
# CO-OPS Current Meter Reconnaissance Procedures

**National Current Observation Program**
**Center for Operational Oceanographic Products and Services**
**National Ocean Service**
**National Oceanic and Atmospheric Administration**

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# 1. Introduction

The National Ocean Service (NOS), Center for Operational Oceanographic Products and Services (CO-OPS), operates a number of short and long term environmental monitoring systems. CO-OPS provides the infrastructure, science, and technical expertise to monitor, assess, and disseminate coastal oceanographic and Great Lakes products and services necessary to support NOS missions of environmental stewardship, assessment, and prediction; safe navigation; and hazard mitigation.

In order to support the NOS and CO-OPS missions, new current meter stations are regularly required. The best method for assembling the information needed to deploy these stations is a reconnaissance. The primary objective of the reconnaissance is to determine where the best location for the current meter will be. It is necessary to obtain the longitude, latitude, bottom type, depth, salinity, and observe any coastal hazards/obstructions around the sites. The reconnaissance consists of personnel visiting the site sufficiently far in advance of site preparation to:

- Locate an acceptable site.
- Compare predictions to observations during the recon
- Obtain measurements and information necessary to design the station.
- Arrange for any permits/license agreements required.
- Arrange for utilities (when needed for side-looking current meters).
- Prepare a cost estimate and work schedule.
- Allow time for the procurement and fabrication of special support components (if necessary).

A proper field reconnaissance for current meter stations is accomplished on a boat, onsite, by taking bottom grab samples; observing tide stage and general current speed and direction; CTD (Conductivity-Temperature-Depth) measurements; GPS measurements; and fathometer readings.

When applicable, property owners should be contacted in advance to obtain oral or written permission to use or modify the site; otherwise, meet with the property owner as soon as the site is visited. An advance letter of permission, permit, security clearance, or some other written instrument may be required by the owner. A license agreement may have to be executed before any work can be done.

Once the reconnaissance information is collected and a report issued, the proper mount type is chosen, and a cost estimate and deployment schedule can be determined.

# 2. Background

NOS is a Federal agency devoted to exploring, understanding, conserving, and restoring the Nation's coasts and oceans. NOS promotes safe navigation, supports coastal communities, sustains coastal habitats, and mitigates coastal hazards. NOS balances environmental

protection with economic prosperity and leads the effort to ensure that our Nation's coastal areas remain safe, healthy and productive.

CO-OPS establishes standards for the acquisition and processing of water level and current data; collects and documents user requirements that serve as the foundation for all resulting program activities; designs new and/or improved oceanographic observing systems; develops software to improve data processing capabilities; maintains and operates oceanographic observing systems; performs operational data analysis/quality control; produces/disseminates oceanographic products; and archives the resulting oceanographic data.

A standard current meter station is a stand alone station that is deployed on the ocean bottom, in a sub-surface platform, or attached to a pier or other structure for horizontal measurements. The primary requirement of a station is to accurately measure current speed and direction that is representative of the area's flow with low power consumption and high reliability. The typical station includes a current meter housed in a trawl resistant bottom mount or subsurface float; an acoustic release; a transponding locator device; and either cable for mounting or line for recovery purposes.

## 3. Types of Stations

There are several types of stations that CO-OPS deploys that are dependent on different characteristics of the site, such as water depth and bottom type. They are:

- Bottom Mounted Current Meter
    a) Trawl Resistant Bottom Mount
    b) Self-contained
    c) Acoustic release for deployment and recovery
- Subsurface Float Current Meter
    a) Subsurface float
    b) Anchored to bottom
    c) Acoustic Releases for recovery
- Side/Horizontal Looking Current Meter
    a) Mounted to pier or other hard substrate
    b) Measures one depth across the water basin
    c) Usually Real-time
    d) Utilities (phone and electric) needed
    e) Normally requires divers to install

## 4. Equipment Needed

The following equipment, forms, and information are needed to perform a complete reconnaissance:

- Digital Camera/Videotape Recorder
- Sample License Agreement/Letter of Permission (if applicable)
- Bottom Grab Sampler with pan to dump sample
- CTD unit with weights and line to cast to bottom

- Hand-held GPS
- Compass
- Chartlet
- Depth Sounder/Fathometer
- Range Finder
- Site Reconnaissance Field Notes form (Appendix A)
- Field Reconnaissance Log

## 5. Office Information

After a general region has been selected for the deployment of a current meter, the first step is to gather all relevant information. In many cases, the site is a previously occupied site and the latitude and longitude are known to a certain margin of error. In other cases, CO-OPS determines the latitude and longitude for the reconnaissance, and must make adjustments after the field reconnaissance either due to depth limitations or other obstructions.

Some office information that can be gathered prior to the reconnaissance is general chartlet information about the site and the bottom characteristics. High resolution bathymetry of the area should be obtained either from NOS or USACE. Coast Pilot should be checked for relevant information, including hazards, tide type, currents, marinas, etc., as should any web sites about the area under consideration.

Meters are not deployed while a waterway is undergoing dredging, unless it is maintenance dredging that will be completed before the reconnaissance and field deployments.

An analysis of the existing predictions should be done and all historic data, analysis and reports from previous CO-OPS current surveys should be located and retrieved and taken into consideration.

Other information of importance may include requests received by CO-OPS from pilots, USACE, USGS, HAZMAT or others for current measurements at specific locations.

It is good to have an understanding of the weather, currents, ship traffic, or other obstacles you will encounter while on site and to make note of them on the logs once on site.

## 6. Site Visit

After compiling all information possible in the office, it is time to visit the site. Upon arrival at the general location, proceed to the precise site determined from the office documents. Use the Site Reconnaissance Field Notes form in Appendix A to record all information and fill out the Site Reconnaissance Field Log. The Log is embedded in this document for reference only.

A separate fillable pdf file (ReconLog.pdf) should be filled out for every site (attached under separate cover).

All NOAA safety regulations will be followed.

All fields in the Site Recon Log should be filled in as accurately as possible.

A tentative name for the site should be recorded. This should be representative of the area and its surroundings. ( e.g. Approach to Juneau Harbor, or Seal Rock, SE of). CO-OPS will determine the final names after recon is complete.

Record the time of observations in Greenwich Mean Time (GMT). Recon can occur at any stage of tide, as long as it is noted on the recon log what time of day and what stage of tide it is, and what the apparent current direction and speed are.

The latitude and longitude will be recorded to at least 6 decimal places in decimal degree format. If degrees and decimal minutes are given, the requirement is three decimal places for minutes.

A depth sounding in feet or meters will be recorded and units specified. CO-OPS typically does not deploy sub surface meters greater than 120 fathoms or bottom mounted meters greater than 120 ft (so a diver can reach the bottom safely if a diver-assisted recovery is necessary).

A CTD cast will determine salinity for the location in question, which will be used to configure the current meter profiling settings.

A bottom grab sample will be obtained to determine the bottom type for deciding what platform to use (these should conform to standard nautical chart conventions, i.e. soft mud, small pebbles, hard mud, large boulders, fine sand, shells, etc,). The sample should be photographed and observed and then discarded. There is no necessity for CO-OPS to have the physical sample after it is logged. CO-OPS does not typically deploy bottom mounts in extremely soft mud. If soft mud is encountered, it is suggested that the vessel move a few 100 yards from the site and take another bottom grab to investigate the bottom substrate.

Hazards should be observed and recorded. These include other vessel traffic, seafloor cable crossings, bridges, and USCG buoys. It should be reported if the seafloor bottom is uneven, or a canyon is encountered.

Digital images should be taken of the bottom grab sample, buoys or large ships passing that characterize vessel traffic. In addition, if the current meter is going to be a side looking meter, photos of the pier and other structures should be taken.

Other information that is helpful to the successful deployment of the current meter should be noted.

## 7. Documentation

Submit the following documentation upon completion of the reconnaissance:

- Site Reconnaissance Field Notes and Log
- All digital photos
- CTD data

**Appendix A – Site Reconnaissance Field Notes**


**National Oceanic and Atmospheric Administration**
**National Ocean Service**
**Center for Operational Oceanographic Products and Services**

# National Current Observation Program
# Field Reconnaissance Log

Project:_____ CO-OPS Project Lead:_____
Body of Water:_____ Tentative name of site: _____
Chartlet #: _____ Nearest Landmark: _____
Date:_____ Time of Observations(GMT):_____
Latitude (°N):_____Longitude (°W):_____
Vessel:_____ Captain:_____
Weather: _____
Field Party:
_____
_____
Log Filled in By:_____
Recorded Depth: (circle m or ft)_____ Depth Source:_____
General Current Direction: _____
Current Speed – if observable (knots):_____
Tide Stage (high, low, slack)_____ Nearest Tide Gauge: _____
CTD file name:_____
CTD observations: (include CTD make/model/SN)
_____
_____
Bottom Grab description: (include Sampler make/model/SN)
_____
_____
_____
Vessel traffic observations: (i.e.: Cruise, Cargo, Ferries, Tugs, Pleasure, etc)
_____
_____
_____
Other (Descriptive characteristics of site, obstructions, buoys, cabling areas, local knowledge, etc..):
_____
_____
_____
_____
_____
Please attach any digital photos or sketches you make of the area.