

Southeast Coast Network

National Park Service
Inventory and Monitoring Division



Standard Operating Procedure 1.2.10

Fixed-Station Remote Sonde Deployment and Water Sample Collection Quick Guide—Version 2.0

Please cite this as:

McCay, D., and E. N. Starkey. 2022. Fixed-station remote sonde deployment and water sample collection quick guide—Version 2.0. Southeast Coast Network Standard Operating Procedure NPS/SECN/SOP—1.2.10. Southeast Coast Network, Athens, Georgia.

Summary

This standard operating procedure (SOP) outlines steps to coordinate sonde deployments and water sampling by cooperators, while maintaining SECN's data quality standards. This SOP was written in an effort to increase the efficiency of the fixed-station monitoring program by reducing the amount of time and cost associated with traveling by Southeast Coast Network (SECN) staff. This SOP is written as a guide to be used by SECN staff and cooperators for different situations where sondes are deployed remotely.

Revision Log

Revision Date	Author	Changes Made	Reason for Change	New Version #
1/17/2013		Citation updated	Protocol publication	1.0
4/1/2021	D.L. McCay	Reformatted document. Refined "Quick Reference Guide". Added sections for different remote deployment situations.		2.0

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Fixed-Station Activities and Workflow Summary

An overview of fixed-station monitoring activities and workflow are presented in Figure 1. SOPs are presented left to right in the general order of operations for each activity. This SOP (1.2.10) pertains to the Data Collection activity.

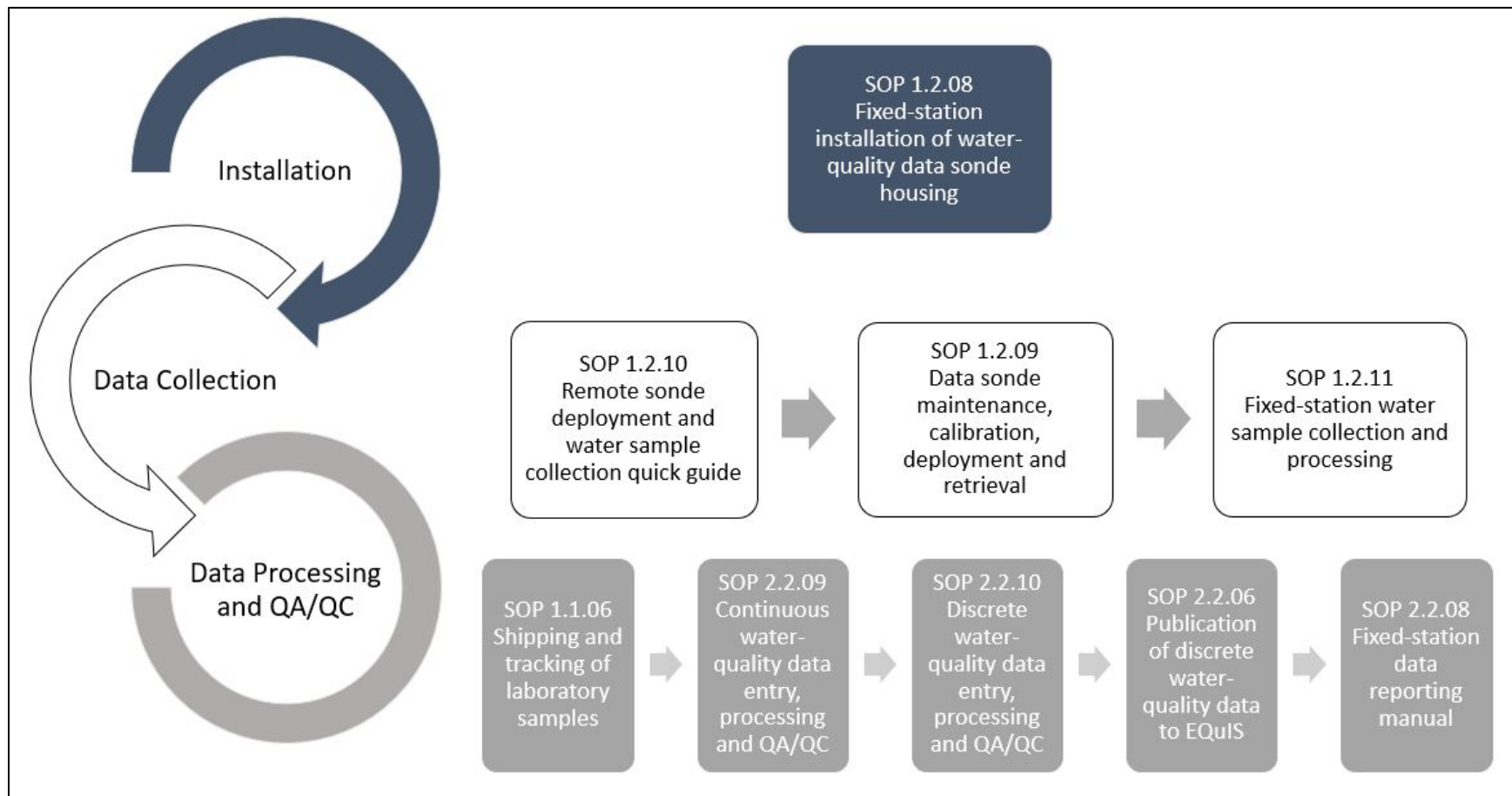


Figure 1. Fixed-station activities and workflow. SOPs are presented left to right in the general order of operations for each activity.

Introduction

Due to various circumstances (e.g., logistics, weather) SECN staff cannot always be present to deploy sondes or collect samples. In these situations, relationships with cooperators can be established to help carry out the protocol objectives. This document explains the details associated with the three most common arrangements with cooperators. These arrangements are referred to as “Setups” below and are based on the level of time, equipment, and familiarity with water-quality operations a cooperator has at their disposal. The SECN staff can provide training and equipment to fill the gaps in a cooperator’s setup to help achieve the highest quality data possible depending on the situation. The main differences in these setups are the order of operations and assigned workflow between SECN staff and the cooperators. Despite the differences in the setups, all sondes are calibrated, cleaned, and maintained according to SOP 1.2.09 *Fixed-Station Water-Quality Data Sonde Maintenance, Calibration, Deployment and Retrieval*—Version 3.0 (McCay et al 2022).

Each setup starts with a short explanation, then moves to an Equipment/Materials List. This list is meant for SECN staff to use as a reference for what equipment the cooperator will need to have for the duration of the arrangement. Next, a shipping list provides a basic reference for the common shipment structure for the setup (i.e., who is shipping what, where, and when). Finally, a Quick Reference Guide is included to help cooperators with a basic order of operations and checklist to carry out the operations laid out in the setup. The sections below are outlined as an overview tool for cooperators and SECN staff. Specific details for procedures are in the associated SOPs and any deviations will be specifically addressed.

Cooperator with Full Setup

This setup maintains the highest level of SECN data quality standards. The cooperator has or is given sufficient equipment to follow **ALL** steps in both the SOP 1.2.09 (McCay et al. 2022) and SOP 1.2.11 *Fixed Station- Water Sample Collection*—Version 2.0 (McCay and Starkey 2022). The cooperator will do all required field work, calibration, and processing. Data and datasheets will be handed off to the Southeast Coast Network for entry, processing, and archival. In these situations, a General Agreement should be signed due to the shared nature of equipment and data ownership.

Equipment/Materials List

- Refer to SOP 1.2.09 Equipment List. All items should be available to the cooperator.
- Refer to SOP 1.2.11 Equipment List. All items should be available to the cooperator.
- Shipping materials for routine supply shipments (e.g., datasheets, standards, sensors, filters)

Shipping

- Routine supply shipments to cooperator.
- Occasional shipments from cooperator for equipment repairs and troubleshooting.

- The cooperator will ship the water samples directly to the lab. FedEx shipping account information or labels can be provided by the Southeast Coast Network as needed.

Cooperator with Partial Setup

This setup still maintains a high level of SECN data quality standards. The cooperator has or is given sufficient equipment to follow ALL steps for SOP 1.2.11 (McCay and Starkey 2022) and the field components of SOP 1.2.09 (McCay et al. 2022). The cooperator will do all required field work and ship samples directly to the analytical laboratory. Sonde data download, calibration, cleaning, and maintenance will be performed by SECN staff. Datasheets will be passed between the Southeast Coast Network and the cooperator to achieve all steps within SOP 1.2.09. In these situations, a General Agreement is optional based on who the cooperator is (park staff versus outside agency) and the amount of shared equipment.

Equipment/Materials List

- EXO Handheld w/cable
- “Barnacle Buster”
- Van Dorn sampler
- Sample processing equipment (flask, pump, graduated cylinder, DI water, filters, foil, sample bottles, plastic bags)
- Shipping materials for routine supply shipments (e.g., datasheets, standards, sensors, filters)

Shipping

- Routine supply shipments to cooperator.
- The SECN staff will calibrate sonde according to SOP 1.2.09, install batteries, and prepare for deployment.
- The SECN staff will pack shipping container with the calibrated sonde, spare cooler with ice packs, spare sample bottles, deployment log, copper guard, shipping labels, and copies of SECN SOPs 1.2.09, 1.2.10 (i.e., this SOP), and 1.2.11 (Figure 2).
- The SECN staff will ship as a second business day shipment, with no signature needed for delivery and insured for \$10,000. Ship Monday through Wednesday to avoid weekend delivery. Notify park contact that sonde shipment has been sent. Include tracking number if possible.
- The cooperator will ship the retrieved sonde back to the Southeast Coast Network in the same manner listed above. SECN FedEx account information can be given to the cooperator or labels provided as needed.

- The cooperator will ship the water samples directly to the lab. Again, shipping account information or labels provided as needed.



Figure 2. Layout of shipping container with sonde, copper guard, logbook, marker, and cooler. SOP's, datasheets, shipping labels, and zip-ties will accompany each shipment.

Quick Reference Guide

Overview for deploying and retrieving data sondes and collecting water samples from fixed-stations. The field sonde refers to the clean, new sonde, while the *in situ* sonde refers to the dirty sonde being retrieved. If anything is missing or any issues are encountered, please contact SECN staff.

Pre-Visit

1. Upon arrival of sonde shipping container, inspect contents and check for completeness. Shipment will contain a sonde with a calibration cup containing a small amount of water, a fresh copper guard, sonde deployment logbook, and cooler with ice packs (Figure 2).
2. Gather field equipment: Sonde, handheld, cable, barnacle buster, Van Dorn sampler, Secchi disk, sample bottle, key, and cooler with ice packs.

3. Check local tidal schedule to ensure that scheduled sample time is within three hours of published low tide (Example: Low tide at 17:00, sample window 14:00–17:00).

Site Visit

Sonde Swap—SOP 1.2.09

1. Upon arrival to the site, record any observations that are noteworthy in either the logbook or the datasheet (e.g., fish kill, algal bloom, recent hurricane).
2. Connect the handheld and cable to the field sonde. Replace the black guard with the copper guard. Lower and secure the sonde in the water. Let it equilibrate in the water for a few minutes, while you remove the *in situ* sonde from the pipe.
3. Clean the sonde pipe with the barnacle buster.
4. Record field sonde readings and set it to deploy. Secure it to the tagline and place it in the sonde pipe. Lock the sonde pipe cap. Record deployment times.
5. Connect cable to the *in situ* sonde and “End Deployment.” Record *in situ* sonde readings at a similar depth and location as the previous field sonde readings. Record retrieval time.
6. Double check all readings and times have been recorded. Make any further notes. Attach black plastic guard and blue cup on the *in situ* sonde for transport.

Water Sample Collection—1.2.11 Fixed-station Water Sample Collection

1. Use the Secchi disk to get and record a reading.
2. Collect a water sample using the Van Dorn sampler.
3. Place the sample in the cooler for transport. Record the sample time.

Post-Visit

1. Process water sample according to SOP 1.2.11 *Fixed-station Water Sample Collection and Processing*—Version 2.0 (McCay and Starkey 2022).
 - a. Water samples need to be stored in freezer until shipped to contract lab for analysis.
2. Pack the samples into the shipping cooler with ice packs for shipment to the analytical laboratory. Include a copy of the nutrient datasheet inside the cooler.
3. Pack the dirty *in situ* sonde, datasheets, and dirty guard in the shipping container for shipment to the SECN office. Be sure that calibration cup contains either some water from the site or tap water. Do not use deionized (DI) water.

Schedule pick-up or drop off at nearest FedEx location. Use the SECN FedEx account to print shipping labels or contact SECN staff for one. Only ship Monday through Wednesday to avoid weekend delivery.

Cooperator with No Setup

This setup still maintains a high level of SECN data quality standards, but confidence in correction factors are diminished due to the lack of field readings. The cooperator has or is given sufficient equipment to follow SOME steps in the SOP 1.2.09 (McCay et al. 2022) and NONE of the steps in SOP 1.2.11 (McCay and Starkey 2022). The cooperator will only deploy a calibrated sonde, clean the sonde pipe, and return the dirty sonde. This setup is only intended for extreme circumstances (e.g., hurricanes, floods, pandemics, personnel shortage) where data collection is important, but it is acceptable to accommodate diminished confidence in correction factors and a potential downgrade in overall data quality. Since these situations are often temporary in nature a General Agreement is not necessary.

Equipment/Materials List

- “Barnacle Buster”
- Shipping materials for basic sonde shipments.

Shipping

- The SECN staff will calibrate sonde based on SOP 1.2.9 and **set to begin recording data**. Choose a date and time as close as possible to when it will be deployed but err on the side of starting it early. Invalid data can easily be screened if recording is early, but fouling could build up if recording is started too late.
- The SECN staff will pack shipping container with the calibrated sonde, copper guard, step-by-step instructions, plastic bags, key, and spare parts (Figure 3).
- The SECN staff will ship as a second business day shipment, with no signature needed for delivery and insured for \$10,000. Ship Monday through Wednesday to avoid weekend delivery.
- Notify park contact that sonde shipment has been sent. Include tracking number if possible.
- Cooperator will request a return label from SECN staff after retrieval. The sonde will be shipped in the same manner it arrived.



Figure 3. Layout of shipping container with sonde, spare parts, plastic bags, and instructions. The barnacle buster is included in a separate box.

Quick Reference Guide

Overview for deploying and retrieving data sondes from fixed-stations. The field sonde refers to the clean, new sonde, while the *in situ* sonde refers to the dirty sonde being retrieved. If anything is missing or any issues are encountered, please contact SECN staff.

Pre-Visit

1. Upon arrival of sonde shipping container, inspect contents and check for completeness. Shipment will contain a sonde with a calibration cup containing a small amount of water, dummy connectors, a fresh copper guard, key, and spare parts (Figure 3).
2. Attach both dummy connectors to the top of the sonde near the handle (Figure 4).
3. Gather field equipment: Sonde, barnacle buster, key, spare parts, instructions.

Site Visit

Sonde Swap

1. Upon arrival to the site take notice of anything noteworthy such as fish kill, algal bloom, damaged sonde pipe. Contact SECN staff if necessary.
2. Unscrew the bottom blue cup from the sonde. Sometimes this can be difficult, and the seal can get stuck to the sonde. Just slowly work it off.
3. With the blue cup removed, remove the black guard, and replace it with the copper guard. The sonde is now ready to be deployed.
4. Remove the lock and bolt from the sonde pipe
5. Remove the PVC pipe cap. Sometimes it can be hard to get started. Slowly work up on each side. Once removed, pull up the rope attached to the cap.
6. Pull up on the rope to remove the dirty *in situ* sonde from the pipe. Unscrew the shackle and set the *in situ* sonde aside.
7. Take the “barnacle buster” and lower it into the pipe. It might take many passes to clear the pipe of growth. You’ll know the pipe is clear when there is a thud from the buster hitting the bottom bolt. Don’t be afraid to be aggressive with the buster. It might take dropping it from several feet up depending on the amount of barnacle accumulation.
8. Now attach the shackle and rope to the handle of the fresh field sonde and lower into the pipe. Resecure the pipe cap and lock.
9. Remove the dirty copper guard and attach the black plastic guard to the dirty *in situ* sonde. Be careful the black plastic guard has two thread patterns, the fine one fits against the sonde body.
10. Now insert the dirty *in situ* sonde with black plastic guard into the blue cup, screw down tightly. Make sure there is some residual moisture inside the cup from the water on site. The sensors need to be kept moist.

Post-Visit

1. To ship the dirty *in situ* sonde back, first remove the dummy connectors and place them in the shipping box.
2. Place the dirty copper guard into the Ziploc bag and into the shipping box.
3. Place the sonde into the trash bag and into the shipping box.
4. The spare parts can either be kept or returned as necessary. The barnacle buster may be kept until no longer needed.
5. Contact SECN staff for a shipping label. Schedule pick-up or drop off at nearest FedEx location.



Figure 4. Dummy connectors being attached to the sonde.

Literature Cited

McCay, D. L., E. N. Starkey, and M. B. Gregory. 2022. Fixed-station, water-quality data sonde maintenance, calibration, deployment, and retrieval—Version 3.0. Southeast Coast Network Standard Operating Procedure NPS/SECN/SOP—1.2.09. Southeast Coast Network, Athens, Georgia. Available at: <https://irma.nps.gov/DataStore/Reference/Profile/2284553> (last accessed June 2022).

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