

Citizen Marine Science Network:
Understanding Change in Coastal Marine Environments

Protocols for the SETL Adopt-a-Plate Program

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SETL: Adopt-a-plate program

Program Goal: The SETL program is being 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).

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 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 non-native tunicates (sea squirts), which are spreading northward along western North America.

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 implement such 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) or 4x (quarterly, as above).

By tracking how long the plates were in the water we are able to calculate the growing period of the organisms on the plate. Recording plate numbers at each deployment and retrieval is important.

3. Supplies and Equipment. We will send each site leader an initial set of 20 plates (enough for 1 site), cable ties, and data sheets. We will also supply line (1/4” nylon) and bricks, as possible. We will send temperature loggers with instructions separately. 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, clipboard, and pencils will be needed in addition.

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

4. Permits. Most states require a collection permit to sample (collect) any marine life. An Alaska wide permit will be acquired by the network coordinator and distributed to all participants.

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. Work with your coordinator to acquire additional permits if necessary.

5. Site Selection and Placement of Plates. 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. An ideal site is a floating dock, such as a marina or private dock. Because these float up at down with the tide, floating docks require a minimum of line for deployment (see below), whereas fixed docks and piers require sufficient line to include the distance to the water, the tidal range, and a depth of 1 meter below low tide. Depth can be estimated with a weighted line, rope, or tape measure. In addition, salinity should be no lower than 25, as tunicates are unlikely to live in such locations.

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 as follows:

- 5 plates placed together at a core location;
- 5 plates distributed individually (one each) among 5 outlying locations.

Obviously, 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.

Once a site is selected, deployment occurs as follows.

Core Location: For the core location, an ideal site is a floating dock that is 5-10 meters (15-30 feet) long, where settling plates can be hung into the water from either side. If a longer dock is available, select a section that is 10 meters. Five plates would be deployed at roughly even intervals (1-2 meters apart) as described below.

Outlying Locations: Five additional locations are selected in the general area (< 1 mile from Core Location), and a single plate is deployed at each. Exact spacing will vary among sites, based upon available structures. The main goal here is to disperse plates as much as possible, to represent the general area --- but not at great distance. For example, the Core Location may be at one dock of a large marina, and Outlying Locations may be selected throughout the marina to include endpoints and center locations.

If you have access to a single dock only, you might cluster 5 plates closer together (but not less than 1 m apart) and deploy the remainder farther apart.

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

6. Assembling the Settlement Plate Units.

Once a site is selected you can begin assembling your settlement plates.

Step A: Write the plate number that is etched into the smooth side of the plate on the sanded side of the plate in permanent marker (Sharpie brand is good).

Step B: Lace a smaller 7 inch (yellow in figures) cable tie from top of one hole in the plate, under (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 C: Repeat on other side of plate.

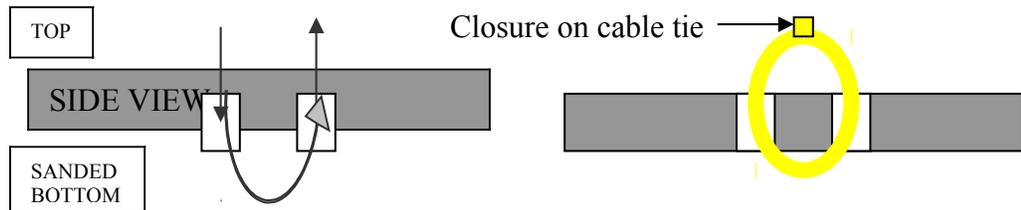


Figure A. Side views of PVC Plate Construction

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

Step E: Lace a extra large 14 inch 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 B1.

Step F: Tighten center cable ties (one extra large and two large).

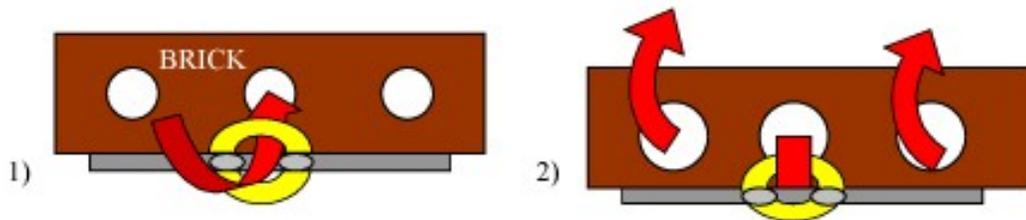


Figure B. Side views of brick attachment to PVC plate

Step G: Loop an extra large 14 inch cable tie through one hole on each end of the brick (1 tie per side) Figure B2. Do not close these cable ties tightly; line gets attached to these loops. See Figure C.

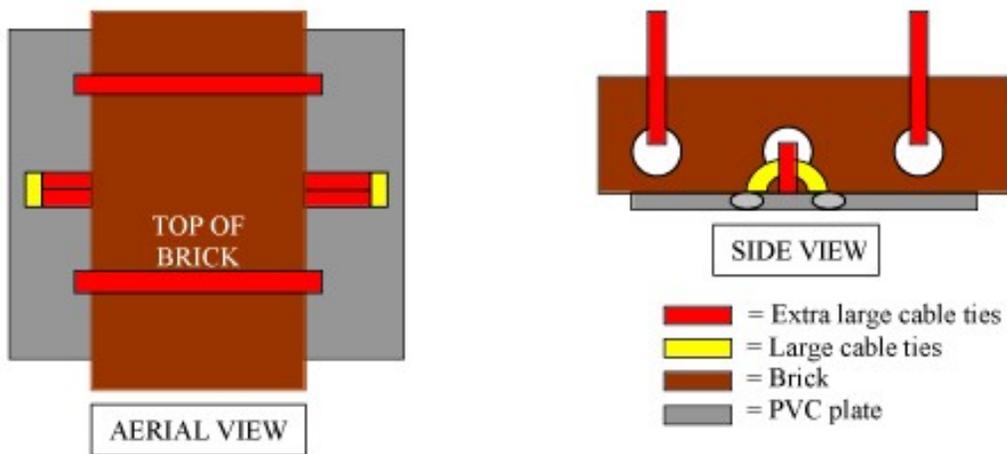


Figure C. Final views (before line attachment) of brick/plate units.

The units are now ready for attachment to a line (rope) and deployment into the water. Lines may be attached at this point or upon arrival to the field location, following instructions below.

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 in deeper locations.

To be able to make comparisons across multiple sites and dates, we have selected a standardized depth 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, the brick should be 1 meter (3.3 feet) below 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 lies 1 meter below the surface upon deployment.*

If you do not have access to a floating dock, you can deploy from a stationary 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 at a + 0.6 meter (+1.96 foot) tide and the tide at your site can drop to -0.6 meter (-1.96 feet), the plate must be suspended $1.2 + 1 = 2.2$ meters ($3.92 + 3.3$ feet = 7.2 feet) 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 (3.3 feet) 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 (7.2 feet). 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 rope through the two loose cable ties (see Figure C), attaching one end of the line 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; for this approach, the line is inside the u-shaped nail and a knot is placed in the line above the nail, to prevent slipping. Other methods include tying off to existing structures

or looping line around planks on the dock. As for attachment to the settling plate unit, the bowline (shown below) is the most secure knot to use.

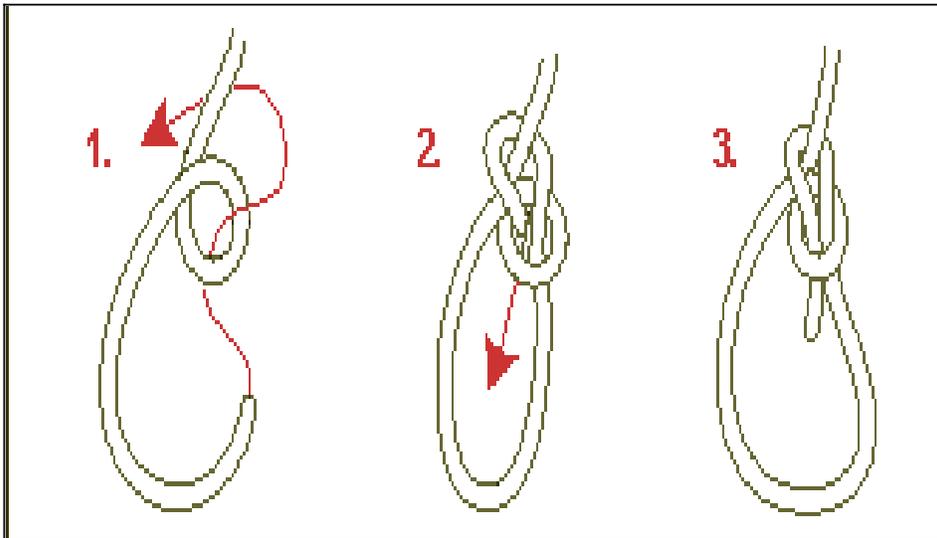


Figure D

9. Filling out Deployment Data Sheet. When you first deploy, key information should be recorded about the deployment site. As a minimum, the following information is needed:

- Name of the site (marina or harbor).
- Location of each plate. Each plate location is given a unique identification code (state, site, number). 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.
- The plate number that is etched into the plate and written in marker on the sanded surface of the plate.

You should include a description that gives us a sense of both the water use and nearby land use (i.e., yacht club in urban location, private dock near forest reserve, etc.).

If you have access to equipment such as a YSI, thermometer or salinity refractometer, please record surface temperature and salinity. We will send a temperature logger to attach to one of the plates at the core location, providing a continuous recording of temperature. Please give us an estimate of how turbid the water is. This can be a visual estimate of how many meters below the surface you can see or you can use a secchi disk if available.

Please note any important weather events two weeks prior to deployment. Unusually heavy rainfall or wind and particularly high or low tides prior to deployment could impact organisms on the plates.

A photograph of the specific plate locations is useful. Also please include notes on any problems encountered with setting out plates.

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

Monaca Noble (noblem@si.edu) phone 443-482-4415

Deployment Supply Checklist

Initial package includes

Temperature loggers (1 or 2)

20 large 30 extra cable ties (enough for 10 plates)

20 PVC plates (only 10 will be deployed at a time)

Enough rope to deploy 10 plates at your site. Because the length of rope need for each site varies, you will need to tell us the length of rope needed for your site in advance.

Ruler for scale bar in close-up photos

Printed version of the retrieval, deployment, labels and physical datasheets (1 per site), which will you can also download from the website (<http://platewatch.nisbase.org/>)

Subsequent packages includes

Temperature loggers (1 or 2)

20 large 30 extra cable ties (enough for 10 plates)

Printed version of the retrieval, deployment, labels and physical datasheets (1 per site), which will you can also download from the website (<http://platewatch.nisbase.org/>)

You will need to supply

Scissors or knife for cutting cable ties

Clipboard and pencils

Bricks with holes

Rope

Local tide tables available on the internet for first deployment if from non-floating dock (http://tidesandcurrents.noaa.gov/tide_pred.html)

Camera (optional for deployment; you will need this for retrieval)

YSI or other device for measuring water temp, salinity (optional)

GPS unit (optional)