Standard Operating Procedure –
Temperature, Thermometer

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1  POINT OF CONTACT

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2  OBJECTIVE

Determine the temperature in the surface (0.5 m below surface) and bottom water (0.5 m above bottom) at the station. When total water depth is greater than 10 m, temperature at mid-depth will also be determined. Temperature is reported in degrees Celsius (°C). Frequency of sampling and daily order of events are specified in the “UWS Sampling Plan SOP.”

A second sample for each depth at one station per embayment per field day will be analyzed, to assess precision of the method. Only one duplicate station is required per embayment, even if multiple field
teams are working in the embayment. At each sample depth, collect two independently obtained samples (do not sample the same collection bottle twice). These duplicate samples will usually come from the last station sampled, for time management purposes.

3 DEFINITIONS AND ABBREVIATIONS

Embayment: A recess in a coastline or an indentation off a shoreline which forms a bay. In Long Island Sound, the names of embayments often include the words Harbor (27%), River (23%), Cove (19%), Bay (10%), Creek (10%), and Pond (7%); with a few including the names Brook, Gut, Inlet, or Lake.

Field Team: Person or group of people working together to sample a station.

Monitoring Group: The group conducting the field work.

Section: The reporting regions for the embayment report card. Each section must include a minimum of three stations. Sections will be assigned a unique name by the UWS; examples are included below.

<table>
<thead>
<tr>
<th>Number of Sections</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name of Sections</td>
<td>whole</td>
<td>inner</td>
<td>outer</td>
</tr>
<tr>
<td>Abbreviations for Sections</td>
<td>W</td>
<td>I</td>
<td>O</td>
</tr>
</tbody>
</table>

Site: The whole embayment, as defined by the UWS list. Each site has a unique three letter code assigned by the UWS; for example, Little neck Bay, NY is “LNE”.

SOP: Standard operating procedure; this document is a SOP.

Station: The location where samples are collected, identified by a GPS location.

UWS: Unified Water Study

UWS Coordinator: The person designated as the point of contact for the UWS.

UWS Scientific Advisor: Estuarine or water quality scientists designated as advisors to the UWS.

4 OVERVIEW

A NIST certified thermometer is used to determine the temperature in the surface (0.5 m below surface) and bottom water (0.5 m above bottom) at the station. When total water depth is greater than 10 m, temperature at mid-depth will also be determined. Temperature is reported in degrees Celsius (°C). Frequency of sampling and daily order of events are specified in the “UWS Sampling Plan SOP.”

A second sample for each depth at one station per embayment per field day will be analyzed, to assess precision of the method. Only one duplicate station is required per embayment, even if multiple field teams are working in the embayment. At each sample depth, collect two independently obtained samples (do not sample the same collection bottle twice). These duplicate samples will usually come from the last station sampled, for time management purposes.

5 SOURCES

These procedures are based on the EPA Volunteer Estuary Monitoring Manual (EPA, 2007) and follow

6 MATERIALS AND EQUIPMENT

- Thermometer with NIST Traceable Certificate Calibration. A NIST certified thermometer typically costs $60 to $80. Select a thermometer with an appropriate temperature range. Ideally, you would like a thermometer with a range of -1°C to 30°C.
  
  Options include:
  
  - H-B Instrument Company Certified Glass Thermometer Enviro-Safe® Laboratory Thermometers; -1 to 61°C range
  - Digi-Sense Calibrated Remote Probe Digital Thermometer, Waterproof

Note – a monitoring group should have a few extra thermometers available, in case of breakage. Ideally, each field team has two thermometers. If a monitoring group has many field teams, the coordinator could be the custodian of the extras, with the understanding that a sample day may be abandoned if the thermometer breaks and the coordinator is not able to deliver the thermometer within the sampling time window.

7 METHODS

7.1 Preparation

- For glass thermometers, check that the thermometer is free from cracks.
- For digital thermometers, check battery power and confirm the thermometer is set to read in °C. Carry extra batteries in the field tool kit.

7.2 Field Collection and Processing

- Collect a water sample as described in the “UWS Sampling Plan SOP.”
- At least one station per field day per embayment (typically the last one), collect a second sample from each depth as a verification replicate. This should be a second sample, not two samples from the same collection bottle.
- Once the water sample for dissolved oxygen has been secured, put the thermometer into the remaining sample water.
- Allow the thermometer to equilibrate to the sample water temperature. While you are waiting, chemically fix the dissolved oxygen sample.
- Read the thermometer to the nearest 0.5 °C. Hold the thermometer such that the eye is level with the top edge of the alcohol in the thermometer. See diagram on next page.
7.3 Sample Storage

Not applicable.

7.4 Laboratory Analysis

Not applicable.

8 TROUBLESHOOTING / HINTS

- Keep your thermometer out of direct sunlight when not in use. It will heat up and take longer to stabilize when stored in sunlight.
- Your thermometer must be immersed in water while you read it.
- Measure water temperature immediately while on the water. Do not wait to come back to shore.
- Always carry a copy of this SOP and the relevant parameter-specific SOPs.
- Print out the “quick sheets” for relevant SOPs to use as a reminder in the field. Do not laminate these as you will want to add notes. A plastic page-protector taped close can be used to keep these sheets dry.

9 DATA PROCESSING AND STORAGE

The UWS Coordinator will be the custodian of the finalized data files. The UWS Coordinator will maintain a database which includes the unique site codes, section codes, and station codes for the embayment.
Each unique station code will be affiliated with the corresponding GPS for the station.

The monitoring group is responsible for obtaining data, entering data into the UWS data template, and delivering the data to the UWS Coordinator.

The monitoring group is responsible for assuring that the correct unique station ID assigned by the UWS is properly matched with the local organizations station ID codes. Both codes (monitoring group’s station code and UWS unique station ID) will be entered into the data template, along with the GPS coordinates.

Field data entry, data entry into the Excel-based data entry template, and reporting of data are covered in the “Recording and Reporting SOP.”

10 REFERENCES


11 Quick Sheet – Temperature, Thermometer

Preparation

- For glass thermometers, check that the thermometer is free from cracks.
- For digital thermometers, check battery power and confirm the thermometer is set to read in °C. Carry extra batteries in the field tool kit.

Field Collection and Processing

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