

Citizen Marine Science Network:
Understanding Change in Coastal Marine Environments

Protocols for the PlateWatch Program

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Gregory M. Ruiz, Linda McCann, Chela Zabin
Smithsonian Environmental Research Center
&
Sarah Cohen
San Francisco State University

PlateWatch

Program Goal: The PlateWatch program was established to (a) detect biological invasions by non-native marine species and (b) measure changes in the distribution and abundance of marine invertebrates more broadly.

Approach: The SETL program relies upon a distributed network of volunteer participants, who take and share standardized measures across many geographic locations. Each participant examines key organisms at a single site and collects descriptive physical measures. Although the individual commitment and time required per participant is small, the combined effort can produce a significant amount of critical information. Together, we seek to address fundamental gaps in our understanding of coastal ecosystems and improve stewardship of coastal resources.

A. Getting Started: Deployment Protocol for Settlement Plates

1. Program Structure. Each network participant or group will assess marine invertebrates and collect physical data (including temperature and salinity) at only one site.

If measures are made by a group, a lead must be identified. Thus, whether measures are made alone or by a group, each site has a designated “**site leader**”. The site leader assumes primary responsibility for (a) proper implementation of protocols, (b)

coordination with group participants, (c) consistency of site and methods over time, and (d) interaction across network participants.

For each site, 10 PVC settling plates will be deployed, retrieved, and analyzed following standardized protocols. The settling plates serve as passive collectors for colonization of marine organisms, providing an easy and standardized method to assess the presence of key species. We are focusing initial attention on a target list of non-native invertebrates which are spreading northward along western North America.

The restriction of one site per participant/group is intended to provide good quality control and a manageable time commitment. We estimate the time required for one site (10 plates) @ 1 day every 3 months.

2. Timing. As a minimum, the plates will be deployed initially on or about 15 June and retrieved 3 months later, on or about 15 September. This standard time period allows comparison across many sites, including North America and overseas.

Ideally, the network participant/group will also be able to sample with replacement, setting out new plates upon retrieval of the initial summer collectors. For those able to sample at additional time points, we suggest the spring time point retrieval in around June 15, with last priority being the winter time point in Dec. If monitors are able to implement quarterly measures, we wish to synchronize these to occur on or about September 15, Dec 15, March 15, and June 15. Thus, at each time, new plates would be deployed as the previous plates (after being in the water for 3 months) are retrieved.

Site leaders should indicate whether they are able to implement collections at a frequency of 1x (deploy in June and collect in September), 2x or more, as above.

3. Supplies and Equipment. We will send each site leader an initial set of 20 plates (enough for initial deployment of 10 plates at 1 site and 10 for replacement if you choose to maintain the panels throughout the year). We will also supply line (1/4" nylon), cable ties for first deployment, temperature loggers and an electronic and hard copy of the data sheets and plate labels. We are working on locating inexpensive salinity measurement tools; if you already have a way to measure salinity, please let us know. A few common tools such as a clipboard and pencils will be needed in addition.

A checklist for deployment is provided at the end of this document.

4. Site Selection and Placement of Plates.

- A. A site should be selected to provide ready access to water that is at least 1.5 - 2 meters (6 feet) deep at the lowest low tides. If there is a freshwater lens on the water, the water will need to be 1.5-2 meters deeper than the bottom of the lens at the low tide.

- B. An ideal site is a floating dock, such as a marina or private dock. Depth can be estimated with a weighted line, rope, or tape measure. In addition, salinity should be no lower than 25, to target marine species.
- C. Plates are placed at least 1 meter apart
- D. Plates are distributed randomly
- E. Lines hang freely from dock, not touching parts of the dock, underwater pipes or infrastructure.

Our goal is to get representative measures of a specific area in which you are collecting. Small-scale differences in the site, such as degree of shading, current flow, and proximity to adult colonies already present, can make a difference in what settles on a plate. We try to capture all this variation by distributing plates randomly around the site, at least 1 meter apart.

Key data are recorded, as described below, about the exact location of each plate at the time of deployment.

5. Permits.

It is important to confirm permission from property owner, business, city, or other entity with oversight or jurisdiction. Participants will usually know members of the community, making this a formality, but an important step nonetheless.

Most states require a collection permit to sample (collect) any marine life. This requires a brief explanation of the purpose and methods to be used. Permits are usually renewable on an annual or biennial basis, upon receipt of a brief report of past activity. Currently sites in Alaska are covered on one permit held by the project coordinator.

Depending upon the location, additional permits may be required. This is often the case for state, regional, or local parks. While this is rarely an obstacle, it is also an important step in avoiding potential problems or interruption of your activity.

6. Assembling the Settlement Plate Units.

Step A: Lace a short (yellow in figures) cable tie from top of one hole in the plate, under rough (sanded), bottom of plate and up through second hole on the SAME side. Close cable tie so there is a loose loop. See Figure A.

Step B: Repeat on other side of plate.

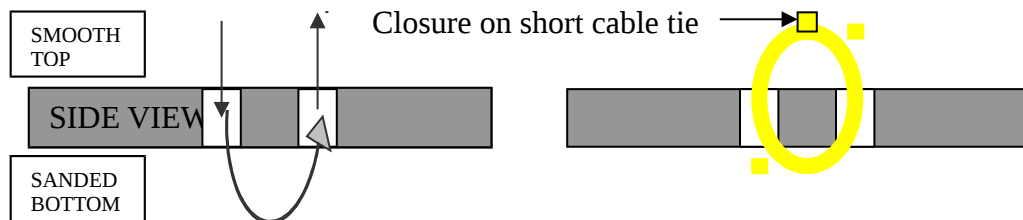


Figure A. Side views of PVC Plate Construction

Step C: Place brick (or weight) in middle of plate on smooth, top side of plate so the cable tie loops are on the sides of brick.

Step D: Lace a long cable tie (red in figures) through one loop, through middle hole of brick, under loop on other side and back through same hole to the other side to close cable tie. See Figure B.

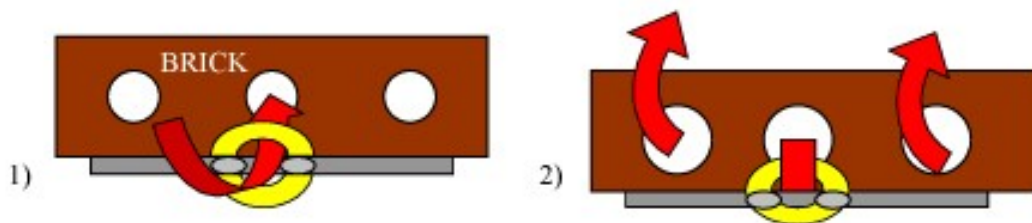


Figure B. Side views of brick attachment to PVC plate. Step D (left) and Step F (right)

Step E: Tighten all cable ties.

Step F: Loop a large cable tie through one hole on each end of the brick (1 tie per side). Do not close these cable ties tightly; line gets attached to these loops. See Figure C.

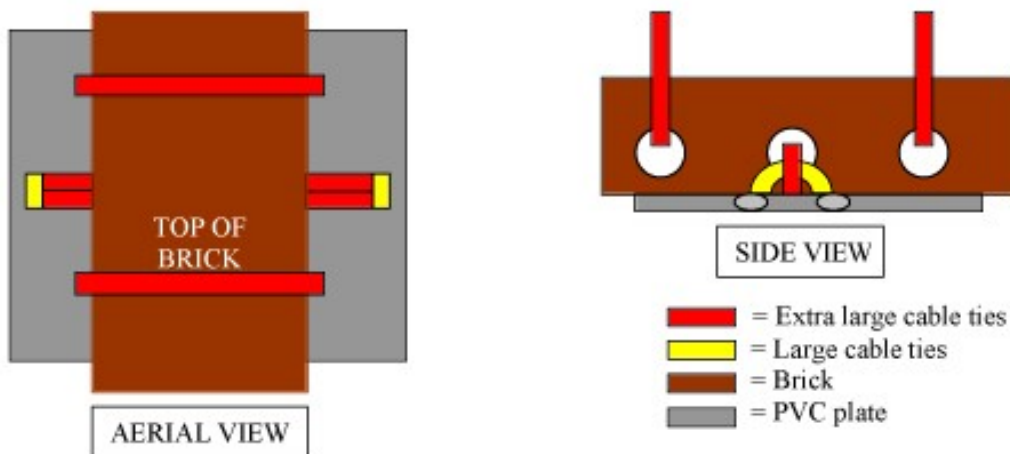


Figure C. Final views (before line attachment) of brick/plate units.

Attach the temperature logger to the top of one plate through the cable ties. The units are now ready for attachment to a line (rope) and deployment into the water.



Figure D. Photo of plate 1) ready for line and 2) ready to go into the water.

7. Line Length. Communities of marine organisms tend to vary with depth, with some species found only in very shallow sites and others only found deeper.

To be able to make comparisons across multiple sites and dates, we have selected a standardized depth of 1 meter below the water surface for deployment. We also require a minimum distance from the bottom, so the settling plates are not scraped or buried by contact with rocks, sand, or mud.

Plates should be deployed such that they are 1 meter (3.3 feet) below the surface of the water at the lowest low tide. It is easiest and preferable to achieve this by deploying the plates from floating docks, which move up and down with the tide. In this case, there should be 1 meter of line between the brick and the surface of the water. *Remember: you must make the line longer than 1 meter to be able to tie it to the dock, such that the plate is 1 meter below the surface upon deployment.*

If you do not have access to a floating dock, you can deploy from a fixed dock or pier, but you will have to figure out how long to make your line. The goal is to deploy the plate 1m below the lowest tide that will occur at that site. To do this, you will need two pieces of information, both of which can be gathered from local tide tables. You need to know the lowest tide your site will experience (these generally fall around the summer and winter solstices). You also need to know the tide at the time you plan to set up the plates.

For example, if you put out plates on a fixed dock at a +2.0 foot (+ 0.6 meter) tide and the tide at your site can drop to -2.0 feet (-0.6 meter), the plate must be suspended $0.6 + 0.6 + 1 (=2.2)$ meters below the surface of the water when you set it out at that time. This

assures that your plate will always be at least 1 m below the water's surface. Thus, to deploy your plate, measure out the length of line that will go under the surface of the water, in the example given, this would be 2.2 m. Place colored tape around the line at this length, or mark the line with a thick permanent marker (Sharpie brand is good), attach the brick and plate, and lower your line until the colored tape is just above the surface of the water. If your plate touches the bottom, then you cannot deploy from this site.

Tide charts in the US generally show tide predictions in feet, so you will have to convert to the metric system to calculate length of line in meters (1 foot = 0.3 m). Tide charts can be found at fishing supply stores and surf shops and on the internet at sites such as <http://tbone.biol.sc.edu/tide/> or http://tidesandcurrents.noaa.gov/tide_pred.html

8. Line Attachment and Deployment. Lace the line through the two loose cable ties (see Figure C), attaching one end to the settling plate unit. A bowline knot works best for this purpose (see Figure D).

Attach line to dock. Methods for doing this will depend on the dock you are working on. The most secure method is to hammer a fence staple (u-shaped nail) into the side of the dock. Other methods include tying off to existing structures or looping line around planks on the dock. For attachment to the staple and to the settling plate unit, the bowline (shown below) is the most secure knot to use.

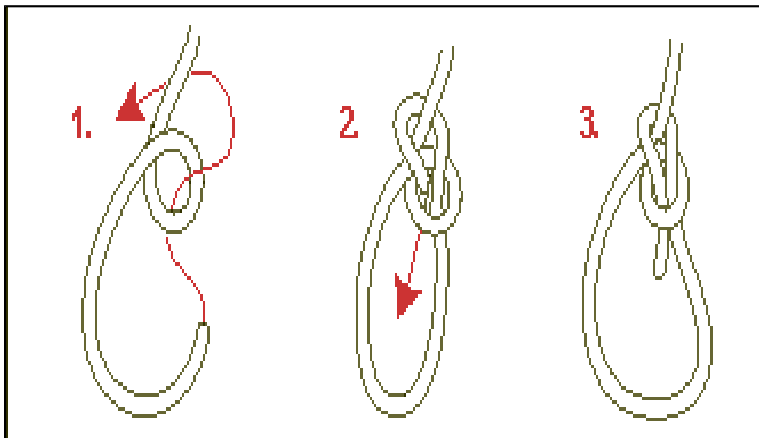


Figure D

Attach a label identifying the project with a phone number in case the plates need to be moved, at the top of the line (where it is attached to the dock) so it does not get fouled in the water. The units are now ready for attachment to a line (rope) and deployment into the water.

9. Filling Out Deployment Data Sheet. Please see instructions for the electronic version of the data sheet on the website. This is the preferred method of data collection, including photos.

When you first deploy, key information should be recorded about the deployment site. As a minimum, the following information is needed:

- Name of person deploying/retrieving
- Name of the site (marina or harbor).
- Location of each plate. Each plate location is given a unique number or identification code. The location is then described, using map, verbal description (e.g., Dock A, berth 22, south side), and GPS location if available.
- Date of deployment.

As equipment is available, we wish to record surface temperature and salinity at the time of deployment and retrieval as back up and supplement to any continuous read loggers.

10. Questions & Coordination. If you have further questions or concerns about deployment, please contact one of us:

Linda McCann (mccannl@si.edu : phone: 415 435 3528)

Greg Ruiz (ruizg@si.edu; phone: 443-482-2227)

Kristen Larson (larsonk@si.edu; phone: 443-482-2309)

Deployment Supply Checklist

From the box we send you

1 temperature logger

Cable ties 20 short and 30 long

20 PVC plates

Enough line to tie 10 plate/brick combos to the dock and have them suspended 1 meter below the water's surface

Printed version of the Retrieval/Redeployment Data Sheet (1 per site, which you will also be able to access electronically.) and blank plate labels.

You will need to supply

- Bricks or weights
- Tools and hardware as needed for tying off bricks and cutting line
- Clipboard and pencil
- Shallow tub and photo stand if available for taking photos (if taking in field)
- Local tide tables (for first deployment if from non-floating dock)
- Camera (Optional for deployment; you will need this for retrieval)
- YSI or other device for measuring water temp, salinity (optional)
- GPS unit (optional)