



Directions

Fitzgerald Marine Reserve is on the western coast of San Mateo County, approximately 20 miles south of San Francisco, in Moss Beach (Figures 1 and 2). From Highway One, look for the large highway sign “California Avenue,” and the smaller sign “Marine Life Refuge,” just below it. Turn west onto California Avenue. The entrance to the Reserve is at the western end of California Ave. Group reservations are required at Fitzgerald. Please be sure to contact your LiMPETS coordinator at FMSA prior to monitoring.

To reach the monitoring site, walk down the path to the tidepools and turn left. Walk south along the beach (about 0.5 miles) until you round a point (Figure 3). The monitoring site is located on the reef near this point.

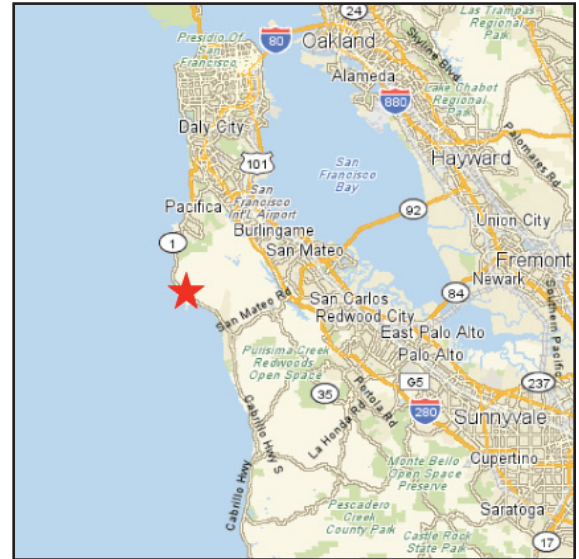


Figure 1: Location of Fitzgerald Marine Reserve.

Sampling procedures

Locations of sampling areas and procedures are outlined below. Four sampling methods are used at Fitzgerald Marine Reserve for monitoring:

- 1) Vertical transect,
- 2) Random quadrats in a permanent plot,
- 3) Size Measurements in a permanent plot
- 4) Total organism counts

1. Vertical Transect

There is one stainless steel bolt embedded in a rock, identifying the beginning of the vertical transect. Locate the bolt (Figure 3). Using a compass or GPS, lay a meter tape from this bolt, 235 degrees westward. A second bolt is located 30.5 m from the first bolt. The transect is 36 meters in length (Figure 4).

- Center the quadrats directly over the meter tape every three meters, beginning with meter 3 (3, 6, 9, 12, etc.) and ending at meter 36.
- Record species abundance within the quadrats as directed on the "Vertical Transect Data Sheet."
- Count only live organisms and algae attached within the quadrat.

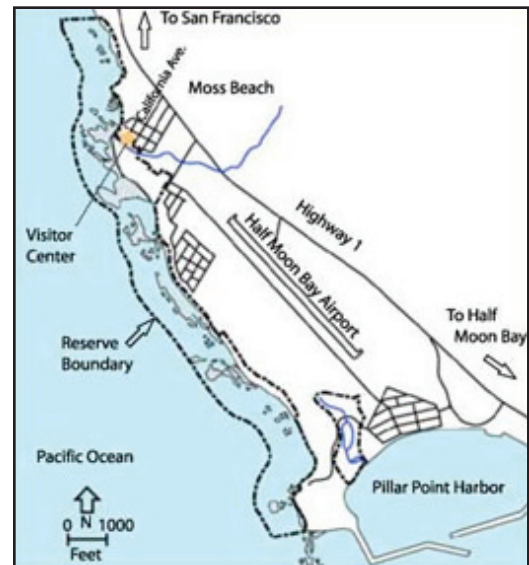


Figure 2: Location of Fitzgerald Marine Reserve.

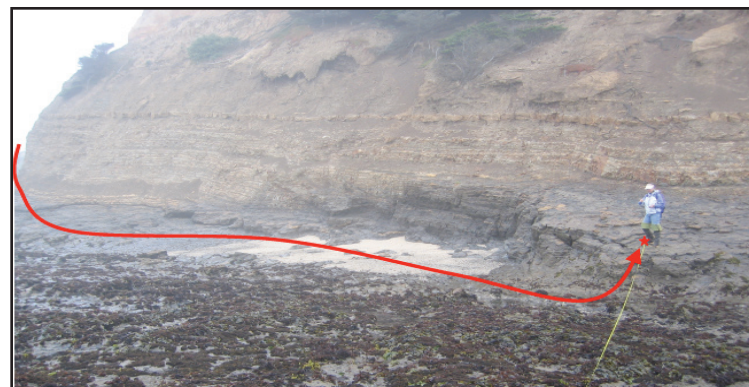


Figure 3. Location of bolt marking the beginning of the vertical transect. To locate the bolt, walk south along the beach and turn the point (shown by red line above). Bolt location shown by red star. Transect line shown in yellow.

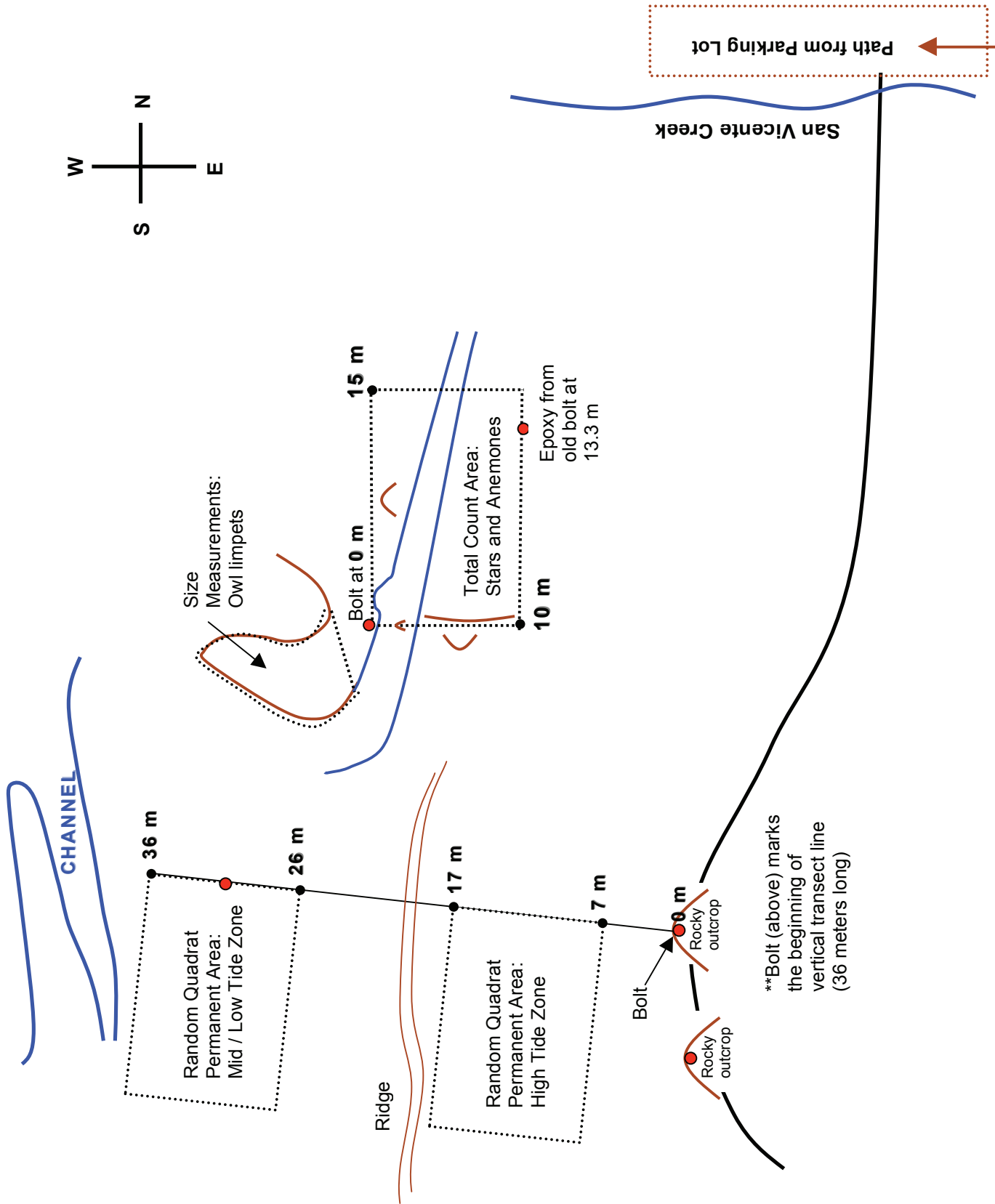


Figure 4: Schematic showing the location of the vertical transect, permanent areas for random quadrats, and permanent areas for total counts. Not drawn to scale.

2. Random Quadrats in Permanent Plots

There are 2 established permanent plots located to the south of the vertical transect (Figure 4). You may want to mark these permanent areas with cones prior to monitoring. Each permanent area is 10 m x 15 m.

- If monitoring the "High Zone Area," use the random number table titled "High Zone Coordinate 1" and randomly choose a number between 7.0 and 17.0. Locate this number along the transect line.
- Next, use the random number table titled "Zone Coordinate 2" and randomly choose a number between 0.0 and 15.0. This number tells you how far, in meters, to move, in a southward and perpendicular direction, away from the transect line (Figure 5). Use a meter tape to measure this distance.
- Center the quadrat over the meter tape.
- Record species abundance within the quadrat as directed on the data sheet.
- Complete 20 quadrats for each of the two permanent areas.

3. Size Measurements

Owl limpets: Find the area for counting and measuring owl limpets (Figure 4). The area is a rocky outcrop north of the vertical transect line, is roughly triangular in shape, and is approximately 8 m x 8 m x 3 m in size.

- In teams of 2 or 3, systematically search the whole area, both the top and sides of the rocky outcrop.
- Designate one person as the recorder. This person is responsible for completing the data sheet. The others should be searching for limpets and should tell the recorder what they see as they see it.
- Use the rulers (or if in a crack, the paper clips) to measure the length of the individual.
- Look carefully in cracks, crevices and under ledges.
- Of course, some individuals will be missed, so counts are just estimates of the true abundance. If 5-10 teams counts owl limpets in the same area, the average number counted provides a reasonable estimate that can be compared over time.

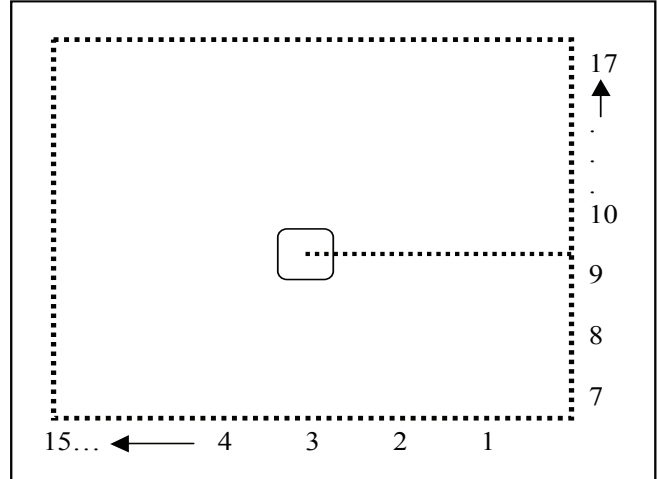


Figure 5: Example showing the placement of a quadrat within the High Zone Permanent Area using the following random numbers, 9.3 and 3.1.

4. Total Organism Counts

Ochre sea stars and large anemones

There are three large, conspicuous species that are monitored within a defined area of the reserve: ochre sea stars, giant green anemones and sunburst anemones. The species are surveyed within a rectangular area surrounding a tidal channel and is 15 m x 10 m in size (Figure 4).

- Locate the bolt at 0 m shown in Figure 4.
- Use a meter tape to measure and mark the boundaries of the area (see Figure 4).
- Counts are best completed during a good low tide, when water in the channel is low.
- Systematically search the whole area in teams of 2 or 3, moving back and forth in successive swaths about the width of your outstretched arms.
- Record what you see, as you go.
- Identify and count only large, solitary sea anemones that are larger than 5 cm in diameter.
- Count closed anemones as "Unidentified, large, solitary anemone."
- Record ochre sea stars as "orange" or "purple/brown".
- When counts are finished, record the length of the count, in minutes, on the data sheet. Each count should last approximately 20 minutes.