
BEACH PROFILING METHOD

Beach Profiling Method Summary

Beach profiling is a simple survey technique used to measure the contour of a beach. Very basic equipment, made from two 1.5 meter rods connected by a 3 meter rope, is used to create a line-of-sight with the horizon. The difference in elevation between the two poles defines the topographic change on that segment of the beach. The magnitude of this difference in elevation, in centimeters, is recorded as a single data point. These data points are recorded at regular intervals (also known as “jumps”) down the beach, from the frontal dune (or seawall) to the low water mark. When these data points are connected, they create a graphic depiction of the contour of the beach, also known as the beach profile. This method of collecting beach profile data is known as the *Emery Method*.

Step by Step Instructions for Beach Profiling

1. **Pre-profiling checklist.** Make sure you have completed the following before you begin collecting profile data:
 - If necessary, review your profiling binder to remind yourselves what your **back objects** are. You will maintain the same transect line every time you profile by always using the same back objects, and by always making sure as you move down the beach that the two objects are aligned from your perspective.
 - Start a new **data sheet**. **Volunteer 3** will fill in the top part of the data sheet, including the names of people profiling, the date, time, profile name and location, and horizon visibility.
 - Volunteers will work together to **measure the length of rope** between the profile rods using your measuring tape. Take your measurement from the *front* of one rod to the *front* of the other—that is, your measurement should include the length of the rope as well as the width of *one* rod. **Volunteer 3** should record this measurement in the “horizontal” column of the data sheet as well as the “rope length” field.
 - **Volunteer 3** will take a **photo of the station marker**. This photo should be at a wide enough angle to include the station marker as well as the ground.
 - **Volunteer 3** will **record the station marker height**. Measure the height of the ground relative to the top of the station marker. If the station marker is higher than the ground, this will be a *negative* number. You may use your profiling rod (if the station marker is higher than the ground, you will need to hold it upside down) or your tape measure.
 - While Volunteer 3 is collecting this initial data, **Volunteer 1** and **Volunteer 2** will place the **reflectors down the beach** on the transect line. Ensure that you are on the transect line by making certain that your two back objects (the station marker and the other object described in your profiling binder) are aligned. The reflectors will help you stay on line when you are farther down the beach.

2. You are ready to begin profiling! To start, **Set Rod 1.** **Volunteer 1** will stand the end of one profile rod on the ground next to the station marker. Take care not to stand directly on the profile line.
3. **Set Rod 2.** **Volunteer 2** should take Rod 2 as far towards the ocean as you can go without Volunteer 1 moving; make sure the rope is pulled relatively taut. Place Rod 2 on the profile transect using the back objects as a guide. **Volunteer 3** should stand a short distance away and make sure that Volunteers 1 and 2 are holding their rods straight and perpendicular to the ground.
4. **Measure and Record the First “Jump.”** **Volunteer 1** will be holding Rod 1 (the landward rod), and will be standing slightly landward of it while holding it. From this position, **Volunteer 1** will sight the horizon and the top of the Rod 2 (the seaward rod). This is done by physically moving your head higher or lower until, from your perspective, the horizon and the top of Rod 2 (the seaward rod) are in the same place. This line-of-sight will intersect partway down Rod 1, which Volunteer 1 is still holding. **Volunteer 1** will read the measurement number marked on Rod 1 that coincides with this intersection point. This measurement indicates the change in elevation between Rod 1 and Rod 2—in other words, it is the data point for the first “jump” of the transect. Because this measurement notes a *downward* slope towards the ocean, **Volunteer 3** will record it on the data sheet as a negative number.

What to do if Rod 2 (seaward) is higher than Rod 1 (landward)? *In most cases, Rod 2 (the seaward rod) will be lower than Rod 1 (the landward rod), or at the same elevation (this occurs when the top of Rod 2, the horizon, and the top of Rod 1 all align from the perspective of Volunteer 1, and the recorded data point for the jump is “0”). However, sometimes the profile line includes a section of the beach where the elevation increases as the profilers move towards the ocean, such as a berm. Volunteer 1 will be able to identify when this is happening because the horizon and top of Rod 2 will line up at a point that is above Rod 1, making it impossible to take a measurement as described above. In this case, Volunteer 1 will find the point where the horizon is in line with the top of Rod 1 (the landward rod, which he/she is holding). Volunteer 1 will then note the measurement on Rod 2 (seaward) that coincides with this intersection point. It can be helpful for Volunteer 2 to assist with reading the numbers on Rod 2, since they’re farther away and may be tough for Volunteer 1 to see clearly.*

Through this process, **Volunteer 3** will watch from a short distance to make sure that Volunteers 1 and 2 are holding their rods straight and perpendicular to the ground. After **Volunteer 1** reads off the measurement, **Volunteer 3** will record it on the data sheet in the “vertical” column. **Volunteer 3** will record any other notes that the team has observed about this jump in the “notes” column of the data sheet.

5. **Move Ahead.** After all data has been collected, **Volunteer 1** will move Rod 1 to the same “footprint” that was occupied by Rod 2. **Volunteer 2** should not move Rod 2 until Volunteer 1 is ready to set down Rod 1, so that you don’t lose track of the exact footprint. Take care to walk next to the profile line, not on top of it. After Rod 1 is in the place of Rod 2, then **Volunteer 2**

will walk forward until the rope is taut and will place Rod 2 on the ground to set up the second “jump.” It is **Volunteer 2**’s job to make sure that each forward move stay on the profile line, by making sure the two back objects are always aligned.

6. **Repeat Steps 4 and 5 as many times as needed.** You will measure, record, and move as described in steps 4 and 5 until reaching the water. As you go, **Volunteer 3** should record anything unusual in the “notes” column of the data sheet. It is also helpful to note basic features like “berm,” “wrack line,” etc. if these terms are familiar.
7. **Stop at the Water.** Your final measurement should be close to the water line. **Volunteer 3** will add “W.L.” to the notes for this final measurement. **Volunteer 3** will also record the time of this last measurement in the “End Time” field on the data sheet. It is important to record the exact end time because the tide, and therefore the water line, is always changing.
8. **Photograph the Beach.** **Volunteer 3** is responsible for taking several photographs at specific locations during the beach profiling session. (Note: if you happen to be out in a team of four, you could subdivide Volunteer 3’s duties so that Volunteer 3 is responsible for the data sheet and the Volunteer 4 is responsible for taking the photos.) You can either take these photos during the profile, or before/after the profile is completed. If you take photos during the profile, Volunteers 1 and 2 should be prepared to pause at the photo locations and wait for Volunteer 3 to take the photos. **Volunteer 3** should review the “Photo Guidelines” portion of this binder for more information.
9. **Pack up Equipment and Submit Data.** One team member should be responsible for storing the equipment between profiling sessions. Another team member should be responsible for submitting the data. This could be, but doesn’t have to be, **Volunteer 3**. There are three steps to submitting data: 1. Upload photos to Google Drive; 2. Enter data into the digital data sheet on Google Drive; and 3. Mail hard copy of data sheet to Caitlin Mandeville at NH Sea Grant. These steps are described in much further detail in the “Guidelines for Submitting Data” portion of this binder.

The original reference for the Emery Method of beach profiling is: Emery, K.O. 1961. A simple method of measuring beach profiles. *Limnology and Oceanography*, v.6, p.90-93.

This document was adapted from the Southern Maine Beach Profile Monitoring Volunteer Manual, Maine Geological Survey, Department of Conservation, 22 State House Station, Augusta ME 04333.