

OPIHI (Our Project In Hawaii's Intertidal) Sampling Protocol

As the teacher, you are responsible for enforcing OPIHI protocols. By making sure OPIHI intertidal data is collected using standardized sampling techniques species abundances at a site can be monitored over time and comparisons can be made between sites.

Before the field trip split up students into groups of three to five. These students will work together with a science assistant to record data along a transect line.

First Things First

The first thing students should do in their group is fill out the top of their data sheet and record the conditions at the site. This is an important step often overlooked in the excitement of setting up, so please help your class remember this essential task. All blanks should be self-explanatory except for transect line number which refers to the group's transect placement in relation to all other groups. Looking out towards the ocean, the transect line on the far left is #1, the next transect to the right is #2, etc.

Species Identification

Species can be identified using the pictorial species ID cards and field guides. Many of the species found at a site will not be on the ID cards, and to identify these the students will have to consult a book. Species should be recorded utilizing scientific names unless they cannot be identified. These "unknowns" can be recorded as "other snail" or "other algae", etc. Tiny algae that cannot be identified and are grasslike in shape are "turf algae", pink, purple or pale orange crusts on rocks are recorded as "coralline algae."

The ID cards were developed for intertidal sites on Oahu. Therefore, if you are located on another island where the species composition is different, the students will have to consult a book more frequently and write in the scientific names of species on their data sheets.

Encourage the groups to ask each other, the science assistants, and even you for help if unsure about a species' identification. Pooling knowledge leads to much more accurate identifications.

Transect Lines

Transect lines should be laid out by each team of students perpendicular to the water's edge. Lay the lines as straight as possible and maintain equal spacing between groups (generally about 2m). The "0" mark should be in the water. The end of the transect line should be at high tide level. Since the field trips are scheduled around low tides, you'll have to help the students determine where the high tide level is by looking for pools of

water, exposed intertidal organisms and algae, compacted sand, or a line of marine debris (ie. drift algae, sticks, shells) that mark the highest point to which the ocean rises.

The length of transect laid out will depend on the size of the intertidal site. The state department of education does not allow public school students to get wet past their knees. Thus, your transects cannot extend into an area that is too deep. You are responsible to knowing how far the transect lines should extend into the water based on prior visits to the site. All the transects lines should extend the same length.

Teams should record data using the transect point-intercept method, recording what lies directly under designated points along the transect line listed on their data sheets. This should be only one species (whatever is on top). For instance, if a snail is on top of an urchin who is on top of an alga that is growing on rock, record the snail. Record bare substrate, like rock or sand, but not dead or transient objects like rubbish or driftwood or water. Look boxes (if available) are useful in deeper water.

****Work your way into or out of the water depending on the tide (e.g. if the tide is coming in, you'll want your class to start at the deepest point on the transect). You are responsible for checking a tide chart so you'll know if the tide is rising or falling when you arrive at the site and so can direct the direction in which your students sample.**

Quadrats

Quadrats should be placed along the transect line at designated points. The quadrat should always be placed in the same position, which the class should have decided on while practicing the methods before the field trip.

You and your class should have decided what type of quadrat data you will be recording, which may be one or more of the following methods.

Quadrat point-intercept: The students record what species is under each of the 25 points where the fishing lines cross. Again, this should only be one thing – whatever is on top. They should make sure their point count equals 25 before moving on.

Quadrat percent cover: The students visually estimate how much cover each species takes up in the area within the quadrat. This is done by estimating the percentage different substrate or organisms takes up looking at the entire area of the quadrat (ie. 50 percent sand). Using this method, you do not have to pay attention to the quadrat lines. Alternately, the students may estimate percent cover by recording the number of small squares formed by the fishing line equivalent to that area (ie. 18 squares sand). Students should double check that their totals for each quadrat add up to 100 percent or 36 squares. Organisms taking up less than 1 square in area can be recorded as fractions, i.e., .5 or .25 squares. Some organisms may be able to be identified but don't take up very much area at all. If they are very small they can be recorded as "< 1" percent/square and not counted in the total percent or number of squares.

To ensure students are adding up their percent cover and/or point counts, check each group's data sheets before you allow them to roll up their lines to ensure everything was recorded correctly.

Diversity Search

After finishing with the sampling methods, the students can do a diversity search in the area looking for more species. You may choose to have the students identify any species they find.

If a diversity search is planned as part of an exploratory first field trip, it should be timed and the number of participants noted in order to allow comparisons of species diversity between sites.

Sampling in Cobble Areas

At intertidal sites characterized by cobble (multiple individual rocks, e.g. Sand Island, Oahu; and Mapulehu, Molokai) many of the interesting organisms are found under the rocks, and thus the OPIHI protocol must be modified slightly to capture this hidden diversity. This sampling method is in addition to the standard transect and quadrat measurements taken at a site.

Along the transect, students should turn over rocks at designated points. These may be the same points sampled at during transect point-intercept or a subset of these points. The students' data sheets you developed will let them know which transect points will incorporate rock turning. If there is no rock under the designated transect point, or the rock directly under the point is too big to flip, the students should flip the nearest rock that is manageable. If there are no rocks within a 1m circumference of the designated point or they are all too big to turn, students should write "N/A" for that point.

The number and species of solitary organisms, like barnacles, under the rock should be counted (e.g. "10 *Nerita picea*"). Students should also count the number of mobile organisms like crabs and brittle stars that may be found hiding under the rock. These will scurry away once the rock is overturned and need to be counted first. Small organisms can be placed into a container to facilitate identification and counting. Some organisms may encrust the bottom of the rock, like sponges. Instead of counting them, estimate the area of the rock underside they cover (e.g. *Palythoa cesais* 30%). Upon completing the count, all organisms should be released to the area near the rock and the rock should be returned to the position in which it was found.

You may choose to have your class make a quick estimate of rock size by measuring the length and width of the base of the rock from the center.