

Appendix 2. Beach Profile Method

Field Data Collection

The original reference on the pole-and-horizon method that is used on this project to record beach elevations is described in: Emery, K.O., 1961, A simple method of measuring beach profiles: *Limnology and Oceanography*, v. 6, p. 90-93.

The following text describes the pole-and-horizon profiling technique and is taken directly from <http://www.seagrant.umaine.edu/files/pdf-global/otherformat/emerymethod.doc> (Maine Geological Survey, Department of Conservation).

- 1. Find the Starting Point.** Set a control point (a reference stake or pin) in the ground. *This is done once before the first profile is taken. The same control point is reused for each subsequent profile and is the starting point of all measurements.* A second control point (stake or pin) or object (sometimes a utility pole, tree, chimney, etc.) is used also. These two reference points define a line to follow to measure a beach profile. Often it helps to place a temporary marker post at these control points that rises up from the dune or above a seawall so the line-of-sight can still be seen down on the beach.
- 2. Begin Notes.** Fill in the top part of the log sheet. Include names of people in the team, the date, time, profile name or number, beach location, etc.
- 3. Record Stake Height.** Measure the height of the ground in relation to the top of the control point with the numbers (scale) up. The person holding this rod should stand off the profile line for the next step.
- 4. Set Rod 1.** Stand the end of one profile rod (Rod 1) on the ground next to the control point with the numbers (scale) up. The person holding this rod should stand off the profile line for the next step.
- 5. Set Rod 2.** The second person takes Rod 2 toward the ocean. Looking back toward land and Rod 1, this lead person places Rod 2 (with scale up) on the profile line using the control points as a guide. Pick a horizontal distance of a meter (or other suitable distance if obstacles are in the way) as a spacing between the two poles. Use a graduated chain or pole to do this and be careful to hold both poles straight up and down while setting Rod 2 in place.
- 6. Measure and Record.** From the landward pole, the first person sights the horizon and the top of the lower of the two rods (Figure 14). This line-of-sight will intersect part way up the other rod. Read the elevation number marked on the other rod that is in line with the pole top and the horizon. *Keep both poles vertical when reading!* Note that sometimes the reading will come from Rod 1 (Figure 14) and sometimes from Rod 2. This is because the ground may slope down or up and may change which pole is higher at different places on the beach profile line. When the ground slopes down toward the ocean, the forward rod will be lower, and a negative [-] number is assigned to the vertical reading off of Rod 1. When the ground slopes up looking toward the ocean, the forward rod will be higher, and a positive [+] number is assigned to the reading. In this

case, the number is read off the forward rod (Rod 2). So moving forward on the profile, uphill is [+] and downhill is [-]. Always use either a + or - before the number. It takes careful attention to get this right on each measurement. A single error will make the rest of the data plot incorrectly on a graph. Record the elevation change and horizontal distance between poles on the log sheet. Also note any features at the forward rod (such as edge of dune, slope change, water line, etc.) in the Notes column on the log sheet.

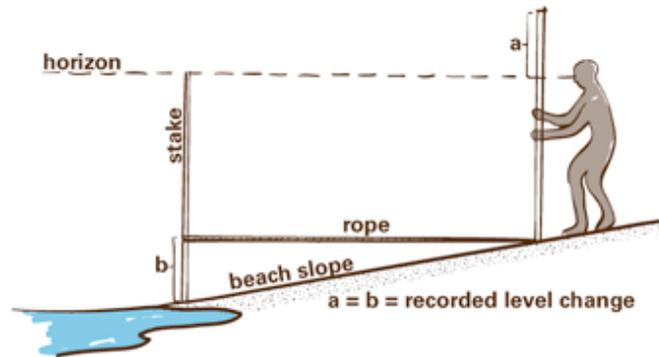


Figure 14. Pole-and-Horizon Beach Profile Method.

7. **Move Ahead.** After the notes are taken, move Rod 1 to the same “footprint” occupied by Rod 2. The person at Rod 2 should wait for Rod 1 to come up alongside Rod 2 in order to be certain of getting the position correct. After Rod 1 is in the place of Rod 2, the forward rod can be moved ahead another meter or two and placed on the ground in line with Rod 1 and the original control point(s). The job of the lead person is to be sure each forward move stays on the line. Rod 2 must be set down on the ground keeping the chain (or other tape measure) level.
8. **Repeat Steps 6 and 7. Measure, Record, & Move.** Continue to move ahead, repeat these steps all the way to the water. As you go, everyone on the team should look ahead for features to stop on and measure. If some feature, perhaps the edge of the dune, does not occur at a horizontal interval of one meter, then make the horizontal distance smaller. For example, if the dune edge is only 0.6m from the least measurement, move the forward pole ahead only that far. On the next measurement move ahead only 0.4 (or 1.4) m in order to get back on a spacing of 1 m intervals. Keeping a set interval in whole meters will help with data analysis later.
9. **Stop at the Water.** Make a measurement that includes the water line. IN the notes column of the log sheet abbreviate it W.L. and record the TIME it was measured. Because the height of the tide is changing, the time of the reading is important. Estimate the place on the beach where the water level would be without the waves, the still water level. There is no need to measure how far up the beach the swash is going at the time of the measurement.
10. **Continue On (Optional).** The process can be continued into the water if teams want to. This is optional and not necessary. In cold water there is a risk of hypothermia. In rough seas there is a risk of getting hit by breaking waves. Do not take chances.

Always keep your personal safety and that of your team members in mind. A few extra points on a graph are not worth the risk of personal injury.

11. **Final Reading.** At the last measurement, record the TIME finished in the Notes column on the log sheet.

12. **Photograph the Beach.** Take three photographs of the beach. It helps to place the profile rods down on the profile line part way up the beach, near the high-tide line. Stepping back from the rods, take a picture looking up to the dune (or seawall) from a spot near the water line. Move up about halfway on the profile and take two more pictures: one looking each way along the beach (parallel to the water line). For these shots try and include the profile rods in the foreground. Frame the picture to include the beach from dune (seawall) to the water.