Maine Department of Marine Resources
Bureau of Public Health

Water Quality Volunteer Program
Quality Assurance Training
Certification Overview

1. Quality Assurance Training Power Point
2. Volunteer Standard Operating Procedure (SOP) Training Checklist
3. Liability Waiver
4. Site Certification (to be completed with DMR staff member)

• The items listed to the right are the yearly requirements to water sample for the DMR.
Commercial License Holders

Title 12: CONSERVATION
Part 9: MARINE RESOURCES
Subpart 2: LICENSING
Chapter 623: SHELLFISH, SCALLOPS, WORMS AND MISCELLANEOUS LICENSES
Subchapter 1: SHELLFISH
Article 6: WATER QUALITY

§6691. Water quality samplers
A commercial shellfish license holder who complies with the shellfish sanitation program's quality assurance and quality control training and certification requirements as administered by the department may serve as a volunteer water quality sampler for the department.

- Any shellfish license holder who has past water quality volunteer experience (> 1 year) with the DMR WQ Program could immediately begin fulfilling certification requirements;
- Any shellfish license holder new to the program will be required to sample in tandem with a non-license holder volunteer for one year before solo trips;
- All volunteers will be required to sign an agreement between the DMR that outlines data collection accuracy requirements, training, expectations and professional conduct pertaining to collection of water quality samples as a DMR water quality volunteer.
Recent Changes

- No Test Required
  - Replaced by Power Point
- No In-house Training
  - Covered during Site Certification
- New Data Sheet
  - Wind data no longer collected
- Boat GPS Coordinate Form
  - No longer required if using a preprogramed GPS
States in the US that harvest and ship, or receive, shellfish across state lines are required to meet the guidelines described in the current National Shellfish Sanitation Program’s (NSSP), Guide for the Control of Molluscan Shellfish.

Click [here](#) for the full NSSP Guide
After reading this guide, you will be able to:

- Find all necessary sampling documents
- Record raw data and field observations as described in the QA Manual
- Learn with a trainer how to collect, transport, and store samples for water quality analysis as stipulated in the NSSP guide.

This training guide covers sample collection and transportation.
Quality Assurance Overview

- First, you will need a printed copy of the Volunteer SOP Training Checklist from the DMR website.
- For each training element on the checklist, read the indicated documents that are embedded in the slides.
- Then initial and date in the appropriate column.
  **Dates must include month, day, and year.**

- When the FDA evaluates the DMR lab, Training Checklists are reviewed and are considered legal documents indicating an employee’s/volunteer’s understanding and fitness to perform the tasks as described by the NSSP.

### Sample Collection and Transportation

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<thead>
<tr>
<th>Training Element</th>
<th>Documents</th>
<th>Volunteer Initials/Date</th>
<th>Trainer Initials/Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Water Quality - Water</td>
<td>Microbiology Checklist Section 2.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Water Quality</td>
<td>SOP 2, WQ Lab Form 1</td>
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<td>3. Temperature Monitoring</td>
<td>QA Manual Appendix D Section 11</td>
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<td>4. Chain of Custody</td>
<td>QA Manual Section 3.3</td>
<td></td>
<td></td>
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<td>5. Documentation</td>
<td>QA Manual Section 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Sampling Sites</td>
<td>*Run Maps/Directions</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Volunteer specific. These forms are given to volunteer each year.
Training Elements

1. **Water Quality**: *SOP 2, WQ Lab Form 1*
   - Purpose, Responsibilities, Equipment and Supplies, and Sampling procedure

2. **Water Quality – Water**: *Microbiology Checklist Section 2.1*
   - Water sample collection and transportation

3. **Temperature Monitoring**: *QA Manual Appendix D Section 11*
   - Requirements for thermometers and temperature monitoring.

4. **Chain of Custody**: *QA Manual Section 3.3*
   - Requirements for documenting personnel, transportation and storage of samples

5. **Documentation**: *QA Manual Section 4*
   - Requirements for recording data on datasheet.

6. **Sampling Sites**: *Run Maps/Directions*
   - Requirements for run maps and directions

• Following each training element is a knowledge check that consists of questions reviewing the training element.
Training Element #1: Water Quality

ME Bureau of Public Health, Shellfish Sanitation SOP 2

2.1 Purpose, Scope, Applicability
The purpose of this SOP is to describe a standardized procedure for collection and transportation of water samples for fecal coliform analysis. This SOP is intended for use by staff or volunteers collecting seawater samples along the Maine coast for analysis in an NSSP-approved method. This SOP applies to sampling of seawater for classification of growing areas per the NSSP.

2.2 Responsibilities
The staff or volunteer collecting the samples is/are responsible for ensuring correct collection location, recording accurate data at the time of activity/observation, following the data recording guidelines in Section 4.0 of the QA manual, and Chain of Custody recording as indicated in Section 3.3 of the QA manual. In addition, staff are responsible for preventing sample rejection as described in Section 3.2 of the QA manual.

2.3 Definitions
NSSP - National Shellfish Sanitation Program
QA - Quality Assurance

2.4 Equipment and Supplies
DMR Cooler with calibration-verified thermometer and freezer packs
Sampling tongs
Whirl-Pak bags
Data sheet
Sample rack
Pen and Permanent Marker
Hip waders, Field thermometer, GPS
2.5 Procedure

2.5.1 Confirm sites for sample collection and plan sampling time to ensure collection of samples in the appropriate depth of water and that the sample is being collected within a 300-foot radius of the designated site.

2.5.1.1 Samples are delivered to the lab to allow for processing water samples within **30 hours** of collection as stipulated in the ISSC Microbiology Checklist.

2.5.2 Place the bag between the alligator and securely clamp the tabs between the teeth of the clips.

2.5.3 Wade into the water to a depth of 18”, taking care not to disrupt the sediment or surrounding vegetation.

2.5.3.1 Collect sample ‘upstream’ to prevent sampling water with suspended sediments.

2.5.4 Remove perforated flap from top of Whirl-pak bag while taking care to not touch the top of the bag to prevent contamination.

2.5.5 With the bag closed, submerge the bag 8 to 10” below the surface then open the bag with the tongs. Draw the bag through the water upstream to fill to just above the line on the bag.

2.5.5.1 Leave enough head space in the bag to allow for thorough homogenization by the lab staff prior to analysis.

2.5.6 Twirl the bag closed by holding the wire ends and spinning. Secure by crossing the wire tabs into an “X.”

2.5.6.1 If there are any leaks, resample with a new, unopened bag.

2.5.7 Label the bag with the area letter, station number, time of collection (military), date, and initials.

2.5.8 Place filled bags in a rack to hold them upright in the cooler.

2.5.9 Ensure cooler maintains a temperature between **0 and 10° C**.

2.5.9.1 If samples are transferred to another individual, the Chain of Custody section of the data sheet is initialed by the person relinquishing custody as well as the person receiving custody, with date, time, temperature, and number of samples verified upon exchange.

2.5.9.2 If a temperature-controlled satellite location is used for temporary storage, the location is noted and upon retrieval of the sample the temperature of the refrigerator at that location is recorded with the date, time, number of samples, and the initials of the person receiving custody. This is recorded in the Chain of Custody section of the data sheet (**ME BPH WQ Lab Form 1, 2**).

2.5.10 Once back at the lab, place samples in the refrigerator and record total number of samples, temperature of the cooler at time of delivery to the lab, designated run number, time, and initials in the Samples Received log. Complete Chain of Custody on the data sheets.
Sample Bags

Headspace to
Allow shaking and aeration at the lab

Growing Area & Station #
Sample Date
Sample Time
Sampler Initials
The sampler fills in the sections indicated as s/he is collecting samples.

Gray fields are for DMR lab staff use.

Sampling sheets are printed 2-sided, so that the below is available for reference when needed.

An ‘Adversity’ is a condition observed at the time of sample that could potentially negatively influence the score.

If any ‘Adversities’ are present at a collection station, use the code letter to describe it in the designated column on the data sheet.

If a sample cannot be collected, the ‘Missed Station Field Code’ is written in the designated column on the data sheet.

The letter in the ADVERSITIES column represents an adverse condition observed at the time the sample was collected (i.e., if it rained any time during the 2 days prior to collecting the sample the condition would be ‘P’ (P for precipitation). If there are 5 or more boats near the station that may adversely affect the water quality, the condition column would read ‘B’ for boats.

- **B**: Boats: Minimum 5 encroached boats (i.e., not open skiffs) that might have a head
- **F**: Flood: Use only during an officially declared statewide flood closure
- **H**: Habituation: Seasonal occupation of homes that might have an impact on water quality
- **M**: Mammals: Open business with 10 or more enclosed boats in the water
- **N**: Nonpoint: Flowing streams, storm water pipes, or overland runoff
- **P**: Precipitation: Rain or mixed precipitation anytime within past 2 days (i.e., thunderstorms, rainfall more than a drizzle)
- **T**: Tides: Snow and ice melt
- **S**: Sewage Treatment Plant: during treatment plant malfunction or bypass events
- **W**: Wildlife: Waterfowl (10 or more), domestic or wild animals (i.e., at the station or in close enough proximity to have a possible impact) - put details in "REMARKS" on front

The letter in the MISSED STATION FIELD CODE column represents a reason why a sample cannot be collected.

- **A**: Access: the station was not accessible due to trespass issues or natural obstructions
- **S**: Safety: The station could not be sampled due to safety issues
- **E**: Equipment: The station was set up and water was not available
- **O**: Other: Please note what the issue is in comments for that station

The Chain of Custody

<table>
<thead>
<tr>
<th>Rall. by</th>
<th>Date, Time &amp; Temp (°C)</th>
<th>Samples</th>
<th>Rall. to</th>
<th>Received by</th>
<th>Date, Time &amp; Temp (°C)</th>
<th>Samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circle Water Quality Lab</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Backbay or Lagoon</td>
<td>WQ Lab Staff Acceptance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Boat GPS Coordinates

- A volunteer sampling by boat is required to provide GPS coordinates for all stations collected during each sampling trip OR to use a GPS preprogrammed with station locations.
Training Element #1
Knowledge Check

1. Who is responsible for ensuring proper sample location and the recording of accurate data?
2. Within how many feet of the plotted station location must a sample be collected?
3. What is the minimum water depth required to take a sample?
4. What is the minimum sample depth?
5. Is it required to use a DMR cooler for sample transportation?
6. What writing utensils are required for sampling?
7. What should you do if your sample bag is leaking?
8. If samples are being dropped off at a temperature-controlled satellite location, what information must be on the Chain of Custody form?
9. Why is it important not to touch the top or mouth of the bag when removing the perforated flap?
10. What is an adversity and why is it important to record adversities on the data sheet?

*Answers in the appendix*
Training Element #2:
Water Quality – Water

Microbiology Checklist Section 2.1

*Excerpt from the FDA Audit Checklist. When the FDA audits the DMR lab, this is a portion of the review.

<table>
<thead>
<tr>
<th>Code</th>
<th>Ref.</th>
<th>Part II - Seawater Samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>11</td>
<td>2.1 Collection and Transportation of Samples</td>
</tr>
<tr>
<td>C</td>
<td>9</td>
<td>2.1.1 Sample containers are of a suitable size to contain at least 110 mL of sample and to allow adequate headspace for proper shaking. Seawater samples are collected in clean, sterile, watertight, properly labeled sample containers.</td>
</tr>
<tr>
<td>K</td>
<td>1</td>
<td>2.1.2 Samples are identified with collectors name, harvest area, sampling station, time and date of collection.</td>
</tr>
<tr>
<td>C</td>
<td>9</td>
<td>2.1.3 Immediately after collection, seawater samples are placed in dry storage (ice chest or equivalent) capable of maintaining a temperature of 0 to 10°C with ice or cold packs for transport to the laboratory. Once received, the samples are placed in the refrigerator unless processed immediately.</td>
</tr>
<tr>
<td>O</td>
<td>1</td>
<td>2.1.4 A temperature blank is used to represent the temperature of samples upon receipt at the laboratory. Temperature should be equivalent or less than that of the growing area waters. Results are recorded and maintained.</td>
</tr>
<tr>
<td>C</td>
<td>9</td>
<td>2.1.5 Analysis of the sample is initiated as soon as possible after collection. Seawater samples are not tested if they have been held for more than 30 hours from the time of collection.</td>
</tr>
</tbody>
</table>
Training Element #2
Knowledge Check

1. What critical pieces of information must be written on the sample bag?
2. What is the acceptable temperature range for coolers?
3. Samples must be processed within how many hours of collection?
4. Why is it important to leave a little air or “headspace” in the bag when collecting a sample?

*Answers in the appendix*
Training Element #3: Temperature Monitoring

- Temperature monitoring is required at all times for samples throughout collection, transportation, and post-processing before analysis.

- All thermometers used in lab activities must have a calibration check date within one year of the use date.

- DMR supplied sampling thermometers and calibrated cooler thermometers are given to volunteers at the beginning of the sampling season at the site certification.

- Section 11 in Appendix D of the Lab QA Manual describes thermometer use in more detail.
11.0 Thermometers

 Appropriately ranged thermometers are used for the target equipment and are calibrated at temperature of use. Calibration Certificates are kept on file and thermometers are tracked by the imprinted serial number. Yearly, the accuracy of thermometers is determined by comparison with a National Institute of Standards and Technology (NIST) traceable reference thermometer at the temperature of use and results are recorded and retained (SOP Thermometer Calibration Verification; ME BPH WQ Lab Forms 31, 32, and 33; ME BPH WQ Excel Template 3). Dates of calibration verifications are recorded and kept on file. All in-use thermometers are properly immersed and labeled with the date of the last calibration verification. Alternatively, thermometers are sent to a third party for calibration verification. Performance is verified through use in the target equipment by comparison to the current working thermometer in that equipment. If the newly introduced thermometer does match the temperature of the official working thermometer, the new thermometer is not placed in use. Data loggers are used for the BBH Water Quality laboratory and are set to save and email temperature recordings from the refrigerators, incubator, and water baths twice a day (see Sections 9 and 12 of this appendix). Biotoxin refrigerator temperatures are checked and recorded once daily. Coolers are equipped with thermometers for transportation temperature monitoring. Any correction factors are indicated in the thermometer log with the calibration verification. If a thermometer is broken or found out of tolerance (see SOP Thermometer Calibration Verification), the unit is marked as out of service and is replaced. Thermometers are immersed to the immersion line or to a level that allows reading of the target range without parallax.
Training Element #3
Knowledge Check

1. Who supplies the thermometer for cooler temperature monitoring?
2. How often must cooler thermometers be calibrated?

*Answers in the appendix*
Chain of Custody is important for verifying samples were delivered to the laboratory within the designated amount of time, held at the appropriate temperature, and were always in the custody of our samplers, volunteers, or refrigerators (see Section 3.3 in the QA Manual). Your trainer will review this process as you learn to collect and transport samples.

- The number of samples on each sheet corresponds ONLY to the samples on that sheet; not to the number in the entire batch that was collected. Multiple sheets are often used.

- Any corrections made to any part of this data sheet must be corrected with a single line through the writing. New information can be written next to the crossed out information, or footnoted as described in the QA Manual, Section 4.0. A simple reason for the correction is also indicated. All corrections require initials and date.
3.3 Traceability and Chain of Custody

Each sample is uniquely identified through date, location identification, and for shellfish samples, species. This combination follows the sample from the field to result and entry into the database. Each data sheet (see ME BPH BTX Lab Forms 1, 2, and 3; ME BPH WQ Lab Forms 1, 2, and 4) has designated locations for noting the chain of custody as the batch of samples travel from collection to analysis. Each person transporting samples notes her/his initials, date, time, temperature of holding vessel, number of samples and location for when custody of the samples is received and when it is relinquished. Samples delivered to BAS for PSP or ASP analysis are labeled with a unique identifier consisting of the date, location ID, and first 3 letters of the shellfish species name. This string is further differentiated by an A, P, or D prefix to specify ASP, PSP, or DSP testing, respectively. In addition, the information for the final relinquishment to the lab is transcribed onto the Samples Received Log, which is located near the laboratory refrigerators where samples are deposited.
Training Element #4
Knowledge Check

1. What pieces of information does the chain of custody form document?

2. What are the acceptable ways to correct errors on the datasheet?

3. What 2 pieces of information uniquely identify water quality samples?

4. Does the “# Samples” column indicate the total number of samples collected or the number of samples recorded on the data sheet?

*Answers in the appendix*
Proficiency tests are completed and documented as noted in Section 3.1.

Data sheets contain spaces for sample collection location id, date, time, collector’s initials, and for ocean water samples, temperature of the water at time of collection. Each sheet also has designated areas to identify the technician performing processing and/or analysis, and spaces to indicate autoclave batches and filter lots. Analyst initials and dates link samples recorded on separate data sheets to the analyst processing a group of samples, thus defining daily ‘batches’ of samples for processing. Autoclave batch numbers and lot numbers allow retrieval of sterility, productivity, and lot tests results for the items used to process the batch of samples on a sheet.

Observations/raw data are written in ink on all lab forms. Corrections to lab forms are performed by drawing a single line through the incorrect information, and the new information is written clearly next to the mistake, or a footnote is made linking the crossed-out information with the new. The person correcting the information writes her/his initials and the month, day, and year the correction is made. If the reason for the correction is unclear an explanation is written.

Given the multiple locations of operation for ME BPH monitoring work, the corrections on raw data sheets are not always performed by the person that created the error. Raw data observations and chain of custody errors are confirmed through comparison to concurrent forms or contact with the appropriate sampler/transporter and noted by the data sheet reviewer.

Electronic records in the Department of Marine Resources database are automatically tagged with user ID and date of change as indicated in Section 3.5. Excel files are annotated with the initials of the user and the date, and the reason for the notation. The old information is replaced; however it is kept in the annotation for small corrections. New files are created when there are more pervasive errors, and the archived file is renamed by adding an identifier to the filename for the first archived file and subsequent files numbered in sequence if more than one archive is required.

Records are retained and archived in accordance with Department of the Secretary of State, Maine State Archives (29/255) Chapter 1: State Agency Records Programs per Maine State Revised Statutes, Title 5, Chapter 6, Section 95, §7.
Training Element #5
Knowledge Check

1. What columns on the data sheet are to be filled out by the sampler during sample collections?
2. What utensil is used for filling out data sheets?
3. Can DMR contact the sampler with questions about the sampling data sheets?
Training Element #6: Sampling Sites

- Run maps and directions are given to the volunteer at the beginning of the sampling season.

- Volunteers will receive updated documents if any changes are made to a run during the sampling season.
Congratulations! At this point, you have read the QA Manual, the pertinent SOPs, and know where to find more information about the procedures performed in our program.

You should have an SOP Training Checklist with your initials and date in every row.

Next, you will go into the field on your scheduled site certification date with a DMR staff member, and they will guide you in performing the tasks according to protocol.

Visit the DMR website* for more information on Shellfish Sanitation and Management, as well as an interactive classification map for shellfish growing areas.

APPENDIX: Knowledge Check Answers
Training Element #1 Answers

1. The staff member or volunteer collecting the sample.
2. 300’
3. 18” minimum water depth
4. 12” minimum sample depth
5. Yes
6. Pen and permanent marker
7. Resample with a new, unopened bag.
8. Initials, date, time, temperature, # samples, relinquished to
9. To prevent contamination
10. An adversity is a negative condition observed in the area of the station at the time of sample. It is important to record any adversity that could potentially negatively influence the water quality score.
Training Element #2 Answers

1. Growing area & Station #, date, time (24 hour time), and sampler initials
2. 0-10° Celsius
3. 30 hours
4. To allow for proper shaking of sample
Training Element #3 Answers

1. DMR
2. Once per year
Training Element #4 Answers

1. Initials, date, time, temperature, # of samples, location or person relinquished to

2. A single line through the error with new information written next to the crossed out information OR new information in a footnote at the bottom of the page.

3. Growing area with station number and date

4. The number of samples recorded on that data sheet
Training Element #5 Answers

1. The white columns OR run #, Collected by, date collected, area letter, station #, military time, boat/land, temp, condition/adversity

2. Pen or ink

3. Yes