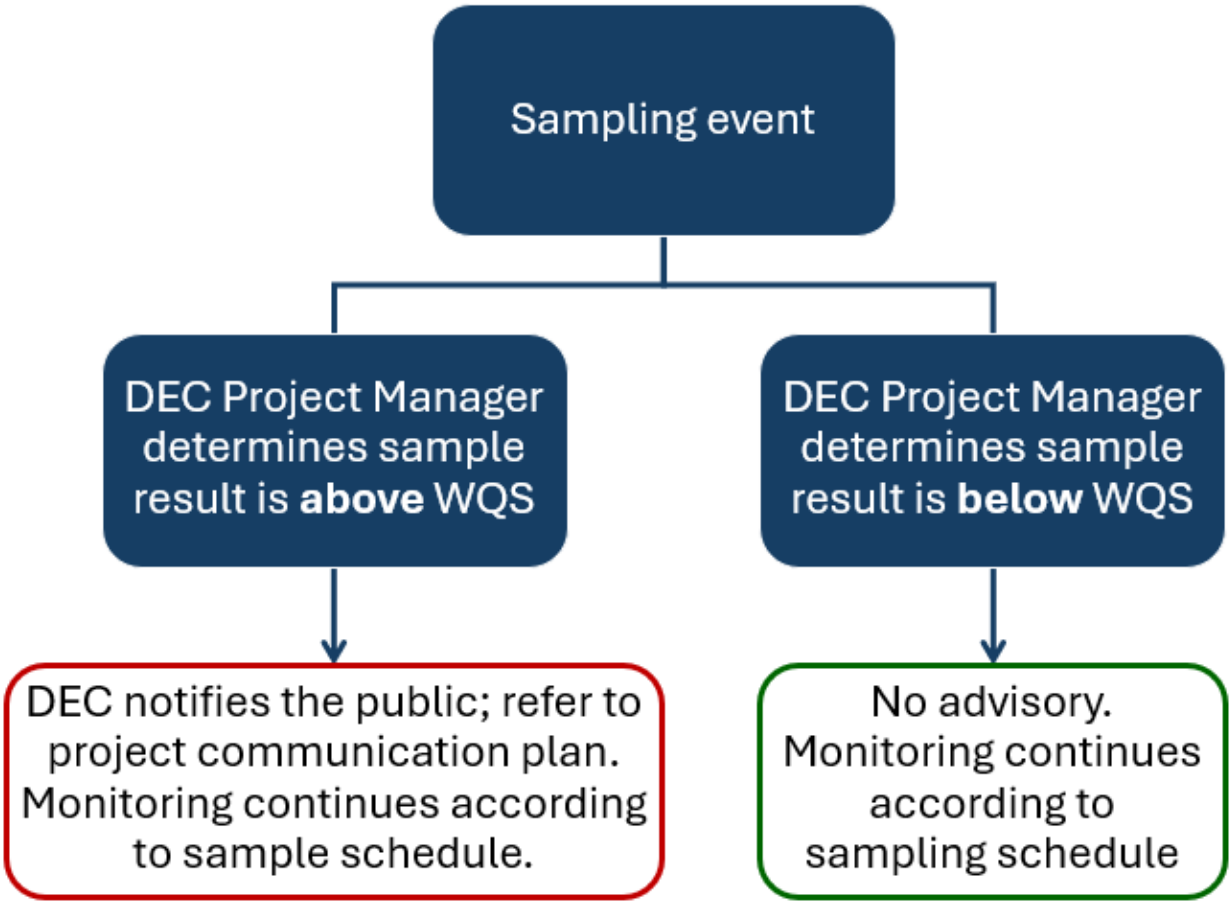


FIGURE 3. SAMPLE DECISION TREE

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. DEC will work with the respective landowner 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 DEC, landowner(s) and the Grantee on a case-by-case basis.

Beach Advisory

DEC will post monitoring results on our webpage (beaches.alaska.gov) after each sampling event. DEC will send a beach advisory when beach sampling results indicate potential fecal bacteria contamination above recreational water quality criteria. This advisory will be based on the bacterial counts and the information from the BEACH Survey 123. Posting may consist of press releases, social media post, listserv notices, and/or website updates; see the project communication plan for more information.

A beach advisory provides recommendations to the public to avoid contact with water that has exceeded the WQS referenced in Section 1 (Table 1) of this handbook. A beach advisory may be issued by DEC upon receipt of water quality sampling results that demonstrate a continued exceedance of water quality standards for bacteria. Proposed advisories require consultation with DEC Public Information Officer and DEC Program Manager.

DEC utilizes the Alaska BEACH Program Listserv and social media to distribute advisory notices to key stakeholders and the members of the public. Anyone can sign up to receive notifications by visiting the Alaska Beach Program webpage and clicking on the listserv link. All DEC social media posts must receive approval from DEC Public Information Officer before being posted online. DEC encourages sharing of DEC's post on Grantee social media groups.

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
- Number to contact beach manager for further information

Advisories should be issued in the form of press releases, signs at the affected beach, social media and/or fact sheets (informative flyers). 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 are developed and verified at the beginning of each season and reported in the Beach Communication Plan. Table 2 is a framework for organizing possible contacts.

TABLE 2. CONTACT LIST FOR PUBLIC NOTIFICATIONS

Community Entity	Contact	Phone Number	Email
Interim Borough Manager	Alekka Fullerton	907-766-6404	manager@haines.org
Local Tribal/NGO Entity	Derrek Poinsette	907-766-3542	derek@takshanuk.org
Emergency Services	Brian Clay	907-766-6443	bclay@haines.ak.us
Public Health Office	Stephanie Pattison	907-766-6300	stephaniep@searhc.org
Radio Station	Avery Ellfeldt	907 766-2020	news@khns.org

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

Beach Signs

If sampling events continue to show exceedances of water quality standards, signs should be posted at major beach access points to alert beach users of their risk of illness from water contact recreation. 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 sampling determines that water quality standards are being met. An example of a Beach advisory sign is 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 flyers, posters, and fact sheets that can be used to inform the public. These can be found on DEC beaches.alaska.gov under the respective sub-page for each beach.

Social Media and Press Release

A social media post or press release is likely the fastest way to spread the news about water quality at recreational use beaches in Alaskan communities. DEC and landowner will act as the lead agents in providing public information. DEC staff will work with DEC Public Information officer on all social media posts and press releases.

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 Grantee Lead Field Sampler 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 123 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 123 and chain-of-custody form is sent to the Grantee and DEC Project Managers.

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 (enterococci and fecal coliform bacteria).
   - Artificial ice to keep the cooler chilled to the appropriate temperature (<10°C).
   - 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.
   - 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. **If shipping the samples, 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. Include the beach sampling location on the bottle label and Beach Survey Field 123.

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 (if any) 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 water scum or debris. 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.

10. Place the bottle into a clean zip-lock bag.

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 location (e.g., beach name, KB-HerringCove)
    - Sampling date and time
    - Laboratory method for analysis
    - Name of sampler

Collect one replicate for each analyte per sampling event. To collect a replicate sample, you must first request extra bottles from the laboratory. Repeat Steps 2 through 9 at the same location and at the same time as the regular sample.

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.

Additional Environmental Parameters

Environmental parameters will be collected with Grantee or DEC provided equipment. A handheld probe (HANNA Instruments combo tester HI98129, YSI meter, Hach turbidimeter or similar) will be used to collect air and water temperature, and other in situ parameters (such as turbidity, pH, DO). Calibrate the handheld probe before heading to the field (see calibration instructions in the appendices). Always make sure devices are fully charged and/or bring additional batteries.

13. Handheld Probe

    - If water sample collection increased suspended sediment, wait until water settles or move 1-2 steps to the side to take measurements. Stand downstream of the location where you will take the measurements.
    - Turn on device. Submerge measurement probe end of the handheld probe in water (do not submerge entire device), and swirl gently to remove air bubbles.
    - Hold probe until reading has stabilized (indicated by a stability tag on the HANNA model).
    - Record measurement value, type, and time of collection on Beach Survey 123.
    - Repeat process for remaining parameters. HANNA device measurements include pH, total dissolved solids, and air/water temperature; YSI and Hach turbidimeter includes turbidity.

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. Rinse probe with deionized water before storing. Place probes in appropriate storage solution in between uses.

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.**

2. Place enough packing material inside the cooler to protect the sample bottles from breaking during transport to the laboratory. Wrapping clean paper towels around the bottle and placing them in a separate clean zip-lock bag works well.

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: Grantee Lead Field Sampler, Grantee Project Manager, and DEC Project Manager.

4. If the cooler is out of your immediate control (such as on an airplane or courier), 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.

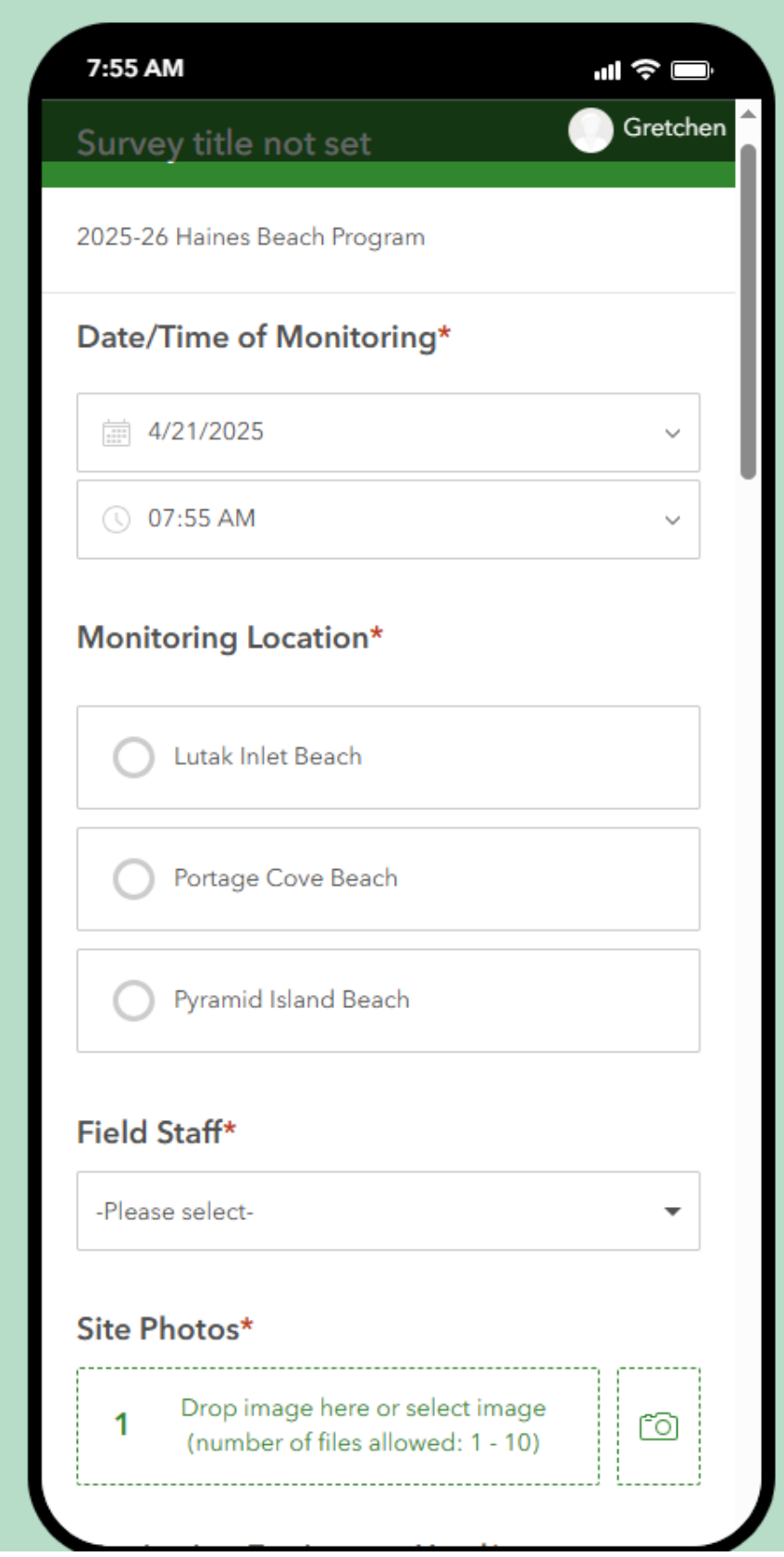
5. Securely tape the cooler shut prior to shipment. Attach shipping labels that identify the shipping destination and say: "keep cool," "do not freeze," and "fragile."

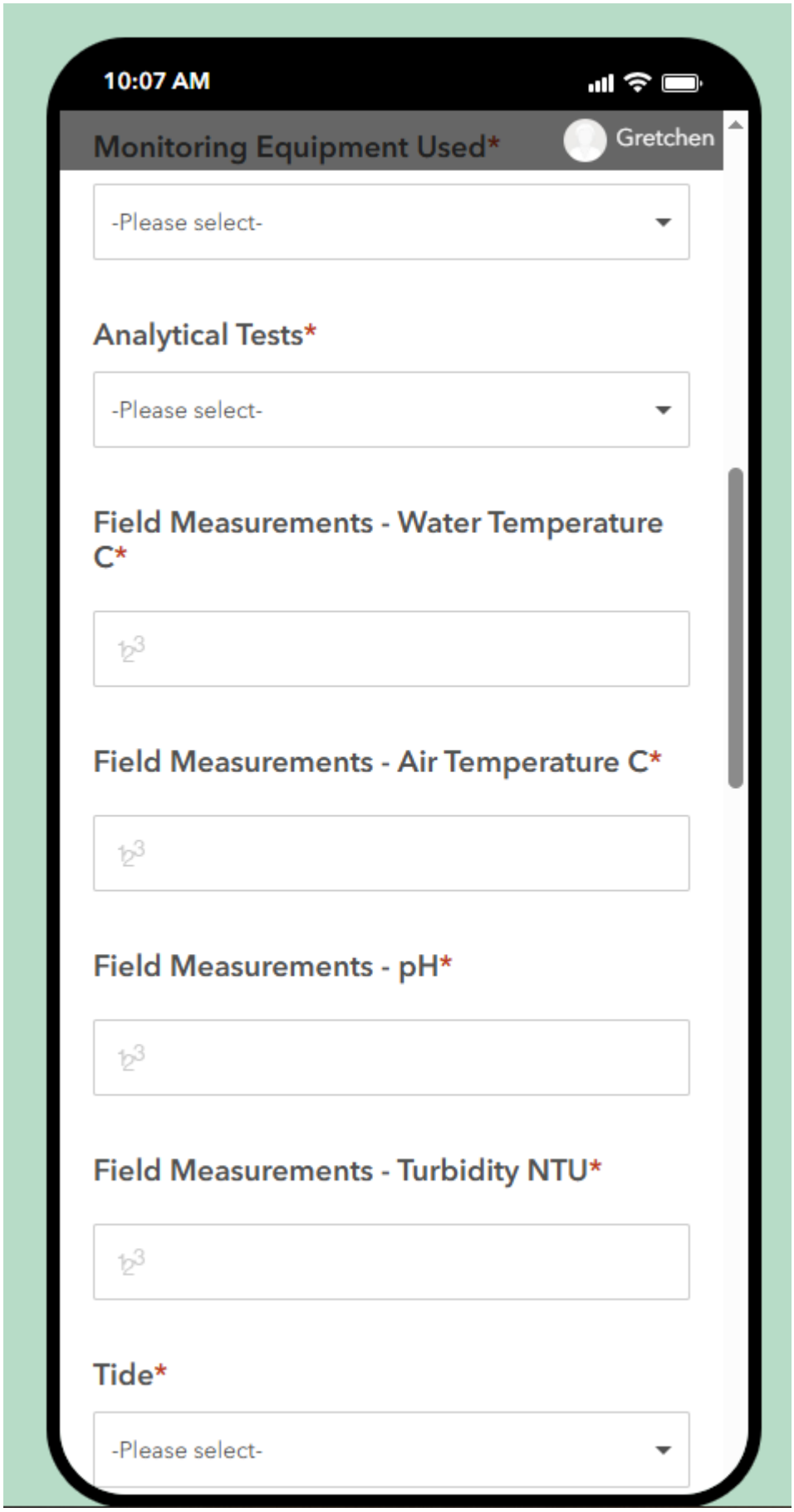
6. Ship/drop off the samples to DEC-certified laboratory.

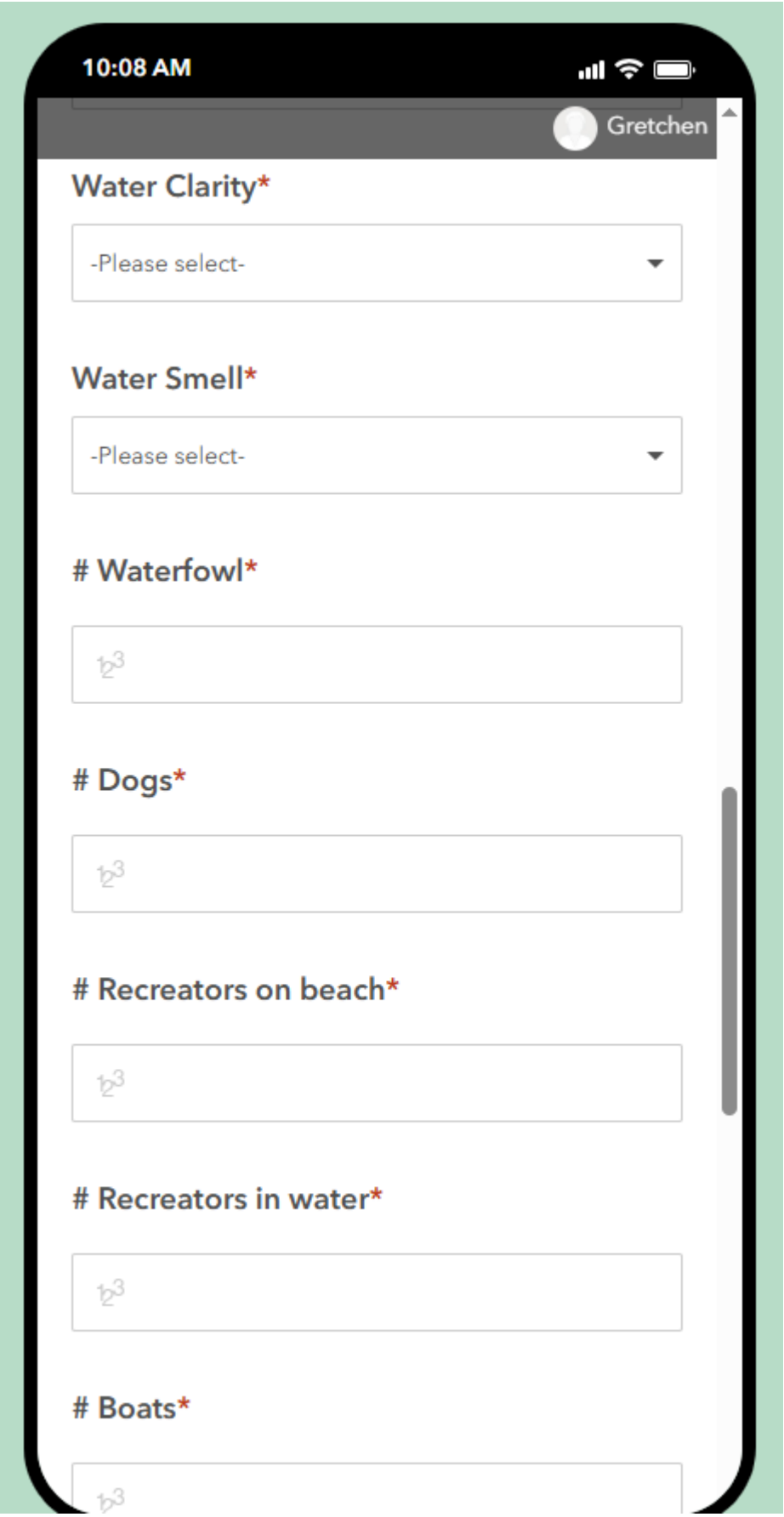
7. **Remember that samples must be collected, shipped, and received by the laboratory in 6 hours. Consult flight schedules and call the laboratory prior to sampling to make sure there will be a flight that can get the samples to the laboratory within 6 hours of sampling, and that there will be someone at the laboratory to receive the samples and begin the analyses**.

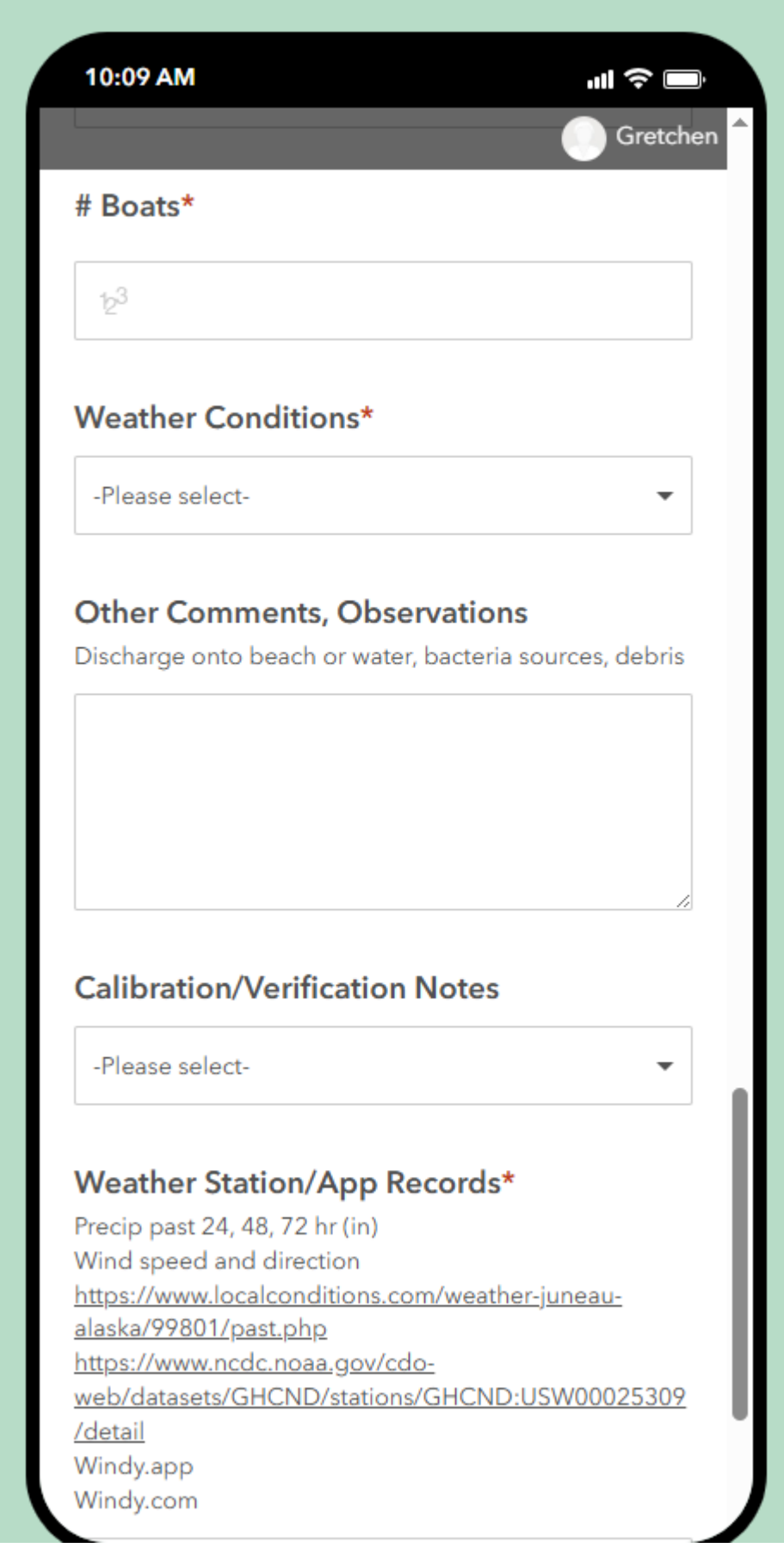
Example Forms

Example Site-Specific Beach Survey 123




10:07 AM
Monitoring Equipment Used*
Gretchen
-Please select-
Analytical Tests*
-Please select-
Field Measurements - Water Temperature C*
Field Measurements - Air Temperature C*
Field Measurements - pH*
Field Measurements - Turbidity NTU*
Tide*
-Please select-


10:08 AM
Gretchen
Water Clarity*
-Please select-
Water Smell*
-Please select-
Waterfowl*
Dogs*
Recreators on beach*
Recreators in water*
Boats*


10:09 AM
Gretchen
Boats*
123
Weather Conditions*
-Please select-
Other Comments, Observations
Discharge onto beach or water, bacteria sources, debris
Calibration/Verification Notes
-Please select-
Weather Station/App Records*
Precip past 24, 48, 72 hr (in)
Wind speed and direction
https://www.localconditions.com/weather-juneau-alaska/99801/past.php
https://www.ncdc.noaa.gov/cdo-web/datasets/GHCND/stations/GHCND:USW00025309/detail
Windy.app
Windy.com

Example Beach Advisory Sign

CAUTION

for (insert location) only

ELEVATED BACTERIA LEVELS DETECTED AT THIS LOCATION

Swallowing contaminated water may cause nausea, vomiting, diarrhea, and fever. Contact may lead to earache or skin rashes. Wash after contact with water and avoid swimming or swallowing it.

Fish should be rinsed in clean water and cooked to a minimum internal temperature of 145 degrees Fahrenheit before eating.

Water quality will continue to be monitored

For more information on water quality sample results, visit http://beaches.alaska.gov, or contact the Department of Environmental Conservation.

Gretchen Augat
907-465-5023 or gretchen.augat@alaska.gov

Alaska BEACH webpage

Example DEC Press Release

Division of Water

2024 ALASKA RECREATIONAL BEACH MONITORING BEGINS

Alaska Beach Program

2024 ALASKA RECREATIONAL BEACH MONITORING BEGINS

FOR IMMEDIATE RELEASE — May 29, 2024

CONTACT: Laura Eldred, Division of Water, 907-376-1855

JUNEAU, AK — The Alaska Department of Environmental Conservation (DEC) has started bacteria monitoring at selected Alaska beaches for the summer season. Water quality samples will be collected in coastal waters at recreational beaches in Kodiak and Skagway. This will be the second summer of monitoring beaches in these communities.

The Beach Program is a statewide coastal program which monitors bacteria levels in marine water samples from May to September. The program evaluates potential health risks as indicated by fecal coliform and enterococci bacteria and notifies the public when levels exceed state standards. The Skagway Traditional Council and the Kodiak Area Native Association each have a grant through the Alaska Clean Water Actions grant program, managed by DEC, for conducting the water sampling and assisting with community notifications.

Visit beaches.alaska.gov for:

- up-to-date information on beach monitoring, which beaches have elevated bacteria levels, and sample collection dates
- advisories for beaches where test results show bacteria levels exceed guidelines
- interactive maps showing beach monitoring locations
- a link where you can sign up to receive emailed beach updates
- historical beach testing data and reports

If public health advisories are issued for beaches where test results show bacteria levels exceed guidelines, they will be posted on DEC's Facebook and Twitter pages.

There are many ways we can all help keep Alaska's beaches clean and Alaskans healthy. Check out the DEC beach website for what you can do to help.

As a reminder, protect yourself by washing or sanitizing your hands after contacting water and cooking your catch to an internal temperature of 145 °F to destroy any bacteria.

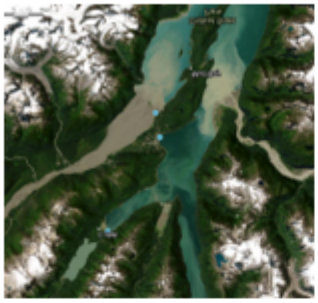
The DEC BEACH Program is part of a nationwide effort to decrease the incidence of water-borne illnesses at public beaches under the federal Beaches Environmental Assessment and Coastal Health (BEACH) Act. This project has been funded in part by the United States EPA.

Learn more at: https://dec.alaska.gov/water/water-quality/beach-program/, or scan:

Example Listserv Email

Good afternoon.

X Advisories in affect for 3 Haines beaches – bacteria levels above state standards
(or No advisories in affect for 3 Haines beaches – bacteria levels below state standards



The Haines Beach Program has begun weekly monitoring for the 2025 recreational season. The Takshanuk Watershed Council will conduct 18 sampling events at three (3) Haines Area beaches this summer - Lutak Inlet, Portage Cove, and Pyramid Island.

The (#) set of beach water samples were collected on (DATE). All three of the beaches monitored were below recreational criteria (130 MPN/100ml enterococci).

The next Haines Beach Sampling event is planned for (DATE). Sample results are expected to be available on (DATE).

Visit beaches.alaska.gov for:

- Up-to-date information on beach monitoring, results, and sample collection dates
- Advisories for beaches if needed
- Interactive maps of beach monitoring locations
- A link where you can sign up to receive emailed beach updates
- Historic beach bacteria data and reports

Information is posted on DEC's Facebook and Twitter pages when an advisory is issued.

How can you help? What can you do?
Members of the public can help lessen beach bacteria by reducing attractants to birds, properly disposing of trash and fish waste, and picking up after pets. Also, please follow safe food handling recommendations and cook seafood to a minimum internal temperature of 145 degrees Fahrenheit to destroy any bacteria. Note that freezing alone does not kill pathogens.
Together we can keep the Alaska's beaches clean.

The Alaska Beach Program is a statewide program which tests bacteria levels in marine water samples during the summer recreation season. The program evaluates potential health risks as indicated by fecal coliform and enterococci bacteria and notifies the public when levels exceed state standards. This program is part of a nationwide effort to decrease the incidence of water-borne illnesses at public beaches under the federal Beaches Environmental Assessment and Coastal Health (BEACH) Act. This project has been funded in part by the United States EPA.

Click here to unsubscribe from this listserv

For questions/concerns about the Haines Beach Program please contact:
Gretchen Augat gretchen.augat@alaska.gov (907) 465-5023

Calibration Information

HANNA Instruments Combo pH/EC/TDS Tester

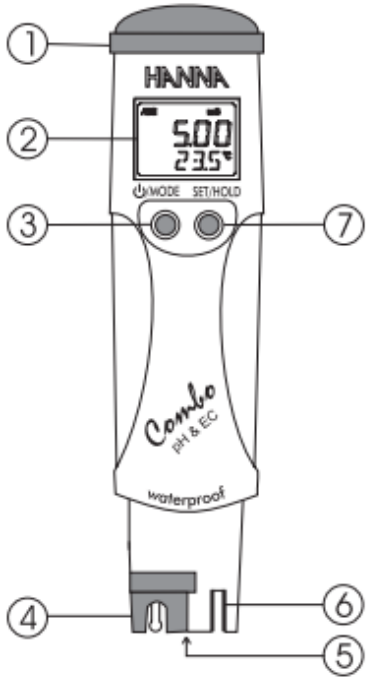
DEC will provide HANNA handheld probes. Each probe comes with its own calibration and storage solution.

Each device must be calibrated before each monitoring, or more frequently if values are outside normal range.

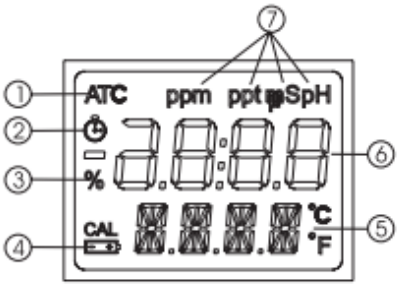
The instruction manual is available online: https://cdn2.hubspot.net/hubfs/2134380/product-manuals/manhi_98129_98130.pdf. Please carefully read through the device manual before operating. It is the responsibility of the person monitoring to make sure device has been calibrated and operating properly.

Use deionized water to clean devices between monitoring events. Use provided storage solution between monitoring events. Do not touch the pH probe membrane.

FUNCTIONAL DESCRIPTION



1. Battery compartment
2. Liquid Crystal Display (LCD)
3. ON/OFF/MODE button
4. **HI 73127** pH electrode
5. Temperature sensor (behind)
6. EC/TDS probe
7. SET/HOLD button



1. Automatic temperature compensation indicator
2. Stability indicator
3. Battery life percentage indicator
4. Low battery indicator
5. Secondary display
6. Primary display
7. Measuring units for primary display

SPECIFICATIONS

Range	0.0 to 60.0°C / 32.0 to 140.0°F 0.00 to 14.00 pH 0 to 3999 µS/cm (**HI 98129**) 0.00 to 20.00 mS/cm (**HI 98130**) 0 to 2000 ppm (**HI 98129**) 0.00 to 10.00 ppt (**HI 98130**)
Resolution	0.1°C / 0.1°F 0.01 pH 1 µS/cm ; 1 ppm (**HI 98129**) 0.01 mS/cm ; 0.01 ppt (**HI 98130**)
Accuracy (@20°C/68°F)	±0.5°C / ±1°F ±0.05 pH ±2% f.s. (EC/TDS)
Typical EMC Deviation	±0.5°C / ±1°F ±0.02 pH ±2% f.s. (EC/TDS)
Temperature Compensation	automatic, with β=0.0 to 2.4%/°C (EC/TDS)
Environment	0 to 50°C (32 to 122°F); RH 100%
TDS Factor	0.45 to 1.00 (CONV)
Calibration	automatic, 1 or 2 point with 2 sets of memorized buffers (pH 4.01/7.01/10.01 or 4.01/6.86/9.18) for pH; automatic, at 1 point for EC/TDS
EC/TDS Cal.solutions	
HI 98129:	**HI7031** (1413 µS/cm) **HI7032** (1382 ppm; CONV=0.5) **HI70442** (1500 ppm; CONV=0.7)
HI 98130:	**HI7030** (12.88 mS/cm) **HI70038** (6.44 ppt; CONV=0.5 or 9.02 ppt; CONV=0.7)
Electrode (included)	**HI 73127** pH electrode
Battery Type/Life	4 x 1.5V with BEPS/approx. 100 hours
Auto-off	after 8 minutes of non-use
Dimensions	163 x 40 x 26 mm (6.4 x 1.6 x 1.0")
Weight	100 g (3.5 oz.)

Recommendations for Users

Before using this product, make sure that it is entirely suitable for the environment in which it is used. Operation of this instrument in residential areas could cause unacceptable interferences to radio and TV equipment.

The glass bulb at the end of the electrode is sensitive to electrostatic discharges. Avoid touching this glass bulb at all times.

Any variation introduced by the user to the supplied equipment may degrade the instrument's EMC performance. To avoid electrical shock, do not use this instrument when voltages at the measurement surface exceed 24 Vac or 60 Vdc. To avoid damages or burns, do not perform any measurement in microwave ovens.

IST98129R4 07/05

OPERATIONAL GUIDE

To turn the meter on and to check battery status

Press and hold the ⏻/MODE button for 2-3 seconds. All the used segments on the LCD will be visible for a few seconds, followed by a percent indication of the remaining battery life (Eg. % 100 BATT).

To change the temperature unit

To change the temperature unit (from °C to °F), from measurement mode, press and hold the ⏻/MODE button until TEMP and the current temperature unit are displayed on the lower LCD (E.g. TEMP °C).
Use the SET/HOLD button to change the temperature unit, and then press the ⏻/MODE button twice to return to normal measuring mode.

To freeze the display

Press the SET/HOLD button for 2-3 seconds until HOLD appears on the secondary display.
Press either button to return to normal mode.

To turn the meter off

Press the ⏻/MODE button while in normal measurement mode. OFF will appear on the lower part of the display. Release the button.

Notes:

- Before taking any measurement make sure the meter has been calibrated.
- To clear a previous calibration, press the ⏻/MODE button after entering the calibration mode. The lower LCD will display ESC for 1 second and the meter will return to normal measurement mode. The CAL symbol on the LCD will disappear. The meter will be reset to the default calibration.
- If measurements are taken in different samples successively, rinse the probe thoroughly to eliminate cross-contamination; and after cleaning, rinse the probe with some of the sample to be measured.

pH MEASUREMENTS & CALIBRATION

Taking measurements

Select the pH mode with the SET/HOLD button.
Submerge the electrode in the solution to be tested.
The measurements should be taken when the stability symbol ▯ on the top left of the LCD disappears.

The pH value automatically compensated for temperature is shown on the primary LCD while the secondary LCD shows the temperature of the sample.

Calibration buffer set

- From measurement mode, press and hold ⏻/MODE until TEMP and the current temperature unit are displayed on the lower LCD (E.g. TEMP °C).
- Press the ⏻/MODE button again to show the current buffer set: pH 7.01 BUFF (for pH 4.01/7.01/10.01) or pH 6.86 BUFF (for NIST set, pH 4.01/6.86/9.18).
- Press the SET/HOLD button to change the buffer value.
- Press the ⏻/MODE button to return to the normal measuring mode.

Calibration procedure

From measurement mode, press and hold the ⏻/MODE button until CAL is displayed on the lower LCD. Release the button. The LCD will display pH 7.01 USE or pH 6.86 USE (if you have selected the NIST buffer set). The CAL tag blinks on the LCD.

For a **single-point pH calibration**, place the electrode in any buffer from the selected buffer set (eg. pH 7.01 or pH 4.01 or pH 10.01). The meter will recognize the buffer value automatically.
If using pH 4.01 or pH 10.01, the meter will display OK for 1 second and then return to the normal measuring mode.
If using pH 7.01, after recognition of the buffer the meter will ask for pH 4.01 as second calibration point. Press the ⏻/MODE button to return to measurement mode or, if desired, proceed with the 2-point calibration as explained below.

Note: It is always recommended to carry out a two-point calibration for better accuracy.

For a **two-point pH calibration**, place the electrode in pH 7.01 (or 6.86 if you have selected the NIST buffer set). The meter will recognize the buffer value and then display pH 4.01 USE.
Rinse the electrode thoroughly to eliminate cross-contamination.
Place the electrode in the second buffer value (pH 4.01 or 10.01, or, if using NIST, pH 4.01 or 9.18). When the second buffer is recognized, the LCD will display OK for 1 second and the meter will return to the normal measuring mode.

The CAL symbol on the LCD means that the meter is calibrated.

EC/TDS MEASUREMENTS & CALIBRATION

Taking measurements

Select either EC or TDS mode with the SET/HOLD button.
Submerge the probe in the solution to be tested. Use plastic beakers to minimize any electromagnetic interferences.
The measurements should be taken when the stability symbol ▯ on the top left of the LCD disappears.

The EC (or TDS) value automatically compensated for temperature is shown on the primary LCD while the secondary LCD shows the temperature of the sample.

To change the EC/TDS conversion factor (CONV) and the temperature compensation coefficient β (BETA)

- From measurement mode, press and hold the ⏻/MODE button until TEMP and the current temperature unit are displayed on the lower LCD. Eg. TEMP °C.
- Press the ⏻/MODE button again to show the current conversion factor. Eg. 0.50 CONV.
- Press the SET/HOLD button to change the conversion factor.
- Press the ⏻/MODE button to show the current temperature compensation coefficient β. Eg. 2.1 BETA.
- Press the SET/HOLD button to change the temperature compensation coefficient β.
- Press the ⏻/MODE button to return to the normal measuring mode.

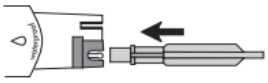
Calibration procedure

- From measurement mode, press and hold the ⏻/MODE button until CAL is displayed on the lower LCD.
- Release the button and immerse the probe in the proper calibration solution: **HI7031** (1413 µS/cm) for **HI98129** and **HI7030** (12.88 mS/cm) for **HI98130**.
- Once the calibration has been automatically performed, the LCD will display OK for 1 second and the meter will return to normal measurement mode.
- Since there is a known relathionship between EC and TDS readings, it is not necessary to calibrate the meter in TDS

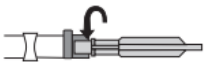
The CAL symbol on the LCD means that the meter is calibrated.

pH ELECTRODE MAINTENANCE

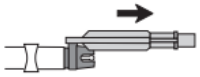
- When not in use, rinse the electrode with water to minimize contamination and store it with a few drops of storage (**HI 70300**) solution in the protective cap after use. DO NOT USE DISTILLED OR DEIONIZED WATER FOR STORAGE PURPOSES.
- If the electrode has been left dry, soak in storage solution for at least one hour to reactivate it.
- To prolong the life of the pH electrode, it is recommended to clean it monthly by immersing it in the **HI 7061** cleaning solution for half an hour. Afterwards, rinse it thoroughly with tap water and recalibrate the meter.
- The pH electrode can be easily replaced by using the supplied tool (**HI 73128**). Insert the tool into the electrode cavity as shown below.



- Rotate the electrode counterclockwise.



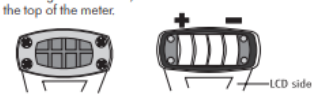
- Pull the electrode out by using the other side of the tool.



- Insert a new pH electrode following the above instructions in reverse order.

BATTERY REPLACEMENT

The meter displays the remaining battery percentage every time it is switched on. When the battery level is below 5%, the ▭ symbol on the bottom left of the LCD lights up to indicate a low battery condition. The batteries should be replaced soon. If the battery level is low enough to cause erroneous readings, the meter shows "0%" and the Battery Error Prevention System (BEPS) will automatically turn the meter off.
To change the batteries, remove the 4 screws located on the top of the meter.



Once the top has been removed, carefully replace the 4 batteries located in the compartment while paying attention to their polarity.
Replace the top, making sure that the gasket is properly seated in place, and tighten the screws to ensure a watertight seal.

ACCESSORIES

HI 73127	Replaceable pH electrode
HI 73128	Electrode removal tool
HI 70004P	pH 4.01 solution, 20 mL sachet (25 pcs)
HI 70006P	pH 6.86 solution, 20 mL sachet (25 pcs)
HI 70007P	pH 7.01 solution, 20 mL sachet (25 pcs)
HI 70009P	pH 9.18 solution, 20 mL sachet (25 pcs)
HI 70010P	pH 10.01 solution, 20 mL sachet (25 pcs)
HI 77400P	pH 4 & 7 solutions, 20 mL sachet (5 each)
HI 7004M	pH 4.01 solution, 230 mL bottle
HI 7006M	pH 6.86 solution, 230 mL bottle
HI 7007M	pH 7.01 solution, 230 mL bottle
HI 7009M	pH 9.18 solution, 230 mL bottle
HI 7010M	pH 10.01 solution, 230 mL bottle
HI 70030P	12.88 mS/cm solution, 20 mL (25 pcs)
HI 70031P	1413 µS/cm solution, 20 mL (25 pcs)
HI 70032P	1382 ppm solution, 20 mL (25 pcs)
HI 70038P	6.44 ppt solution, 20 mL (25 pcs)
HI 70442P	1500 ppm solution, 20 mL (25 pcs)
HI 7061M	Electrode cleaning solution, 230 mL bottle
HI 70300M	Electrode storage solution, 230 mL bottle

Hach Turbidimeter Protocol

Turbidity Sampling Directions

EPA 180.1

Hach 2100P or 2100Q

Materials needed

- Turbidimeter (EPA 180.1 compliant)
- Calibration standards
- Glass sampling vials (bottles)
- Tissue or cloth (to wipe vials dry)
- Batteries
- 1 Liter collection container (optional)
- Cooler with ice (for sample storage if not analyzing immediately)

Before sampling

1. Check turbidity meter using a known calibration standard (10 NTU).
    a. Choose one of the standards and rub the vial container with a clean cloth so that there aren't any smudges on the glass.
    b. Write down the known value or number of the standard, expiration date and lot # (should be on the outside of the vial) on the field sheet.
    c. Insert the standard into the turbidimeter and close the lid on the top of the turbidimeter.
    d. Press "on"
    e. Press "read"
    f. Write down the measured value for "pre" on field sheet.
2. If the measured value is more than 10% different than the known standard value, the turbidimeter will need to be re-calibrated (see calibration directions for the turbidimeter).
3. Samplers are encouraged to take photos of the site and write down a description of the site in their field notes (weather, is the water high/low, any other changes).

Site Visit

1. Rinse empty glass vial(s) with sample (site) water three times. To prevent disturbance, empty the vials immediately down current of the sample site. Samplers are encouraged to take an extra (duplicate) to confirm their first reading.
2. Fill the glass vial(s) completely with sample water at the site. To collect the sample, invert the bottle and fill from 6-12 inches below the water surface. Screw lids on tightly.
3. Dry vial(s) with a clean cloth so that there are no bubbles or smudges on the glass.
4. Insert one vial into the turbidimeter and close the lid.
    a. Press "on"
    b. Press "read"
    c. When turbidity value stabilizes (stops changing values, record result on field sheet as "measured value" for stream sample 1.
5. If taking a duplicate sample, repeat #4 with the second vial for stream sample 2.

6. Empty the water from the vial(s) back into the stream and put the vials back into the case.

Post Visit

1. Check the turbidity meter calibration again with a known standard (10 NTU). Follow the same directions as the Before Sampling but record the known standard value as "post" on the field sheet.

YSI Meter Protocol

YSI Meter Protocol:

Specific Conductivity, pH, & Dissolved Oxygen

Part I: Accuracy Checks and Calibration:

- **Conductivity** needs to be checked prior to sampling and should be within 5% of the standard solution.
- **pH** should be checked before and after sampling (2 x day) and should be within 0.2 units of standard 7.0 and 10.0 solutions.
- **Dissolved oxygen** should be calibrated onsite at each sampling location (a change in elevation of just 100 to 200 ft can change the barometric (atmospheric) pressure).

Conductivity Accuracy Check:

1. Should be done prior to sampling. If the cable is not already attached, attach it to the bottom of the handheld meter, DO NOT force it on. Line up the notches and gently push together, and then twist the outer ring until it clicks into place.
2. Rinse sensors and storage cup with distilled or deionized water 3 times.
3. Rinse sensors and storage cup with a small amount of the conductivity standard provided (can rinse directly or put a small amount in the storage cup, screw it on and shake gently).
4. Fill the storage cup with enough conductivity standard solution to cover the hole in the side of the conductivity probe and tap out any air bubbles. Screw the storage cap on.
5. Press the green "Power" button, and on the "Run" Menu Gently swirl the probe to circulate solution, check the microsiemens (µs/cm) reading for conductivity. Calculate the relative % difference between the reading and the value written on the conductivity standard bottle (*ie* 1404 µs/cm) by using this equation:
   Rel. % diff = ((Standard value – reading) / standard value) x 100
6. Record the reading, standard value, and relative % difference in the logbook (instructions on how to record information are on the front cover), and if it is equal or less than 5%, conductivity is good to go so move on to the **pH Accuracy Check**! If it's higher than 5% you'll need to do a **Conductivity Calibration**.
7. If meter checks out well for accuracy, empty standard solution, rinse 3X.

Conductivity Calibration:

1. From the "Run" menu, press the "ESC" or escape button to go to the "Main Menu", and using the arrow buttons scroll down to "Calibrate." Press "enter" (the arrow button), then choose "conductivity" and then "specific conductance."
2. Enter the value of the conductivity standard (written on the bottle) onto the screen in milliSiemans (mS/cm) NOT microSiemans (µS/cm). For example, 1404 µS/cm = 1.404 mS/cm (decimal point is moved 3 numbers left). Press "enter" (arrow button).
3. Continue gently swirling and wait until the sensor reading has stabilized and press "enter" to calibrate. Press "enter" again to continue.
4. Record the new conductivity reading of the calibrated meter into the logbook under the calibration column.
5. To exit, push "ESC" until you reach the "Run" screen with parameter values on it.
6. Empty standard solution.

pH Accuracy Check: should be checked before and after sampling (2 x day). pH readings should be within 0.2 units of the temperature adjusted standard solutions for pH 7 (yellow) and 10 (blue).

1. Rinse sensors and storage cup with distilled or deionized water 3 times
2. Rinse sensors and storage cup with a small amount of the yellow pH 7 standard.
3. Fill the storage cup with enough of the yellow pH 7 standard to cover the glass pH bulb and the metal thermometer. Tap out any air bubbles.
4. Turn the meter on (green power button) and on the "Run" menu, while gently swirling the probe to circulate solution. Record the temperature of your pH solution. Check the original pH bottle to find the temperature adjusted pH for the temperature you have recorded. Check the pH reading for accuracy. Record the reading and the temperature adjusted standard value in the logbook. Also record the pH millivolts reading in the logbook.
5. If pH reads more than 0.2 units from the temperature adjusted standard value, move on to **Calibrate pH**. If it's reading within 0.2 units above or below the temperature adjusted value, check to see that pH 10 is also accurate.
6. If the meter checks out well for accuracy on pH 7, empty the standard solution.
7. Repeat steps 1 through 6 using the blue pH 10 standard solution instead of the yellow pH 7.0 solution. If the pH 10 readings are also within 0.2 units of the temperature adjusted value for pH 10, you're good to go and move on to **Oxygen Calibration,** completed at your sampling site. If the pH readings are more than 0.2 units away from the temperature adjusted value you'll need to **Calibrate pH** (you must calibrate both pH 7 and pH 10, even if only one is outside of the accepted range).

Calibrate pH:

1. Make sure the storage cup has enough yellow pH 7 standard solution in it to cover the glass pH bulb and tap out any air bubbles.
2. Press "ESC" to go to the "Main Menu" and scroll down to "Calibrate." Press "enter" (the arrow button), then "pH" and then "Three-point calibration".
3. Enter the temperature adjusted value for pH 7 and press "enter." Wait until the pH reading stabilizes (it's neither increasing nor decreasing but just oscillating between a couple of numbers) record that number if you have not already recorded your reading and press "enter" again to calibrate. If the meter says the pH is "Out of Range" DO NOT accept anyway.
4. Record the calibrated pH reading and, if you haven't already, record the pH mv (millivolts) reading.
5. Empty the pH 7 standard into the field container. Rinse sensors and storage cup with distilled water (3X) and refill with blue pH 10 standard solution.
6. Wait for the temperature and pH to stabilize (it's neither increasing nor decreasing but just oscillating between a couple numbers) and record the temperature, and the temperature adjusted standard for pH 10 and press "enter."
7. Enter the temperature adjusted standard for pH 10 for the 2nd pH, press "enter" and wait until the pH value stabilizes. Record the pH reading if you have not already recorded your initial reading. Press "enter" again to calibrate.
8. Record the calibrated pH in the logbook. Also, record the pH mv (millivolt) reading in the logbook. Millivolts are the raw electrical readings from the pH sensor. If the difference between the pH mv for pH 7 and pH 10 drifts below 155 mv, the sensor needs to be changed, and you should contact CRK staff.
9. Press "enter" (arrow button) to continue and keep pressing "ESC" until you reach the main "Run" screen with all the parameters on it.
10. Empty the pH 10 solution back into the field container, rinse 3 times and move onto **Oxygen Calibration.**

Oxygen Calibration: needs to be calibrated onsite as an increase in elevation by just 100 to 200 ft can change the barometric (atmospheric) pressure.

1. Rinse the sensor and storage cup with distilled or deionized water, 3X, then add 1 cm of distilled or deionized water to the bottom of the storage cup (water shouldn't touch probes!)
2. Rest the sensors lightly in the storage cup with a crack open to allow air exchange (**DO NOT** screw on!). The hole in the YSI bag (look at picture for reference) is great for this, don't bump!
3. If the meter is not already on, press the green "power" button. Let the probes sit in the storage cup for **10 min**. to allow the barometric pressure to equilibrate. This is a good time to do something else! The meter automatically powers off after about 15 minutes, if this happens you must start over at step 1.

4. After 10 min, record the DO % Sat (or percent saturation) reading in the logbook under the column labeled "reading."
5. Press "ESC" to get to the "Main Menu" and use the arrow keys to highlight "Calibrate" and press "enter," or the arrow button.
6. Highlight "DO 2 mil PE (Blue)" and press "enter." Then highlight DO % and press "enter."
7. Enter the barometric pressure that is listed in the lower right hand corner of the screen in the 'Enter Baro mmHg' field - ie. 760.2 mmHg - and press "enter."
8. Wait until the DO % Sat value has stabilized (it's neither decreasing nor increasing, but just oscillating between a couple numbers), if you haven't already, record the initial DO% Sat reading in the logbook (in the river we'll record DO in mg/l) under the column labeled "reading" and press "enter" to calibrate. Record the calibrated DO % Sat value in the column labeled "cal." Press "enter" to continue. Press "ESC" until you return to the "Run" the screen with all the parameters.

Part II. Stream Sampling: If the cable is not already attached, attach the cable to the bottom of the handheld meter, DO NOT force it on. Line up the notches and gently push them together and then twist the outer ring until it clicks into place.

1. Unscrew the clear storage cup from the sensor and replace it with the sensor guard. This protects the fragile sensors in the river! Wade into the river about 3 ft deep.
2. Press the green "Power" button, and the screen should read "Run" at the top. You can push "ESC," the escape button at any time to return to the "Run" menu.
3. Although the handheld screen is waterproof, hold it securely in one hand and dangle the sensor into the water. The sensor needs a water flow of 1ft/sec to read correctly, so gently pull it up and down between 2 ft deep and 1 ft if you can. In shallow creeks, keep sensors off the bottom.
4. Wait until the values have stabilized (no more than 5 min!) - stabilized means the values are neither steadily increasing nor decreasing but hovering around a tenth of a decimal point – and record values on your datasheet along with your equipment ID name.

- **Temperature (˚C)**,
- **Specific Conductivity (µS/cm)**
- **Dissolved Oxygen (DO mg/L, % saturation)**
- **pH**
- ***Ignore the pH mv reading***

5. Press the green "Power" button again to turn it off. Store the meter with a wet sponge and a bit of water at the bottom of the storage cup to keep the sensors humid & moist. The water level shouldn't touch the probes. Gently twist on the storage cup and pack up!