

The Maine Healthy (Coastal) Beaches Program: Training Plan for Collecting Water Samples and Recording Environmental Data

Objective: Train volunteers to take water samples using “aseptic” technique, and record environmental field data for Maine’s Healthy Beaches (MHB) Program. For quality control purposes, MHB Program staff must train all individuals taking samples for this program annually.

Materials (quantity depends on number of participants):

1. Volunteer packet containing MHB Program materials
2. Copies of field protocol, clipboards with field tip sheet and site map attached (laminated or in plastic bags), pencils, and datasheets
3. Waders
4. Monitoring kits including:
 - cooler with multiple ice packs, and divider to keep samples from touching ice packs
 - Whirl-pak bags held together with a rubber-band in a Ziploc bag
 - Monitoring tongs
 - Permanent markers
 - Eye dropper (one is usually included in each refractometer box)
 - Distilled water in squirt bottle
 - Kimwipes in Ziploc bag
 - Hand-held salinity refractometers
 - Digital thermometer
 - MHB Program brochures in Ziploc bag
5. Sign-in sheet
6. Laptop loaded with database training (if necessary)
7. Additional program materials (i.e. brochures, posters, signs, Monitoring kits) to distribute upon completion of training

Procedure: Depending on the participants, this may be the first training or review for volunteers.

1. **Meet at an agreed upon beach location.** Ideally, the beach chosen should be one that is monitored through the MHB Program, with ample space for multiple people to enter the water safely at 2-3 ft. depth. This beach should be representative of the conditions they will encounter. Depending on weather conditions, it may be advantageous to complete steps 2 – 6 inside and then go outside for the remainder of the session.
2. **Pass around sign-in sheet and introduce staff and participants to each other.** Thank participants for attending.
3. **Introduction/Orientation**
 - MHB Program is a statewide effort to monitor Maine’s coastal beaches
 - Brief description of program partners and funding
 - Purpose of the program is to ensure safety and to protect public health. Goal is to assist communities in assessing water quality conditions at their beaches and to notify the public of those conditions. When routine monitoring results in exceedances of *Enterococci* bacteria levels, assist the community in a process to identify pollution sources and working together with program partners make recommendations for remediating those problems.
 - Monitoring is the responsibility of the local jurisdiction, not a mandated requirement from the state. It is a voluntary effort on the part of the participating towns and state parks.

- Beach user survey was conducted when the program was first initiated. Results of the survey indicated the public would rather swim at monitored beaches versus ones that are not. Visitors may assume an area is already monitored for public safety.
- Currently 21 towns/state parks representing 43 beach management areas participating (this will change according to season)
- Testing for *Enterococci*, which the EPA has deemed the best indicator of fecal contamination. This may lead to recreational water-borne illnesses (RWI) (i.e. skin, ear, respiratory, eye, and wound infections. The most commonly reported RWI is diarrhea)
- Ask what are the possible sources of fecal contamination and discuss as a group (i.e. people using the beach as their bathroom, pet waste, feeding waterfowl, trash on the beach, small children & diapers, failing septs, failure of treatment plants, heavy rainfall & non-point sources of pollution, etc.)
- Ask what the high-risk scenarios are and discuss as a group (i.e. heavy volume of visitors, high temperature, heavy rainfall in the last 24 hrs, stagnant tide pools, and fresh-water inputs entering beach area). **Be sure to physically point out any factors that may be present during the training!**
- **It is critical for volunteers to know that they play an important role in educating the public and advocating healthy beach habits!** Encourage volunteers to review program materials, review the website: www.mainehealthybeaches.org, and contact MHB Program staff for more information. You may want to practice with the group answering questions they may encounter in the field (*See MHB Program Field Questions & Answers*).

4. General Outline of Process

- Samples are taken at specific, designated sites once a week, Memorial through Labor Day. Samples are generally taken in the middle of the week, so results will be obtained before the weekend, when the beach is generally the busiest and to give time for resampling in case of an exceedance.
- Samples are transported to a laboratory for analysis. In southern Maine, most communities have a courier pick-up the samples at a specific time and regional location each week.
- It takes approximately 24 to 26 hours to process and incubate the samples before the results are available once the samples reach the lab. The samples **must** be analyzed within 6 hours from the time the samples are taken.
- During the monitoring process, volunteers record field data and observations on a datasheet. Make a copy of the datasheet to transport along with the samples to the lab. Document chain of custody.
- Designated staff or volunteers will enter the field data and observations into the MHB database; which the lab will then enter the bacteria results approx. 24 hrs later.
- The community beach manager and the MHB Program staff are automatically alerted when exceedances occur. A decision is then made on whether or not to change the beach status from open to advisory or closure.
- If the initial water test fails, resampling of the site(s) is scheduled.
- Resampling continues until the results are within acceptable limits, and the advisory/closure is lifted.
- The posting of the beach or removal of a posting is made on the database—a critical component of the on-line database as this informs the public via the MHB website and Public Interface.

5. Community background (This can be jointly presented with the beach manager and/or local officials)

- How long the community/park has been involved (if applicable).
- Who are the primary local participants and what their roles are (i.e. beach manager).
- Discuss high-risk areas (if any) from previous monitoring; worst case scenario for specific area.
- Go over map and sample locations. Review site numbers and make sure all participants are able to read the map.
- Discuss pick-up time and location of sample transfer to laboratory.

6. Safety

- **Monitor at your own risk!**
- Emphasis is on using good judgment before going out into the field.
- When in doubt, do not ever risk personal safety for getting a sample
- Working in pairs is recommended for safety, efficiency and quality control.
- Recommend wearing a personal floatation device (PFD). This is especially important for groups wearing waders. Waders may fill up and pose a risk.
- Emphasize not touching eyes and mouth during and after sample collection. Wash hands. This is especially important in areas with a history of elevated bacteria counts. Wear gloves if the site is known to have high bacteria.

7. Field Datasheets

- Hand out field datasheets (*See MHB Field Datasheet*). Discuss each box/entry area of the field sheets to ensure that all participants understand how to completely and accurately fill out the information. This includes requiring each volunteer to fill out datasheet during the training. Be sure to emphasize the following information:
 - a) Neatness is critical on the data sheets. More than one person may read the data sheet and it serves as historical record if any problems occur with the database entry.
 - b) Be sure to fill out the entire datasheet starting with group name, the names of volunteers collecting the samples, and the date collected
 - c) Report weather conditions including rainfall in the last 48hrs (this may also be found at www.weather.com), water surface, and current weather as clear (C), partly cloudy (P), overcast (O), raining (R), and snow (S).
 - d) The information in each datasheet row corresponds to a specific numbered sample at a specific location. Be sure to report the data accurately starting with site number, military time sample was taken (add hours to twelve noon; one o'clock p.m. = 1300), air temperature (degrees Celsius), tide stage (rising or falling), water temperature (degrees Celsius), salinity, and observations.
 - e) The importance of additional observations. Be sure to record observations that may potentially affect water quality. (i.e. presence of children in diapers, dogs, rotting seaweed, waterfowl in large numbers, heavy runoff entering beach area, etc.) You may use the codes located on the back of the datasheet for convenience. Add any specific info as needed.
 - f) Explain the Chain of Custody and recording of cooler temperature.

8. Monitoring Protocol

- Break the group into small groups (5 or less is an appropriate size) with one or more instructors. Distribute waders if necessary.
- Distribute volunteer packets. Introduce materials and sources of more information. Focus on monitoring protocol and tip sheet (*See MHB Field Monitoring Protocol*). Go over each step of the protocol and demonstrate proper technique with the volunteers. Distribute monitoring tongs, discuss the cooler and sample transport, reading a thermometer, and demonstrate labeling sample bags and using the refractometer before taking participants into the water. If the weather is poor, this may be done under shelter or inside.
- Show participants the cooler/equipment bag and cover the following:
 - a) Samples should be kept between 4-10° C.
 - b) Samples should go in the cooler as soon as they are taken. Do not carry the sample bags; bring the cooler to the water if practical.
 - c) Samples should be stored upright in cooler to avoid damage. If necessary, a plastic quart or gallon milk jugs cut in half make good containers for keeping the samples in place and upright. This also keeps the sample bags from directly touching the ice packs.

- d) Only samples and ice-packs are transported in the cooler. All other equipment is transported and stored in the MHB field bag.
- e) Thermometers should be turned off when not in use.
- f) Volunteers are responsible for proper usage, maintenance, and storage of equipment.
- Discuss using a thermometer
 - (a) Temperature is measured and recorded in degrees Celsius. This is a waterproof digital thermometer with a cable and probe. The on-off button needs to be held down for a second to turn the thermometer on and off. Be sure to check it after a few seconds to make sure it's actually off when you put it away for the day.
 - (b) Take air temperature first, while the thermometer is still dry, or the breeze on a wet probe can cool it and give you a false low air temperature reading. Be sure the probe isn't touching anything and is completely in the shade for one to two minutes.
 - (c) Water temperature - because the probe (metal spike at the end of the cable) is the only portion which conveys the temperature, the hand held electronic end does not need to touch the water. You can clip it on or keep it in your shirt or waders pocket while getting your water temperature. It's O.K. if it gets wet, but please rinse it in fresh water, just like your other equipment at the end of the monitoring day. You will need to hold the probe at the correct depth under the water surface (6-8 inches) and take care not to touch the probe while getting your temperature reading or you'll change the reading with body temperature.
 - (d) Hand a thermometer to one participant. Show them the correct method of handling and reading the thermometer. Pass the thermometers around to each member of the group. Emphasize turning the thermometer power off when not in use.
- Demonstrate the proper method of labeling the whirl-pac bags (*See Field Tip Sheet.*)
 - a) Mark with bag before filling it with water. It is almost impossible to write on the bags once they are wet. If it is raining, mark the bags minus the time before going outside.
 - b) It is important to label on the bottom third of the bag the correct station number, date and military time. **Neatness is critical!**
- Demonstrate the use of the refractometer (*See MHB Field Monitoring Protocol*) Make sure each volunteer has the opportunity to calibrate and correctly read the refractometer.
- Take participants in the water (at least knee deep) and demonstrate collecting water using a whirl-pac bag and sample tongs (follow steps 3-6 in *Field Monitoring Protocol*). **This must be done in the water and all volunteers must participate until they are adept!**
 - a) Clearly demonstrate attaching the alligator clips to the white tabs as close as possible to the collection bag. The clips should be pressed down tightly to the tabs for a better hold. This is especially important in high surf conditions.
 - b) Remind participants that the goal of the program is to determine the water quality where people are swimming (ideally 3 feet deep).
 - c) **"Aseptic" technique is critical!** Be careful not to contaminate the bag by opening it too early. Wait to remove perforated seal until you are in the water and just about to collect the water sample! **DO NOT TOUCH PREFORATED OPENING OF BAG!**
 - d) The perforated seal may be difficult to remove. Hold the long-edge of the whirl-pac bag with one hand, while removing the seal with the other hand.
 - e) **Participants must take at least one sample with a trainer observing their skills.** If a participant has trouble with any aspect of collection, have them get a new bag, label it, and take a new sample. At least one "perfect" sample per volunteer must be collected successfully and with confidence! If they are unable to do this for any reason, either stay after training to try again or give them a different task (such as recording information, organizing volunteers).
- Place samples bags in cooler. Emphasize **samples should not touch the ice packs directly!**

- The cooler and samples should be kept in a secure location while in transport and/or while waiting for the courier pick-up. If there is a lag time before the samples are transported to the lab, check the cooler temperature and add additional ice packs if necessary.
- Sign off on the chain of custody and record cooler temperature. Record cooler temperature by dangling the probe over the cooler's lip into the cooler, not touching the ice or samples. **GENTLY**, lower the lid and **DO NOT** crush the cable between the lid and cooler lip. Wait one to two minutes and read the "lollipop".

9. Equipment Maintenance and Storage

- All equipment **must** be rinsed in freshwater, dried and stored properly to ensure the integrity and longevity of the equipment. Be sure to point out high risk items such as the thermometer, refractometer and corresponding screwdriver, and the alligator clips.

Note: Working in pairs is recommended (i.e. while one person is collecting the sample, the other person can be filling in the datasheet). This is important for safety and quality control purposes. Initially, the process of sample collection may be awkward. Practice and reviewing the field methods will speed up and smooth out the process. Not everyone will be able to perform the field collection methods. In that case, it is important to give the person(s) another task such as recording the data on the field sheet.

Methods adapted from:

Stancioff, Esperanza. Clean Water: A Manual for Coastal Water Quality Monitoring, published by the University of Maine Sea Grant, 1992, revised 1996