



MassDEP

**Massachusetts Department of Environmental Protection
Bureau of Water Resources
Division of Watershed Management
Watershed Planning Program**

CN 001.23

STANDARD OPERATING PROCEDURE

Sample Collection Techniques for Surface Water Quality Monitoring in Rivers and Streams

CN 001.23

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1.0 SCOPE AND APPLICATION

This document provides guidance to Watershed Planning Program (WPP) staff for field sample collection procedures of ambient surface water samples in rivers and streams. The consistent use of proper field collection methods helps to ensure data quality and consistency across teams within WPP, and to meet the quality assurance requirements of the program Quality Assurance Project Plan (QAPP) and the sample method requirements of the Wall Experiment Station (WES) Laboratory and other laboratories. These procedures are required for most WPP monitoring, unless otherwise specified as recommended.

This SOP is applicable for most WPP ambient water quality monitoring involving basic surface water grab sampling in rivers and streams. Parameter-specific techniques are described as appropriate. The SOP also addresses sample collection for a variety of field conditions that may provide unique challenges (e.g., elevated platforms, slack water, low or high flows).

Topics not covered in this SOP that may be found in separate WPP SOPs include the use of field instruments (multi-probe, velocity meters, ion-selective probes, etc.), composite sampling (depth-integrated, flow-weighted, time-composited), stormwater sampling, effluent sampling, lake sampling, flow measurement, sediment sampling, macroinvertebrate, and macrophyte/periphyton sampling. Project-specific and special-purpose monitoring procedures may be found in project-specific QAPPs and/or Sampling and Analysis Plans (SAPs).

This SOP was last revised in December 2024

2.0 SUMMARY

WPP monitors for a variety of physical, chemical, and microbial parameters in rivers and streams. All personnel must be familiar with the proper field procedures for the collection of water quality samples at each site. Improperly collected samples either cannot be analyzed or result in poor analytical data, thus negating considerable effort and cost expended in their collection. The procedures contained herein will provide specific sampling protocols that are used by current WPP field monitoring crews and will serve as a training tool for both current and new WPP field monitors. These procedures cover activities from sampling trip preparation to sample drop-off at the lab (Wall Experiment Station, WPP lab, EPA New England Regional Laboratory, or contract labs) for analysis.

In most cases for WPP projects, the number of samples collected at each station is limited to five or six. As a result, the statistical confidence for quality-assured data in deriving true parameter concentrations is limited. One way, however, to reduce error and uncertainty for the small number of samples taken is to employ standardized field procedures that specifically attempt to minimize sample contamination and sampling error.



3.0 SAFETY CONSIDERATIONS

The unique characteristics of sampling sites in rivers and streams, the use of acid/base preservatives, and the handling of unknown sample constituents provide many hazardous opportunities to a field monitor. The following points cover general safety considerations for the collection of water samples.

- The accessibility of sampling sites, as well as typical/anticipated flow and depth characteristics at river and stream locations, must be investigated prior to the collection of samples. If the monitor feels that the collection site is hazardous, sampling should be postponed, or an alternative site found. Following USGS's rule of thumb: do not wade in to sample if approximate estimates for water depth (ft.) x velocity (fps) > 10.
- Always sample in teams of two or more, unless otherwise approved by the WQ Monitoring Section Chief.
- Use good judgement in clothing and personal protection items. Dress based on anticipated conditions but be prepared for the "worst case" scenarios. Items to consider include extra clothing, sunshade, sunscreen, orange safety vests, hats, insect repellent, insulated boots and gloves, safety glasses, waterproof boots for highest anticipated depths (chest waders or hip waders).
- Equipment must be checked for defects prior to use to prevent accidents.
- Be sure to inspect all protective gear (boots, gloves, eyewear, etc.) for holes and defects. Do not assume the gear is free from defects or normal wear and tear.
- Field and First Aid kits must be taken on all sampling trips; inspect and re-stock as needed before going on-site.
- An AED must be taken on every electrofishing survey.
- Contact with sample media should be avoided if there are suspected sources of contamination (e.g., sampling downstream of a CSO). Elbow-length rubber gloves are recommended for work directly in sample media (e.g., sampling). Disposable powder-free gloves are recommended for analytical sample handling (e.g., acidification of samples).
- The preservatives 1:1 H₂SO₄, 1:3 H₂SO₄, 1:1 HNO₃, 1:1 HCl and 1:1 H₂PO₄ are acids of varying strengths. If splashed on the skin or in eyes rinse with lots of water and seek medical attention if necessary. Safety glasses and disposable powder-free gloves are recommended when working with acids, bases, or solvents. Make sure the preservative containers are tightly capped and properly disposed after use.
- Never have food or drinks near samples. Schedule lunch/dinner/snack at a non-sampling time. Always wash hands thoroughly before and after handling samples and food. Never use sample coolers to store food or drinks.
- Label any sample known or suspected to be hazardous because of flammability, corrosivity, toxicity, or radioactivity, so the appropriate precautions can be taken during sample handling, storage, and disposal.



- To prevent contaminating other personnel, put package containers that have been coated on the outside with oily residues into clear plastic bags before transporting to WES Laboratory.
- All members of any given sampling crew should be trained in Adult CPR/first aid/AED.
- Work at a reasonable pace to ensure personal safety (and data quality). Rushed sampling will usually lead to mistakes and poor results.
- For sampling from boats, each occupant is required to wear a personal flotation device (PFD).
- **SAFETY FIRST!**

4.0 WATER SAMPLE COLLECTION, PRESERVATION AND HANDLING

4.1 Sample Collection

Samples are collected by trained WPP field monitoring crews and preserved as appropriate after sample collection, following the field collection and preservation procedures in section 8.2. **Attachment 1** provides the bottle type, preservation and holding time requirements for typical analytes. All samples are placed in insulated coolers packed with ice to achieve 4° C and transported to the lab.

In general, the sample collection procedure for taking grab samples is essentially the same regardless of the specific analyte of concern (see 8.2). For sample collection, the main differences between analytes are primarily due to different bottle type, field filtration, preservative used, and holding time.

4.2 Special Parameters and Requirements

It is the responsibility of the sampling team leader to take note of special requirements for certain parameters. These special requirements should be explained in the approved SAP for the project. See Section 8.3 for discussion of special requirements for selected parameters.

4.3 Sample Preservation

Generally, the methods of sample preservation used at WPP are relatively limited and are intended to reduce volatility of constituents, prevent biological and bactericidal action, prevent artifact formation, and retard hydrolysis of chemical compounds. Typically, there are six (6) preservation methods that can be used to satisfy sample preservation requirements:

- Acidification (using 1:1 H₂SO₄, 1:3 H₂SO₄, 1:1 HNO₃, 1:1 HCl, or 1:1 H₃PO₄ depending on analyte)
- Addition of alkaline solution (NaOH)
- Use of amber containers and coolers (light inhibition)
- Addition of reducing/dechlorination agents (sodium thiosulfate or ascorbic acid),
- Cooling to approx. 4° C (+/- 2° C, or < 6° C), and
- Freezing ASAP.



Analyte groups requiring acidification are Nutrients (TP, TN, NH₃, NO₃-NO₂), DOC, VOCs, Phenols, Oil & Grease and Metals. In general, approximately 1 ml of the required reagent are added to 250 ml ample container from a pre-aliquoted vial. The sample is then capped and thoroughly mixed. The final sample must have a pH of less than 2; pH will be checked in the lab. For samples with suspected high pH (>10) and highly alkaline samples, add an extra dose 4 ml of the required reagent.

The preservatives 1:3 H₂SO₄, 1:1 HNO₃, 1:1 HCl, or 1:1 H₃PO₄ are acids of varying strengths. If acid is splashed on skin or eyes, rinse with lots of water and seek immediate medical attention if necessary. Each field kit contains a small field eye rinse bottle containing deionized water; this is preferred for rinsing eyes.

All field samples must be transported to the lab packed in an insulated cooler filled with ice and cooled to 4° C. Ice is made continuously at WPP for this purpose. Coolers must remain < 6° C for proper sample preservation. To ensure the temperature is maintained throughout the sampling day, the ice levels in the coolers must be checked; if necessary, more ice should be added and excess water drained during the trip. If photo-degradation is a concern, the sampling crew is responsible for immediately storing sample containers requiring darkness in the coolers.

4.4 Documentation

Sampling site conditions (e.g., turbidity, weather), observations (e.g., objectionable deposits, aesthetics), and sampling metadata (e.g., bottle group, sample time) are recorded on an electronic fieldsheet in EDGE (a module for the WPP EQUIS database) using a field tablet and uploaded to the WPP EQUIS database by the Data Management and WQ Assessment Section following the survey. Prior to the survey, the project coordinator will pre-load an EDGE electronic data deliverable (EDD) with known survey information (e.g., sites, OWMIDs, analytes) for use in the field. The procedures and protocols for using EDGE including the pre-loading of information, operations in the field, and workflow for management of the EDGE tablets and EDDs are outlined in SOP CN 000.00 EDGE Field Operations Manual (document in preparation).

If EDGE cannot be used at a site (i.e., technical issues), a WPP paper fieldsheet form for rivers and streams shall be filled out completely in waterproof ink. Project waterproof notebooks may also be used (as needed) using ink. No pencils are to be used. All corrections should be crossed out once and the sampler's initials written next to the error. All deviations from this SOP should be noted on the fieldsheet.

4.5 Standard QC Samples (Duplicates and Field Blanks)

It is the survey leader's responsibility to review the approved QAPP and SAP for QC sample types and amounts. In some cases, non-standard QC samples may be required. WPP typically takes duplicate samples for quality control overall precision estimation at a minimum of 10% of samples taken.



Unless there is a conflict with project-specific requirements as contained in an approved QAPP or SAP, the preferred type of sample duplicate is a co-located duplicate. These samples are taken immediately after the first sample, using the same sampling method as the original sample.

In addition, ambient field blanks or equipment blanks (e.g., for Van Dorn bottle use) are taken at a minimum of 10% of total samples taken. See Section 9.0 for more detail.

4.6 **Sample Bottle Labeling**

Sample bottle labels for samples going to the WES Lab should include the WES login ID (batch number), WES sample ID, WPP field sample ID (OWMID) with the bottle group suffix (e.g., N, N2, OC), site ID, preservative, and analyte. Sample bottles going to contract labs will have different labeling requirements depending on the contract lab and may include less or more information (e.g., date/time, preservative codes). An example sample bottle label for a sample going to the WES Lab is shown below.

WES Login ID: 20240183
WES Sample ID: 2401086
Field Sample ID: 25-0968_N2
Site: Wigwam P: H₂SO₄, Cool to 4°C
[Nutrients]

The labels should be waterproof or weatherproof and placed on the dry containers prior to entering the field or at the car/truck. It is important to note that the adhesive labels when in contact with water, acids and debris may not adhere to the sample container.

4.7 **Field Filtration**

Field-filtering for dissolved analytes (0.45um filter pore size is the default) is the preferred technique to capture the nearly instantaneous soluble fraction(s) in ambient surface waters. This is typically done using a high-volume syringe and filter kit but other equipment options (e.g., peristaltic pump or hand-pump device and filter kit) may be used for field filtration if required for a specific project objective. Project-specific SAPs should address the use of any atypical equipment.

In lieu of field-filtration, dissolved analytes, such as dissolved reactive phosphorus (DRP) can be sampled for and lab-filtered ASAP as follows:

- Take samples in separate bottle and DO NOT ACIDIFY.
- Place on ice to 4° C ASAP.
- Deliver to lab ASAP for immediate lab filtration.
- Analyze within holding time (e.g., 48 hrs. for DRP).



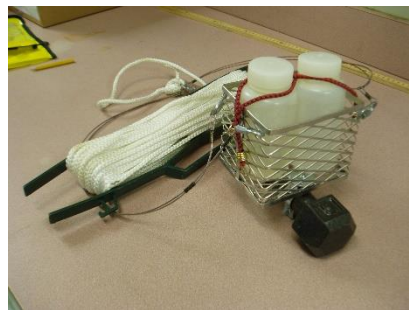
5.0 SAMPLING EQUIPMENT

Sampling personnel are provided with enough new, pre-cleaned sample containers to collect the projects specified samples and associated quality control samples. Other equipment needed, including insulated coolers filled with ice, personal protective equipment, appropriate collection apparatus, chain of custody form(s), EDGE tablet with pre-loaded survey information, and backup WPP fieldsheets, are also provided.

The sampling locations dictate the equipment that may be required for proper and safe sample collection and preservation. The project-specific SAP or survey guidebooks should address the specific apparatuses needed at the sampling locations. In general, sampling stations should be located for the taking of wade-in manual grab samples (wading in and filling sample bottles by hand) using narrow mouth (NM) or wide-mouth (WM) bottles. Where wade-in sample collection is not possible, river/stream samples can be collected from the shore or bank (if the water collected is representative of the flowing river/stream) with an extension sampler pole used to avoid shore effects.



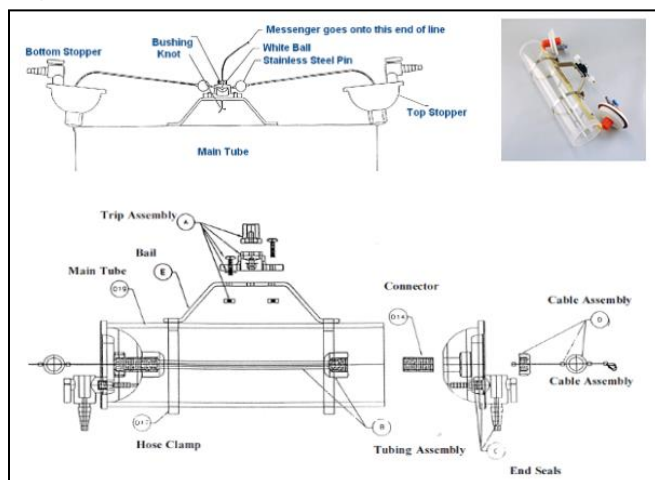
The preferred sample collection apparatus used for taking multiple, simultaneous samples and when manual grabs are not possible (e.g., bridge drops) is a **weighted basket sampler**. WPP has both single-bottle and double-bottle baskets. The basket is attached to four leaders (400 lb. test fishing line) that are coupled to a 3/16-inch polyester rope (used to lower the unit down). Cross-contamination between stations is minimized by rinsing the basket three times (without bottles) with station water prior to use.



The weighted basket samplers can be used for all analytes (including bacteria), except metals. **DO NOT USE BUCKETS OF ANY KIND TO TAKE SAMPLES.**



Although sample collection directly into sample bottles is the preferred method for sample collection on rivers and streams, **Kemmerer, Van Dorn or other “thief” type samplers** can also be used. The sampler must be rinsed three times with water from the station to be sampled before each use. If a visible residue remains attached to sampler after rinsing, wipe the inside clean with towels and rinse again three times. In high flow situations, Van Dorn or other “thief” type sample may “surf” on the water surface and not submerge to an appropriate depth for sampling. In these situations, weights should be added/strapped to the outside of a Van Dorn sampler so the sampler will submerge below the water surface to the appropriate depth.



6.0 REAGENTS

The on-site preservation of samples requires that some preservation reagents be available to the sampling crew. The bulk of reagents handled by WPP sampling crews are dilute acids. Acid preservative is generally supplied in single-use plastic vials with 1 ml of 1:3 H_2SO_4 , 1:1 HNO_3 , or 1:1 HCl . Some sample containers may be supplied with the preservative already added (e.g., 1:1 H_3PO_4 for DOC, or sodium thiosulfate for bacterial samples).

7.0 CALIBRATION

Calibration is generally not applicable to water sample collection (Procedures for use and calibration of multi-probe instruments are described in standard operating procedure CN 004.26).

8.0 SAMPLING PROCEDURES

8.1 General

Project-specific sampling requirements should always be reviewed prior to entering the field, as part of sampling trip preparation. These requirements should include but are not limited to sample container preparation, equipment required, detailed description of sampling location, common problems



encountered, types of samples, and sample label information. Survey guidebooks or SAPs prepared by project coordinators contain much of the information that should be reviewed prior to entering the field.

WPP sample collection occurs in rivers and streams of varying characteristics (i.e., depth, gradient, access) and each situation may require a different approach for sample collection. It is critical that the monitors document any unanticipated conditions at the collection site. For example, if a stream is too shallow for proper collection techniques, this should be noted on the chain of custody (COC) and EDGE tablet or WPP fieldsheet. If samples were collected at a depth less than about 6 inches below the water surface, note on the EDGE tablet or WPP fieldsheet(s).

Most WPP samples are collected using new, pre-cleaned HDPE bottles.



8.2 **Sample Collection**

The major steps in taking a representative water quality grab sample are provided in the **Table 1** below. These techniques are applicable to most parameters, but some parameter-specific considerations are noted in Section 8.3. For consistency within WPP, ensure that the sampling meets the intent of these steps. If deviations are made, document them on the fieldsheet.

8.2.1 Pre-survey Activities

Survey preparation activities often occur days to weeks before the survey and sample collection. The pre-survey activities an individual needs to complete are dependent on their role in the survey or project (e.g., project coordinator, crew leader). The major steps in survey preparation are outlined below.

1. **Review approved QAPP and/or SAP** as needed for site locations, sampling equipment and sample analytes, etc.
2. **Preparing survey and sample collection information** (e.g., station and sample identifications, laboratory COCs, EDGE EDDs).
 - a. **Station identification:** Each **collection station** has a corresponding WPP identification number (the “Unique ID”) assigned when the station is registered with the station data manager. Ideally stations are registered before the start of sampling but can be registered after sampling.

- b. **Sample identification:** Get sample ID#s (aka, OWMIDs) and pre-printed OWMID labels for use on the fieldsheets (if needed) from the WPP Database Manager.
 - i. The WPP sample identification number (OWMID number) is designated as: a project code followed by four pre-determined sequential numbers (e.g., 27-0967). Each analyte group (aka “bottle group”) sampled is assigned a letter designation that is appended to the end of the OWMID. For example, a lake baseline project crew collects a chemistry and a nutrient sample, the WPP identification numbers could be designated as 27-0967_C and 27-0967_N. Project codes and analyte group designations are updated annually (**Attachment 1**).
 - c. **Survey guidebooks** (created as needed): Each site group (i.e., the set of sites sampled on a trip by a crew) typically has a guidebook. Guidebooks contain information about the sites such as site identification (Site ID, coordinates, waterbody, watershed, town), site access, relevant site characteristics (e.g., gradient, substrate), sample analytes and sample collection equipment that may impact survey preparation or sample collection.
 - d. **Pre-log samples (for WES) and COCs:** Pre-log the samples going to WES using web-based WinLIMS (complete instructions for pre-logging are updated annually: CN 001.97) and download the COCs generated from WinLIMS.
 - i. The lab login and sample IDs to be included on the bottle label is generated as part of the pre-log process.
 - ii. Template COCs for other labs are available in the WPP files; COCs supplied by another laboratory may also be used and should be complete according to their instructions.
 - e. **Pre-load EDGE EDDs with known survey information** (e.g., sites, OWMIDs, analytes) for use in the field. The procedures and protocols for using EDGE including the pre-loading of information, operations in the field, and workflow for management of the EDGE tablets and EDDs are outlined in SOP CN 00.00 EDGE Field Operations Manual (document in preparation). Prepare backup WPP paper fieldsheets for situations where EDGE cannot be used for documentation (i.e., technical issues).
3. **Coordination with the WPP Field and Laboratory Operations Coordinator for probes:** Probe request forms should be submitted to the WPP laboratory coordinator no later than two weeks prior to the survey. If the survey includes continuous probe deployments, probe requests should be submitted no later than one month prior to the survey. See SOP CN 004.26 Water Quality Multiprobes and CN 004.42 Continuous Probe Deployment for information on submitting probe requests.
4. **Review number and type of sample containers for trip,** including those needed for QC samples. Refer to **Attachment 1**. The project QAPP or SAP should provide general information on the type and number of sample containers needed at each collection station. The project leader is responsible for preparing the specific number, size, and type of containers with the proper labels for each station, including duplicates and blanks. Sample container substitutions can only be made after consulting with a project leader and WPP QC Analyst.



- a. **Affix completed sample labels.** Container labels provide information critical to the identification, analysis, and assessment of specific sampling locations. The labels may be placed on the dry containers prior to entering the field or at the car/truck. See label description above. **Place labeled bottles in site-specific bags if appropriate.**
5. **Review Survey Guidebooks** as needed for site locations and characteristics, sample analytes, access information, sampling equipment, etc.
6. **Sampling trip preparation** (assemble all gear for the trip using trip checklist). See **Attachment 3**. This includes vehicle scheduling, equipment inspections and preparations, EDD tablet preparation, personal gear (e.g., waders) preparation, and organizing bottles (if not already completed).

8.2.2 Sample Collection

For wade-in manual grab samples (river/stream). The following protocol is applicable for most wade-in-type grab sample collections. Exceptions include metals sampling using “clean hands - dirty hands” techniques.

1. Visually scan station for best wade in area that will provide the least disturbance of substrate and provide for a representative sample. Note any site conditions that may affect samples. Start filling out an electronic fieldsheet in EDGE or a WPP paper fieldsheet. If there is no water in the stream, record as “No Flow”.
 - a. Conservatively use USGS rule of thumb: do not wade in to sample if water depth (ft.) x velocity (fps) > 10. Where wading into the flow is not possible for the chosen site and no other alternative is available, ensure that a sample taken from the bank is in the flow and representative of the larger area. **IF A REPRESENTATIVE LOCATION CANNOT BE FOUND, DO NOT TAKE SAMPLE.**
2. Discuss and determine among the sample crew how and by who different sampling activities (e.g., sample collection, probe deploys, probe measurements) will be completed, with a goal of avoiding sediment disturbance upstream of the sampling point. Often this will require sampling activities to be completed sequentially and not concurrently due to river/streams characteristics (e.g., narrow channel, soft substrate bottom).
 - a. If sediments are disturbed upstream of the sampling point at any time, wait until the disturbance has abated (e.g., the sediment plume has passed the sampling point) before taking any samples.
3. If needed (see notes above) put on shoulder or elbow-length double polyethylene sampling gloves or other skin-protective gloves.
4. Enter the stream, move slightly upstream, and wait for any disturbed sediment to settle.
5. **RINSE the sample bottles (including the cap) three times with ambient water, emptying the bottle downstream of the sampler’s position. DO NOT RINSE BOTTLES ALREADY CONTAINING PRESERVATIVE.**
6. **For single sample bottle grabs,** uncap the bottle (careful to not contaminate the inside of the cap). Facing upstream, submerge the bottle with the opening facing upstream at a slight downward



angle approximately 6 inches below the water surface, gently sweep the bottle with opening faced upstream and slightly up, through the water to fill the bottle. Try to avoid collecting surface scum or bottom sediments and minimize air contact with open bottle. Cap bottles (with assistance if necessary). Leave enough head space in the bottle to allow preservation and sample mixing at the lab. Wade out.

7. **For co-located, duplicate samples**, repeat step 4, taking the sample immediately after the original sample, using the same sampling technique.
8. **Acid-preserve samples ASAP (if required).** Use caution with acids. Disposable gloves and safety glasses are recommended. Set up a stable, organized work area to ensure safe working conditions and ensure that each required sample is acidified properly and accounted for (avoid double dosing or skipping).
 - a. To acidify samples, add acid from the pre-aliquoted vials to the sample bottle to achieve sample pH <2. If working in teams, one person can un-cap the sample just long enough for the other person pour the acid. Check the project SAP for amounts needed (generally 1 vial per 250-ml sample). Recap and mix thoroughly the sample. Recap the acid vial and return it to the carrying container for later disposal (acid vials are collected and sent to WES for disposal).
9. **Place samples on ice** in cooler (4° C, dark) immediately.

For manual grab samples from river/stream bank or edge using sampling pole. The following protocol is applicable where collecting a representative wade-in-type grab sample is not possible due to water depth or velocity, but a representative location can be reached with a pole.

1. Visually scan the stream bank or edge at the station for a spot that will provide access to a representative location in the river/stream with the sampling pole. Note any site conditions that may affect samples.
2. Rinse the end of sampling pole (i.e., the bottle holders or clamps) with ambient water.
3. Clamp the sample bottle into the bottle holder at the end of the pole and uncap the bottle (careful to not contaminate the inside of the cap). Hold the caps without contaminating the inside of the cap or place them in a new plastic baggie.
4. **RINSE the sample bottles (including the cap) three times with ambient water, emptying the bottle downstream of the sampler's position. DO NOT RINSE BOTTLES ALREADY CONTAINING PRESERVATIVE.**
5. Reach out into the river/stream to the desired collection location. Invert sample bottle and submerge in water approximately 6 inches below the water surface. Rotate container upstream to fill container. Lift container from water. Try to avoid collecting surface scum or bottom sediments and minimize air contact with open bottle.
6. Cap bottles (with assistance if necessary). Leave enough head space in the bottle to allow preservation and sample mixing at the lab.
7. **Acid-preserve samples ASAP (if required).** Use caution with acids. Disposable gloves and safety glasses are recommended. Set up a stable, organized work area to ensure safe working conditions



and ensure that each required sample is acidified properly and accounted for (avoid double dosing or skipping).

- a. To acidify samples, add acid from the pre-aliquoted vials to the sample bottle to achieve sample pH <2. If working in teams, one person can un-cap the sample just long enough for the other person pour the acid. Check the project SAP for amounts needed (generally 1 vial per 250-ml sample). Recap and mix thoroughly the sample. Recap the acid vial and return it to the carrying container for later disposal (acid vials are collected and sent to WES for disposal).

8. **Place samples on ice** in cooler (4° C, dark) immediately.

For elevated drop/bridge grab samples (rivers/streams with >36 inches approximate water depth at drop location). There are two sampling equipment options for elevated drop/bridge grab samples: basket sampler and Van Dorn sampler.

Basket Sampler

1. Visually scan the drop location for unobstructed vertical drop and for approximate water depth >36 inches.
2. **Secure bottles inside the basket with cable cuffs or small bungees.** Do not deploy unless the bottles are tightly secured inside basket; if not secured, bottles will pop out on entry.
 - a. For bottles already containing preservative or analytes that require filtering, attempt to find a wade-in station to take the sample directly OR use a larger HDPE bottle as a temporary sample holder and pour or filter into the sample bottle(s) as soon as possible. Be sure to use a bottle large enough to allow the rinsing of filters and sample bottles, if necessary.
3. Unscrew caps and place in new plastic baggie.
4. **Rinse the basket and sample bottles (including caps) three times with ambient water. DO NOT RINSE BOTTLES ALREADY CONTAINING PRESERVATIVE.**
 - a. Lower slowly to water surface and gently plunge into water to approximately 6 inches below water surface and allow bottles to fill.
 - b. When bottles are full, pull up basket slowly. While pulling the basket up, be sure no debris from the bridge or the tow line/ rope is falling into the sample bottles.
 - c. Discard the ambient rinse water on the drop/bridge while also rinsing the caps.
5. **Collect samples using the basket sampler.**
 - a. Lower slowly to water surface and gently plunge into water to approximately 6 inches below water surface and allow bottles to fill.
 - b. When bottles are full, pull up basket slowly. While pulling the basket up, be sure no debris from the bridge or the tow line/ rope is falling into the sample bottles.
 - c. Cap sample bottles. Leave enough head space in the bottle to allow preservation and sample mixing at the lab.
6. **Acid-preserve samples ASAP (if required).** Use caution with acids. Disposable gloves and safety glasses are recommended. Set up a stable, organized work area to ensure safe working conditions



and ensure that each required sample is acidified properly and accounted for (avoid double dosing or skipping).

- a. To acidify samples, add acid from the pre-aliquoted vials to the sample bottle to achieve sample pH <2. If working in teams, one person can un-cap the sample just long enough for the other person pour the acid. Check the project SAP for amounts needed (generally 1 vial per 250-ml sample). Recap and mix thoroughly the sample. Recap the acid vial and return it to the carrying container for later disposal (acid vials are collected and sent to WES for disposal).

7. Place samples on ice in cooler (4° C, dark) immediately.

Van Dorn Sampler

1. Visually scan the drop location for unobstructed vertical drop and for approximate water depth >36 inches.

2. Rinse the Van Dorn sampler three times with ambient water.

- a. Set the spring-loaded end seals on the sampler and lower it to approximately 6 inches below the water surface.
- b. Wait a few seconds, send the messenger to trigger the end seals, and retrieve the sampler slowly.
- c. Open both stopper valves to rinse the stoppers on the end seals. Dispose of rinse water on the drop/bridge by pulling end seals open. Close stopper valves on end seals.
- d. Repeat rinse procedure two more times.

3. Collect samples using the Van Dorn sampler.

- a. Set the spring-loaded end seals on the sampler lower it to approximately 6 inches below the water surface.
- b. Wait a few seconds, send the messenger to trigger the end seals, and retrieve the sampler slowly.
- c. Rinse the sample bottle(s) three times (cap/shake/discard) using the water from the sampler. Use the stoppers on the end seals to dispense the water. **DO NOT RINSE BOTTLES ALREADY CONTAINING PRESERVATIVE.**
- d. Fill the rinsed sample bottle(s) and cap. Leave enough head space in the bottle to allow preservation and sample mixing at the lab.

4. Acid-preserve samples ASAP (if required). Use caution with acids. Disposable gloves and safety glasses are recommended. Set up a stable, organized work area to ensure safe working conditions and ensure that each required sample is acidified properly and accounted for (avoid double dosing or skipping).

- a. To acidify samples, add acid from the pre-aliquoted vials to the sample bottle to achieve sample pH <2. If working in teams, one person can un-cap the sample just long enough for the other person pour the acid. Check the project SAP for amounts needed (generally 1 vial per 250-ml sample). Recap and mix thoroughly the sample. Recap the acid vial and return it



to the carrying container for later disposal (acid vials are collected and sent to WES for disposal).

5. **Place samples on ice** in cooler (4° C, dark) immediately.

For shallow depth sampling (where very shallow water depth precludes the manual filling of designated sample bottles without sediment disturbance). Manually altering stream/riverbed to form a man-made pool deep enough to sample is not recommended. Proceed as follows:

1. Visually scan station for “flowing” pool or deeper section where a representative sample can be taken.
2. If an area is found, proceed as described in the **section for wade-in manual grab samples** using a rinsed smaller HDPE bottle (60 – 120 mL) to transfer ambient water to the designated sample bottle for rinsing and sample collection (a smaller assistance bottle may allow sampling in very shallow depths). Carefully observe if sediment is disturbed while sampling and if sample contains mostly water from the surface.
3. When the designated sample bottle is filled, cap and wade out. Take any duplicate samples immediately after the original sample, using the same technique.
4. Document situation on the electronic fieldsheet in EDGE or WPP paper fieldsheet. For example, note on the fieldsheet if sample contains predominately water off the surface due to shallow water depth.
5. If the entire area is too shallow, reconsider the need to sample the station, document its low flow characteristics and/or devise an alternative approach to take a representative sample, such as using a hand-operated vacuum pump.
6. **Acid-preserve samples ASAP (if required).** Use caution with acids. Disposable gloves and safety glasses are recommended. Set up a stable, organized work area to ensure safe working conditions and ensure that each required sample is acidified properly and accounted for (avoid double dosing or skipping).
 - a. To acidify samples, add acid from the pre-aliquoted vials to the sample bottle to achieve sample pH <2. If working in teams, one person can un-cap the sample just long enough for the other person pour the acid. Check the project SAP for amounts needed (generally 1 vial per 250-ml sample). Recap and mix thoroughly the sample. Recap the acid vial and return it to the carrying container for later disposal (acid vials are collected and sent to WES for disposal).
7. **Place samples on ice** in cooler (4° C, dark) immediately.

8.2.3 Sample Transportation to Laboratories

Transport samples to the lab as soon as possible (samples with longer hold-times may be held temporarily at WPP and delivered within a few days of sample collection). During transport, always keep the coolers containing samples in sight or locked in the car if stops are made. Do not leave samples unattended at any time, unless they are locked in a vehicle. In general, minimize sample handling.



Transfer custody at the lab using chain-of-custody form; the lab will scan and transmit the completed chain. At sample check-in, the lab will check cooler temperature and record it on the COC.

In general, for samples to be analyzed at WES and being stored temporarily at WPP, it is not advisable to sub-sample for other analyses (e.g., apparent color from chemistry bottle).

8.2.4 Clean/Decontaminate Equipment

Clean/decontaminate equipment used in rivers and streams with known non-native species (e.g., Eurasian milfoil, Asiatic clam) according to procedures in the WPP SOP CN 059.6 Field Equipment Decontamination to Prevent the Spread of Invasive Aquatic Organisms. All remaining equipment should be cleaned according to best practices or manufacturer's instructions.

8.3 Parameter-Specific Considerations for Field Sampling and Sample Handling:

8.3.1 Bacteria

As listed in **Attachment 1**, a bacteria group grab sample is collected in a sterile, 120ml HDPE container. Containers can be requested to have sodium thiosulfate tablet or powder included for dechlorination if ambient water at sampling locations possibly contains residual chlorine. When in doubt, request that sodium thiosulfate be included. Coordinate with the lab(s) as needed regarding special instructions for your project. Given the potential for residual chlorine to be present at many river locations sampled by WPP, it is standard practice to include sodium thiosulfate in bacteria sample bottles.

Specific sampling techniques are as follows, depending on bottle type used to sample (for consistent presentation to the labs, use the same bottle type and size as much as possible):

For wade-in grab samples for BACTERIA using 120 ml thiosulfate or non-thiosulfate bottles:

1. DO NOT RINSE INSIDE OF BOTTLES.
2. Uncap the bottle and hold the bottle near its bottom, and sweep the container through the water, to approx. 6 inches below the surface, with the opening facing upstream and slightly upwards (same as the standard sampling described in Section 8.2) to collect the sample.
3. Fill the container to the 100ml mark, leaving ample airspace to facilitate mixing by shaking. If thiosulfate is included, do not overfill.
4. Recap the bottle and put on ice to 4°C immediately.

For use of sterile, 250 ml NM, thiosulfate, or non-thiosulfate bottles to collect BACTERIA samples from drop locations using the basket sampler:

1. Rinse basket three times without bottles



2. Secure bottles inside basket with cable cuffs or small bungees. Do not deploy unit unless bottles are tightly secured inside the basket; if not secured, bottles will pop out on entry.
3. Break sterile seal and uncap bottle. Place cap(s) in new plastic baggie.
4. Collect samples using the basket sampler. **DO NOT RINSE INSIDE OF BOTTLES.**
 - a. Lower slowly to water surface and gently plunge into water to approximately 6 inches below water surface and allow bottles to fill.
 - b. When bottles are full, pull up basket slowly. While pulling the basket up, be sure no debris from the bridge or the tow line/ rope is falling into the sample bottles.
 - c. Cap sample bottles. Leave enough head space in the bottle to allow preservation and sample mixing at the lab.
5. Place on ice to 4 deg. C immediately.

It is important to document the samplers' expert opinion on the chain of custody when a site is suspected of having a high bacteria concentration. Informing the bacteria analyst when the site is suspect provides information on how the sample should be treated during analysis.

8.3.2 Phosphorus

Phosphorus (P) samples taken by WPP are usually Total Phosphorus (TP), but sometimes other fractions are desired, such as Dissolved Reactive Phosphorus (DRP), Total Dissolved P (TDP) or Total Reactive P (TRP).

The preferred preservation method for TP is 1 ml of 1:3 H₂SO₄ added to a 250 ml sample (new, pre-cleaned HDPE bottles) immediately after collection, followed by 4° C ice storage. This results in sample pH <2. Use 2 ml for 500 ml samples. The lab SOP should include lab verification of proper pH and thorough mixing prior to analysis within 28 days.

An alternative preservation method is freezing ASAP after collection (including immediate storage in ice to 4° C, then freezing). This method is allowed per Standard Methods, 24th Edition, and may be preferred by volunteer groups that do not care to work with acids. NOTE: This preservation method is not appropriate for NPDES compliance/enforcement monitoring (where acid preservation is required). If this method is used, the lab SOP shall include complete thawing followed by acidification to pH <2, thorough mixing, and overnight storage. This ensures that any P adsorbed to container walls is resolubilized prior to thorough mixing and taking of aliquots.

DRP analysis for dissolved reactive P is best done using field-filtered samples via WPP's field filtration apparatuses, such as 60 ml syringes and disposable 0.45 µm filter capsules. If separate, disposable membrane filters are used, they should be pre-soaked (50 filters in 2 L distilled/deionized water for 24 hours). If sampling is done using a pole or a device from a bridge, separate bottles for filtrate and raw



sample are needed. Filter in the field ASAP after collection. After filtration, place on ice (no acid preservation) and analyze within 48 hours.

8.3.3 Metals

THE COLLECTION OF TOTAL AND DISSOLVED METALS SAMPLES USING MODIFIED CLEAN SAMPLING TECHNIQUES SIMILAR TO THAT DESCRIBED IN EPA METHOD 1669 IS COVERED IN A SEPARATE WPP SOP (CN 101.0).

This type of sample collection, handling, and analysis involves special techniques for collecting ambient water for determination of metals at EPA water quality criteria levels. The “clean hands-dirty hands” protocol outlined in CN 101.0 involves a high level of attention to minimizing sample contamination due to metals in the immediate sampling area (e.g., airborne particulates, human breath, particle on hands, clothes, etc.). For analysis of more common metals (Ca, Mg, Na) by EPA 200.7 may not require the “clean hands-dirty hands” sample collection protocol, but the requirements should be evaluated on a case-by-case basis.

9.0 QUALITY CONTROL

9.1 General

For the purposes of this SOP, quality control (QC) is the sum of all field sampling measures designed and implemented to limit (and sometimes provide quantitative estimates for) the amount of systematic and random error. The QC process for proper sample collection starts with the EPA-approved program quality assurance project plan (QAPP) and ends with successful sample delivery to the analytical lab. The approved project SAP should verify the data quality objectives (e.g., accuracy, precision, etc.) identified in the QAPP.

The WPP typically collects two types of quality control samples in the field: ambient field blanks and duplicate samples. (NOTE: Trip blanks are collected only when VOC samples are collected. A trip blank is a sample of type II reagent grade deionized water made at the WPP, taken to the sampling site, and returned to the laboratory unopened.)

The general rule is that blanks and duplicates are taken at 10% of total samples collected, or once per sampling day. A lower frequency of QC samples for some situations (e.g., sample collection at one or two lakes per day) may specified in the project SAP with prior consultation with the project QA officer. The duplicate and blank sample station(s) selection method should be identified in the approved QAPP. It is recommended that these stations be randomly selected and rotated from among all the sampling stations, to best estimate sampling program precision for individual analytes.



9.2 Ambient Field Blank

The ambient field blank is a deionized water sample that is otherwise treated the same as other samples taken from the field. Filling a pre-cleaned sample container with deionized water and transferring the water into a second pre-cleaned container on location creates a field blank. Except for the type of water in them, the field blank and all samples should be handled, preserved, and transported the same way. For example, if the field blank has been designated to represent a particular group that requires the addition of the preservative 1:3 H₂SO₄, add the preservative to the designated samples including the field blank.

Field blanks are submitted blind to the laboratory along with all other samples and are used to detect any contaminants that may be introduced during sample collection, storage, transport, and analysis. Generally, when the field blank is analyzed, it should read as analyte-free (< MDL or <MRL).

9.3 Field Duplicate Samples

The preferred type of sample duplicate is a co-located duplicate. These are taken as sequential manual grabs or as simultaneous grab samples using the weighted sample bottle basket apparatus.

The field duplicate sample provides an estimate of the overall precision or repeatability of the measurement, and accounts for both analytical and field sampling error. The use of co-located duplicates includes most of the sampling process variability (excludes variability associated with selecting a representative location for sample collection) and, to some extent, natural temporal variability. Duplicate samples are delivered blind to the lab to hide the identity of the sample type from the analysts.

9.4 Field Performance Audits

The intent of field performance audits is to ensure that accepted SOPs are being implemented consistently between groups. As a standard practice, both scheduled and unscheduled field method performance evaluations are conducted by WPP's QC Analyst, usually early in the monitoring season (to correct any problems early). Monitoring staff are advised to sample as they regularly do, and not to misrepresent how sampling is/will be typically occurring for their project. While not always possible, an attempt is made annually to field audit each person at least once.

9.5 QC Coordination within WPP

Quality control for effective data collection must be designed (program QAPP and project SAP) and then implemented. With assistance from WPP's Quality Control Analyst, responsible monitoring staff should continually evaluate QAPP/SAP implementation for their project. Mid-course corrections that deviate from the approved SAP are sometimes necessary to produce more accurate, precise, representative, complete and/or comparable data. The monitoring staff should work closely with the QC Analyst as needed to resolve problems and discuss methodological/analytical issues. Proposed changes from the approved SAP should be discussed and approved by WPP.



For clear communication, monitors should work through the WPP QC Analyst for issues related to analytical methods and laboratory QC.

10.0 INTERFERENCES

The primary goal in field sampling is to ensure that the sample collected reflects ambient conditions at the time of sampling. The integrity of the sample and its associated quality control is dependent on following standardized sample collection, preservation, storage, and transport protocols. The collection of incongruous materials (sticks, stones, surface scum, etc.) and improper sampling techniques introduces unnecessary error into the analytical measurement system and affects data usability.

11.0 PREVENTATIVE MAINTENANCE

A copy of the SAP should be distributed to each sampling team for review prior to going on site. The SAP will provide the reader with several important aspects of the sampling plan, including but not limited to, site location, site background, chain of custody procedures, required sample volumes, shipping requirements, equipment required, and labeling procedures.

Sampling trip preparation is very important to successfully collecting samples. New sampling staff must be fully trained by experienced staff prior to going into the field. At the minimum, new staff members are required to have a copy of and to have read the required instrument and sampling standard operating procedures. New and experienced staff must also incorporate safety into the sampling routine by adhering to the prescribed field sampling safety considerations.

The use of non-routine sampling techniques, current site conditions, current climate, and any unusual observations must be noted on the chain of custody, and WPP field sheet. These notes help the WPP assessment group and other analysis make informed decisions about the data collected.

12.0 CORRECTIVE ACTIONS

No sampling plan is implemented without some problems occurring. When issues arise, such as unanticipated site conditions or new information that affects the sampling or SAP, a system must be in place to address the problem. It is imperative to address the problem effectively to avoid encountering the problem in the future.

WPP sampling crews have several available outlets to start the process of correcting a problem. First and foremost, document the problem on the chain of custody, and WPP field sheet. The project leader is directly responsible for the preparation of the SAP and performance of the sampling crew. Submit any concerns or observations to the project leader so they can address the problem from their perspective. If



the project leader requests further action, the environmental monitoring supervisor, environmental assessment leader and the designated quality control person can help find a solution.

Do not assume somebody else is taking care of the problem.

13.0 REFERENCE

American Public Health Association, American Water Works Association, Water Environment Federation. Lipps WC, Braun-Howland EB, Baxter TE, eds. (2023). *Standard Methods for the Examination of Water and Wastewater*. 24th ed. APHA Press, Washington D.C.



14.0 ATTACHMENTS

1. Sampling Analyte Groups
2. Sampling Tips
3. Survey Checklists
4. Standard WPP Field Kit Items
5. Standard Forms for Sampling (COC, probe-request, fieldsheets)



ATTACHMENT 1: Sampling Analyte Groups*

Sampling Analyte Groups* (for water matrices)					
Bottle Group Code	Analyte	Laboratory Method	Sample Container	Preservative	Hold Time
N	Total Phosphorus (TP)	SM 4500-P F	250 mL or 500 mL HDPE WM Precleaned, Certified	1mL 1:3 H ₂ SO ₄ (pH<2) per 250 mL Cool to 4°C	28 days
	Total Nitrogen (TN)	SM 4500-N C			
	Nitrate/Nitrite (NO ₃ /NO ₂ -N)	SM 4500-NO3 F			
	Ammonia (NH ₃ -N)	SM 4500-NH3 G			
N2	Total Phosphorus (TP)	SM 4500-P F	250 mL HDPE WM Precleaned, Certified	1mL 1:3 H ₂ SO ₄ (pH<2) Cool to 4°C	28 days
	Total Nitrogen (TN)	SM 4500-N C			
N3	Orthophosphate as P (o-P)	EPA 365.1	120 mL HDPE NM Precleaned, Certified	Cool to 4°C	48 hours
CL	Chloride (Cl ⁻)	SM 4500-Cl E	60 mL HDPE NM	Cool to 4°C	28 days
M	Magnesium (Mg ⁺)	EPA 200.7	250 mL HDPE NM Precleaned, Certified	1mL 1:1 HNO ₃ (pH<2) Cool to 4°C	6 months
	Sodium (Na ⁺)				
	Calcium (Ca ⁺)				
	Dissolved Hardness (Calculated from Ca ⁺ and Mg ⁺)	SM 2340 B			
OC	Dissolved Organic Carbon (DOC)	SM 5310 C	(2) 40 mL Clear Type-1 Glass Vial	0.25mL H ₃ PO ₄ (pH<2) Cool to 4°C	28 days
B	E. coli	SM 9223 B	120mL IDEXX Collection Vessel (Sterile)	Na ₂ S ₂ O ₃ (in bottle) Cool to 4°C	8 hours
C	Total Alkalinity	SM 2320 B	500mL HDPE NM	Cool to 4°C	14 days



			Precleaned, Certified		
H	Total Hardness	EPA 200.7 SM 2340 B	500mL HDPE NM Precleaned, Certified	2mL 1:1 HNO ₃ (pH<2) Cool to 4°C	6 months
R	Turbidity	SM 2130 B	120mL HDPE WM Precleaned, Certified	Cool to 4°C	48 hours
	True Color	SM 2120C			
I	Chlorophyll a	EPA 445	25 mL HDPE Amber WM	Cool to 4°C	24 hours (filter/freeze) 21 days (grind/analyze)
A	Phytoplankton	Genus w/biovolume	250mL HPDE Amber WM	5% Lugol's Solution Cool to 4°C	6 months
S	Total Suspended Solids (TSS)	SM 2540D	1L HDPE WM	Cool to 4°C	7 days
MC	Microcystins and Nodularins, Total	EPA 546	120mL Glass Amber	Cool to 4°C	14 days
AT	Anatoxin-a	Abraxis ELISA	120mL Glass Amber	Cool to 4°C	28 days

* Analyte Bottle Groups are updated annually; current documentation is available in WPP's shared documents (OneDrive, SharePoint)



ATTACHMENT 2: Sampling Tips for WPP Surveys

- **SAFETY FIRST**
- All sampling procedures must be detailed in a WPP SOP, and those procedures followed by all samplers. This ensures consistency of technique within the group and allows data to be easily compared. Samplers must avoid affecting water quality and impacting sample integrity due to their activities at each site (avoid sampler effects).
- Principal Investigators (PIs) should take **care and responsibility** for all aspects of surveys from start to finish. Adequate preparation and open communication are very important to successful surveys. Pre-survey meetings with all crew members are encouraged to enable final planning and coordination, especially for initial surveys of the season.
- Adjust survey logistics as needed in May-June to provide for **reasonably paced surveys** for all crews. This helps to avoid rushing around and to collect better field notes.
- PIs and survey crew leads should provide **on-the-job observation and training** of seasonal staff (in addition to their initial training) on an on-going basis.
- **Follow the most current WPP guidance on property access to collect samples.** Do not trespass onto posted private property without permission from the property owner. (MassDEP does not issue liability waivers to cover property owners in case of injury to WPP staff while on private property.)
- Field decontamination of boots and equipment is standard WPP practice to avoid spreading invasive organisms from affected to unaffected location (e.g., removing macroscopic plant fragments from boats and trailers). See most recent version of Quickguide for Field Equipment Decontamination CN 59.95 (2020)
- **Pre-rinse** bottles with sample water immediately prior to taking samples (including when using bottle basket sampler), except for bacteria bottles or pre-acidified bottles, i.e., do not pre-rinse for those.
- If, for any reason, you feel that the collected sample is not **representative** (e.g., contains sediment, leaves, trash, etc.) of waterbody conditions, discard the sample, rinse the bottle again and retake the sample.
- In addition to sample bottle labels, mark bottle caps with ID# to assist field crews and labs keep the caps straight. Use Sharpie pen or small, pre-loaded labels (if available).
- Use **sodium thiosulfate** for all bacteria samples suspected of having residual chlorine OR as a standard practice.
- For all collections, including bacteria, **fill bottles to within ~½ inch of the top** (adequate for mixing sample at the lab; ignore fill lines on bottles in the field).
- When acidifying NUTS samples, use one vial of 1:3 H₂SO₄ (1 ml acid) per 250 ml of sample.
- For color, hardness, and turbidity analyses at WPP lab, use one 125-250 ml bottle for all analyses. Practical holding time for all tests is 48 hours. Use designated lab notebooks—fill out completely. Use same lab ID # for same bottle samples (e.g., color and turbidity).



- WPP fieldsheets have a section for field GPS coordinates. Only use this section if an alternate site greater than 100 feet from the designated site is being sampled for a specific unavoidable situation (e.g., bridge replace makes access to a particular crossing impossible).
- Pls need to review original data package (all crew's fieldsheets, COC, etc.) for accuracy and completeness and initial at the top of the fieldsheet, prior to submittal to the WPP Laboratory Coordinator's inbox for scanning.
- Evaluate precision of habitat evaluations and scoring by using >1 analyst. Follow EPA Rapid Bioassessment Protocol guidance to make appropriate decisions.
- **Make sure depth lines are calibrated prior to use** (mainly for lakes)
- Survey books should include probe deployment sites (inc. exact locations, which may differ slightly from WQ sample stations).
- Use contract lab-provided BACT sample bottles and COC form, where applicable:
- Please keep all personal boots and raingear at your desk.
- Keep lab AND prep, and storage room areas clean (if you mess it up, please clean it up).
- Use **common sense and good judgment** in decision-making and maintain consistency with SOPs. If questions, consult SOPs and/or discuss with other staff.

WPP SOP REFERENCES:

WPP SOPs are available in the SharePoint SOP drive:

<https://massgov.sharepoint.com/sites/DEP-BWR/SOP/>

The complete list of documents in the SOP folder is available near the top of the file at:

[aaa_CN_DOCUMENT_LIST_updated_2022-03-09.xlsx](#) including but not limited to:

CN 00.2.1	2025	SOP_Field Safety
CN 001.23	2025	SOP_Field Sampling
CN 001.31	2025	SOP_Sample Collection Pole
CN 001.36	2025	SOP_Hinged Pole Sampler
CN 001.5	2005	SOP_Stormwater Monitoring
CN 001.56	2025	SOP_Sampling Collection Techniques for Stormwater Manholes
CN		
001.991	2024	WinLiMS_SamplePreLog 2024
CN 035.0	1998	SOP_Periphyton Sampling
CN 059.96	2024	SOP_Quickguide for Field Equipment Decontamination .docx
CN 151.1	2025	SOP_Lake Sampling.doc



ATTACHMENT 3: Survey Checklists

BASIC SURVEY CHECKLIST (updated 2022)

- ☐ **Multi-probes** (reserved one week prior to survey)
- ☐ Pre-filled **fieldsheets** for each crew with fieldsheet sample labels attached
- ☐ Pre-filled **COC** forms for each crew
- ☐ **Notification and coordination with all applicable labs** re: sample delivery, including WPP labs
- ☐ **Pre-logged sample data into WES LIMS**, including pre-filled and printed sample bottle labels (for WES samples only)
- ☐ Labeled **sample bottles** (for each crew and from each lab), including QC samples and an “extra” bottle bag/crew
- ☐ Acid **preservative** (1:3 H₂SO₄ in vials for nutrient samples)
- ☐ **Coolers w/ ice**
- ☐ **Survey books**, including USGS/other road/trail maps (for each crew)
- ☐ **Vehicle books** (inc. gas/maintenance card and garage card)
- ☐ **Clipboard, ink field pens and extra fine point Sharpies**
- ☐ **Digital camera** (signed out)
- ☐ **Field kit, including separate first aid kit**
- ☐ **Personal protective equipment** (e.g., waterproof boots, raingear, PFDs, sunglasses, hat, warm clothing, traffic safety vest, and other items as needed that are not already in field kit)
- ☐ **Personal tools and materials** (e.g., Swiss army knife, Leatherman, bug net hat, field notebook, etc...)
- ☐ **Bottle basket sampler** (bridge drops)
- ☐ **Van Dorn sampler, Secchi disk, weighted hose sampler** (lakes)
- ☐ **Anchor bucket** (w/ rope attached)
- ☐ **Traffic safety cone** (min. one in each vehicle)
- ☐ **Outdoor storage building items** (as needed)
- ☐ **Survey-specific items** (e.g. measuring tape, max. depth device, machete, etc. as needed)



ATTACHMENT 4: Standard Field Kit Items

Field Kit Items:	√
Standard items:	
FIRST AID KIT (STAND ALONE)	
EXTRA MARKERS (SHARPIE, PEN, PENCIL)	√
Rubber bands	√
Assorted gloves	√
Plastic sampling gloves (several pairs)	√
Compass	√
Colored flagging	
Flashlight	√
Sunscreen	√
Insect repellent	√
Bacteriocidic lotion	√
Poison ivy/oak wash lotion	√
Foot ruler	√
CPR face mask	√
Safety glasses (1 pair)	√
Safety vests	√
Can liner bags	√
Plastic tie wraps	√
Screwdriver	√
Optional: (not included as standard)	
Electrical tape	
Moist towelettes/paper towels	
State map	
Polarized sunglasses	
Poison Ivy pre-exposure lotion	
Tape measure	

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MassDEP/DWM/Watershed Planning Program
RIVERS FIELD SHEET (2024)

Crew Lead (initial): _____

STATION INFORMATION (fill out prior to departure)			
Field Sheet Login #:	Unique ID:	Registered Lat/Long:	
Project:	Site Name (STAID):		
Waterbody Name:	Town:		
GENERAL SITE INFORMATION			
Alternate Station Description (Does site match description?) <input type="checkbox"/> YES <input type="checkbox"/> NO <i>If not, describe below:</i>			
Alt. Field Lat/Long		Lat/Long Method <input type="checkbox"/> GETAC F110 Tablet <input type="checkbox"/> Handheld GPS <input type="checkbox"/> Other	
Survey Crew Lead:		Other Crew:	
Date:		Time: <input type="checkbox"/> EST <input type="checkbox"/> EDT	
Weather Conditions	<input type="checkbox"/> Clear <input type="checkbox"/> Mostly sun <input type="checkbox"/> Mostly cloud <input type="checkbox"/> Overcast <input type="checkbox"/> Fog <input type="checkbox"/> Drizzle <input type="checkbox"/> Rain <input type="checkbox"/> Sleet <input type="checkbox"/> Snow		
Air Temperature	<input type="checkbox"/> < 20 °F <input type="checkbox"/> 21-30 °F <input type="checkbox"/> 31-40 °F <input type="checkbox"/> 41-50 °F <input type="checkbox"/> 51-60 °F <input type="checkbox"/> 61-70 °F <input type="checkbox"/> 71-80 °F <input type="checkbox"/> 81-90 °F <input type="checkbox"/> 91-100 °F		
Water Odor	<input type="checkbox"/> None <input type="checkbox"/> Musty <input type="checkbox"/> Petrol <input type="checkbox"/> Sewage <input type="checkbox"/> Effluent <input type="checkbox"/> Sulfide <input type="checkbox"/> Fishy <input type="checkbox"/> Chlorine <input type="checkbox"/> Rotten Veg. <input type="checkbox"/> Other <input type="checkbox"/> Unobservable		
Turbidity	<input type="checkbox"/> None <input type="checkbox"/> Slightly Turbid <input type="checkbox"/> Moderately Turbid <input type="checkbox"/> Highly Turbid <input type="checkbox"/> Unobservable		
Water Color	<input type="checkbox"/> None <input type="checkbox"/> Brownish <input type="checkbox"/> Blackish <input type="checkbox"/> Greenish <input type="checkbox"/> Greyish <input type="checkbox"/> Reddish <input type="checkbox"/> Yellowish <input type="checkbox"/> Other <input type="checkbox"/> Unobservable		
Floating Scum	<input type="checkbox"/> None <input type="checkbox"/> Algal mat <input type="checkbox"/> Foam <input type="checkbox"/> Oily sheens <input type="checkbox"/> Pollen blankets <input type="checkbox"/> Sewage <input type="checkbox"/> Other <input type="checkbox"/> Unobservable <u>Description:</u>		
General Notes:			
OBSERVATIONS (RIVER ONLY)			
Flow Condition	<input type="checkbox"/> Flowing <input type="checkbox"/> No Water <input type="checkbox"/> Stagnant <input type="checkbox"/> Ice Covered <input type="checkbox"/> No Access		
Est. Flow Velocity	<input type="checkbox"/> ~0 fps <input type="checkbox"/> < 1 fps <input type="checkbox"/> 1-3 fps <input type="checkbox"/> 3-5 fps <input type="checkbox"/> > 5 fps		
Tidal Condition	<input type="checkbox"/> Not Applicable <input type="checkbox"/> Ebb (outgoing tide) <input type="checkbox"/> Flood (incoming tide) <input type="checkbox"/> Slack <input type="checkbox"/> Indeterminate		
% Open Sky:	_____ % (e.g., total shade=0%, total sun = 100%)		
Dominant Substrates	<input type="checkbox"/> Bedrock <input type="checkbox"/> Boulder <input type="checkbox"/> Cobble <input type="checkbox"/> Coarse gravel <input type="checkbox"/> Sand <input type="checkbox"/> Silt/Mud/Clay <input type="checkbox"/> Unobservable		
Staff Gage Reading (in feet to the 1/100 th):	_____ ft		
Discharge (Reference)	<input type="checkbox"/> Upstream of a discharge <input type="checkbox"/> Adjacent to a discharge <input type="checkbox"/> Downstream of a discharge <input type="checkbox"/> Unknown		
OBSERVATIONS (RIVER AND LAKE)			
Objectionable Deposits	<input type="checkbox"/> None <input type="checkbox"/> Trash <input type="checkbox"/> Flocculent mass <input type="checkbox"/> Other <input type="checkbox"/> Unobservable <u>Description:</u>		
Shoreline Erosion	<input type="checkbox"/> None <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Severe <input type="checkbox"/> Unobservable <u>Description:</u>		
Wildlife	<input type="checkbox"/> None <input type="checkbox"/> Fish <input type="checkbox"/> Mammals <input type="checkbox"/> Birds <input type="checkbox"/> Amphibians <input type="checkbox"/> Other <u>Description:</u>		
Beneficial Uses	<input type="checkbox"/> None <input type="checkbox"/> Swimming <input type="checkbox"/> Boating <input type="checkbox"/> Water intake <input type="checkbox"/> Fishing <input type="checkbox"/> Other <u>Description:</u>		
Pollution Sources	<input type="checkbox"/> None <input type="checkbox"/> Outfalls <input type="checkbox"/> Garbage <input type="checkbox"/> Road runoff <input type="checkbox"/> Waterfowl <input type="checkbox"/> Land clearing <input type="checkbox"/> Lawns		
Aesthetics Impaired?	<input type="checkbox"/> YES <input type="checkbox"/> NO <i>Based on water odor, clarity, unnatural color, growths, scum and/or deposits, is the site impaired?</i>		
Water Level (relative to annual high-water level)	<input type="checkbox"/> Low <input type="checkbox"/> Normal <input type="checkbox"/> High Water level, ft above/below _____ ft		



STATION SPECIFIC PLANT DENSITY		None 0%	Sparse 1-25%	Moderate 25-50%	Dense 50-75%	Very Dense 75-100%	Unobservable
Overall Aquatic Plants		<input type="checkbox"/> N	<input type="checkbox"/> S	<input type="checkbox"/> M	<input type="checkbox"/> D	<input type="checkbox"/> VD	<input type="checkbox"/> U
Floating Aquatic Plants		<input type="checkbox"/> N	<input type="checkbox"/> S	<input type="checkbox"/> M	<input type="checkbox"/> D	<input type="checkbox"/> VD	<input type="checkbox"/> U Species: _____
Emergent Aquatic Plants		<input type="checkbox"/> N	<input type="checkbox"/> S	<input type="checkbox"/> M	<input type="checkbox"/> D	<input type="checkbox"/> VD	<input type="checkbox"/> U Species: _____
Submerged Aquatic Plants		<input type="checkbox"/> N	<input type="checkbox"/> S	<input type="checkbox"/> M	<input type="checkbox"/> D	<input type="checkbox"/> VD	<input type="checkbox"/> U Species: _____
Duckweed		<input type="checkbox"/> N	<input type="checkbox"/> S	<input type="checkbox"/> M	<input type="checkbox"/> D	<input type="checkbox"/> VD	<input type="checkbox"/> U
Free-floating algae		<input type="checkbox"/> N	<input type="checkbox"/> S	<input type="checkbox"/> M	<input type="checkbox"/> D	<input type="checkbox"/> VD	<input type="checkbox"/> U
ALGAL BLOOM							
Algal Bloom Present <input type="checkbox"/> YES <input type="checkbox"/> NO							
Bloom Type <input type="checkbox"/> Cyanobacteria <input type="checkbox"/> Green Algae <input type="checkbox"/> Other <input type="checkbox"/> Unknown							
Evidence of Bloom (check all that apply) <input type="checkbox"/> Scum <input type="checkbox"/> Color <input type="checkbox"/> Turbidity <input type="checkbox"/> Odor <input type="checkbox"/> Other							
Lakeward Width (in meters) <input type="checkbox"/> <1 m <input type="checkbox"/> 1-5 m <input type="checkbox"/> 5-10 m <input type="checkbox"/> 10-15 m <input type="checkbox"/> >15 m							
Shoreline Length (in meters) <input type="checkbox"/> <1 m <input type="checkbox"/> 1-5 m <input type="checkbox"/> 5-10 m <input type="checkbox"/> 10-15 m <input type="checkbox"/> >15 m							
Bloom specific notes: _____							
SITE SPECIFIC PERIPHYTON		None: 0%	Sparse: 1-25%	Moderate: 25-50%	Dense: 50-75%	Very Dense: 75-100%	Unobservable
Filamentous	<input type="checkbox"/> N <input type="checkbox"/> S <input type="checkbox"/> M <input type="checkbox"/> D <input type="checkbox"/> VD <input type="checkbox"/> U	Color: <input type="checkbox"/> Black <input type="checkbox"/> Brown <input type="checkbox"/> Green <input type="checkbox"/> Grey <input type="checkbox"/> Other Location: <input type="checkbox"/> On plants <input type="checkbox"/> On rocks <input type="checkbox"/> On bottom Location Type: <input type="checkbox"/> Riffle <input type="checkbox"/> Run <input type="checkbox"/> Pool					
Film	<input type="checkbox"/> N <input type="checkbox"/> S <input type="checkbox"/> M <input type="checkbox"/> D <input type="checkbox"/> VD <input type="checkbox"/> U	Color: <input type="checkbox"/> Black <input type="checkbox"/> Brown <input type="checkbox"/> Green <input type="checkbox"/> Grey <input type="checkbox"/> Other Location: <input type="checkbox"/> On plants <input type="checkbox"/> On rocks <input type="checkbox"/> On bottom Location Type: <input type="checkbox"/> Riffle <input type="checkbox"/> Run <input type="checkbox"/> Pool					
Loose Floc	<input type="checkbox"/> N <input type="checkbox"/> S <input type="checkbox"/> M <input type="checkbox"/> D <input type="checkbox"/> VD <input type="checkbox"/> U	Color: <input type="checkbox"/> Black <input type="checkbox"/> Brown <input type="checkbox"/> Green <input type="checkbox"/> Grey <input type="checkbox"/> Orange <input type="checkbox"/> White <input type="checkbox"/> Other Location: <input type="checkbox"/> On plants <input type="checkbox"/> On rocks <input type="checkbox"/> On bottom Location Type: <input type="checkbox"/> Riffle <input type="checkbox"/> Run <input type="checkbox"/> Pool					
Moss (enter in Rivers section)	<input type="checkbox"/> N <input type="checkbox"/> S <input type="checkbox"/> M <input type="checkbox"/> D <input type="checkbox"/> VD <input type="checkbox"/> U	Color: <input type="checkbox"/> Black <input type="checkbox"/> Brown <input type="checkbox"/> Green <input type="checkbox"/> Grey <input type="checkbox"/> Other Location: <input type="checkbox"/> On plants <input type="checkbox"/> On rocks <input type="checkbox"/> On bottom Location Type: <input type="checkbox"/> Riffle <input type="checkbox"/> Run <input type="checkbox"/> Pool					
SAMPLE - GENERAL							
Samples taken from <input type="checkbox"/> From shore/left bank <input type="checkbox"/> From shore/center stream <input type="checkbox"/> From shore/right bank <input type="checkbox"/> Wade in/left bank <input type="checkbox"/> Wade in/center stream <input type="checkbox"/> Wade in/right bank <input type="checkbox"/> Bridge upstream <input type="checkbox"/> Bridge downstream <input type="checkbox"/> Boat <input type="checkbox"/> Shore (Lake) <input type="checkbox"/> Wading (Lake) <input type="checkbox"/> Dock <input type="checkbox"/> Pipe <input type="checkbox"/> Other (describe): _____							
Samples taken from description: _____							



Sample-Lab	<Place OWMID Label here>	<Place OWMID Label here>	<Place OWMID Label here>
Sample Type	<input type="checkbox"/> FQC_BLANK (Blank) <input type="checkbox"/> FQC_BLANKRINS (Equipment Blank) <input type="checkbox"/> FQC_REP (Field Duplicate) <input type="checkbox"/> FS_IVP (Integrated Vertical Profile) <input type="checkbox"/> FS_ROUTINE (Routine Sample) <input type="checkbox"/> Other:	<input type="checkbox"/> FQC_BLANK (Blank) <input type="checkbox"/> FQC_BLANKRINS (Equipment Blank) <input type="checkbox"/> FQC_REP (Field Duplicate) <input type="checkbox"/> FS_IVP (Integrated Vertical Profile) <input type="checkbox"/> FS_ROUTINE (Routine Sample) <input type="checkbox"/> Other:	<input type="checkbox"/> FQC_BLANK (Blank) <input type="checkbox"/> FQC_BLANKRINS (Equipment Blank) <input type="checkbox"/> FQC_REP (Field Duplicate) <input type="checkbox"/> FS_IVP (Integrated Vertical Profile) <input type="checkbox"/> FS_ROUTINE (Routine Sample) <input type="checkbox"/> Other:
OWMID Parent			
Medium	<input type="checkbox"/> Water <input type="checkbox"/> Sediment <input type="checkbox"/> Other	<input type="checkbox"/> Water <input type="checkbox"/> Sediment <input type="checkbox"/> Other	<input type="checkbox"/> Water <input type="checkbox"/> Sediment <input type="checkbox"/> Other
Medium (Subdivision)	<input type="checkbox"/> SW (Surface Water) <input type="checkbox"/> MunSewEff (Muni. Sewage Effluent) <input type="checkbox"/> StmW (Stormwater) <input type="checkbox"/> Unknown	<input type="checkbox"/> SW (Surface Water) <input type="checkbox"/> MunSewEff (Muni. Sewage Effluent) <input type="checkbox"/> StmW (Stormwater) <input type="checkbox"/> Unknown	<input type="checkbox"/> SW (Surface Water) <input type="checkbox"/> MunSewEff (Muni. Sewage Effluent) <input type="checkbox"/> StmW (Stormwater) <input type="checkbox"/> Unknown
Relative Depth	<input type="checkbox"/> Surface <input type="checkbox"/> Mid-Water <input type="checkbox"/> Near Bottom	<input type="checkbox"/> Surface <input type="checkbox"/> Mid-Water <input type="checkbox"/> Near Bottom	<input type="checkbox"/> Surface <input type="checkbox"/> Mid-Water <input type="checkbox"/> Near Bottom
Start/End Depth	/	/	/
Start Date/Time	<input type="checkbox"/> EDT <input type="checkbox"/> EST	<input type="checkbox"/> EDT <input type="checkbox"/> EST	<input type="checkbox"/> EDT <input type="checkbox"/> EST
End Date/Time	<input type="checkbox"/> EDT <input type="checkbox"/> EST	<input type="checkbox"/> EDT <input type="checkbox"/> EST	<input type="checkbox"/> EDT <input type="checkbox"/> EST
Gear Type	<input type="checkbox"/> Water Bottle <input type="checkbox"/> Tygon Tube <input type="checkbox"/> Sampling Pole <input type="checkbox"/> Auto Sampler <input type="checkbox"/> Van Dorn <input type="checkbox"/> Other <input type="checkbox"/> Basket <input type="checkbox"/> N/A	<input type="checkbox"/> Water Bottle <input type="checkbox"/> Tygon Tube <input type="checkbox"/> Sampling Pole <input type="checkbox"/> Auto Sampler <input type="checkbox"/> Van Dorn <input type="checkbox"/> Other <input type="checkbox"/> Basket <input type="checkbox"/> N/A	<input type="checkbox"/> Water Bottle <input type="checkbox"/> Tygon Tube <input type="checkbox"/> Sampling Pole <input type="checkbox"/> Auto Sampler <input type="checkbox"/> Van Dorn <input type="checkbox"/> Other <input type="checkbox"/> Basket <input type="checkbox"/> N/A
Gear Serial #			
Composite (Type)	<input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> Flow <input type="checkbox"/> Time <input type="checkbox"/> Depth	<input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> Flow <input type="checkbox"/> Time <input type="checkbox"/> Depth	<input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> Flow <input type="checkbox"/> Time <input type="checkbox"/> Depth
Field Lat/Long	/	/	/
Field Lat/Long Method	<input type="checkbox"/> GETAC F110 Tablet <input type="checkbox"/> Other: <input type="checkbox"/> Handheld GPS	<input type="checkbox"/> GETAC F110 Tablet <input type="checkbox"/> Other: <input type="checkbox"/> Handheld GPS	<input type="checkbox"/> GETAC F110 Tablet <input type="checkbox"/> Other: <input type="checkbox"/> Handheld GPS
Sample Notes			
Bottle Group	Planned Collected Preserved In Field Filtered In Field	Planned Collected Preserved In Field Filtered In Field	Planned Collected Preserved In Field Filtered In Field
Bacteria (B)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Na ₂ S ₂ O ₃ <input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Na ₂ S ₂ O ₃ <input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Na ₂ S ₂ O ₃ <input type="checkbox"/> Y <input type="checkbox"/> N
Nutrient (N)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> H ₂ SO ₄ <input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> H ₂ SO ₄ <input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> H ₂ SO ₄ <input type="checkbox"/> Y <input type="checkbox"/> N
Nutrient (N2)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> H ₂ SO ₄ <input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> H ₂ SO ₄ <input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> H ₂ SO ₄ <input type="checkbox"/> Y <input type="checkbox"/> N
Metals (M)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> HNO ₃ <input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> HNO ₃ <input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> HNO ₃ <input type="checkbox"/> Y <input type="checkbox"/> N
Chloride (CL)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Y <input type="checkbox"/> N
OrgCarb (OC)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> H ₃ PO ₄ <input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> H ₃ PO ₄ <input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> H ₃ PO ₄ <input type="checkbox"/> Y <input type="checkbox"/> N
Nutrient (N3)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Y <input type="checkbox"/> N
Solids (S)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Y <input type="checkbox"/> N
Chl a (I)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Y <input type="checkbox"/> N
Color/Turb (R)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Y <input type="checkbox"/> N
	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Y <input type="checkbox"/> N
	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Y <input type="checkbox"/> N
	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Y <input type="checkbox"/> N

