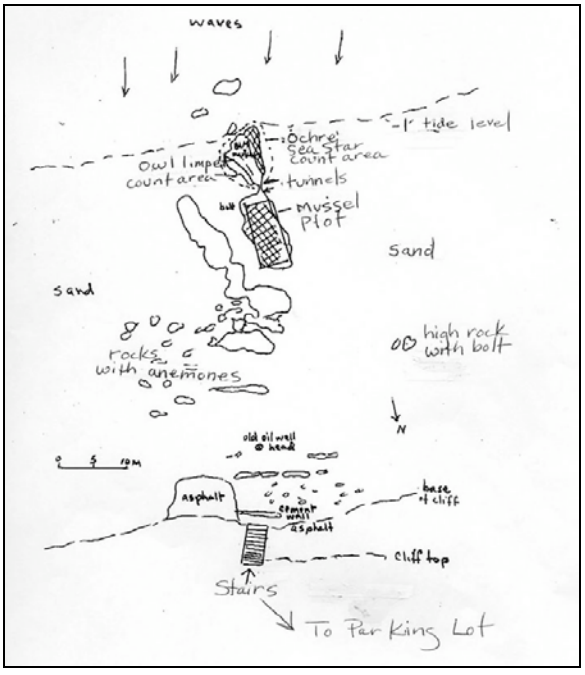
Directions:

This site is located at the east end of Carpinteria State Park in Carpinteria, Santa Barbara County. Take Highway 101 to Carpinteria. Get off at the Casitas Pass Rd exit and turn toward the ocean. Take a right on Carpinteria Drive, then take the first left on Palm Avenue. Go all the way to the end of Palm Avenue and enter Carpinteria State Park. After going through the kiosk take a sharp left and proceed down the coast to the very end where there is a little cul-de-sac where you can park. Just downcoast from the parking lot (southeast) is a staircase that leads to the beach.

The study site is straight off-shore, about 40 meters from the staircase and centered on the outermost and largest, mussel-covered rock outcrop. The outcrop is surrounded by sand, which varies in height more or less seasonally. It consists of two parts, an oceanward portion and a shoreward portion, separated by a narrow connection that bridges over two small tunnels.



Monitoring Protocols

Three monitoring procedures are used at Carpinteria Beach for monitoring:

1) Random quadrats in a permanent area
2) Total organism counts
3) Size measurements

1. Random Quadrats in a Permanent Plot

The permanent plot is 10m by 5m, or 50m^2, and covers most of the top of the platform, as well as a portion of the southwest side. Survey 20 random quadrats in total.

- Lay a transect tape across the top of the outcrop, from the middle of the inner edge

Random Quadrats *(continued)*

of the shoreward outcrop to the neck connecting the two portions of the outcrop. The length will be 13 m. The permanent plot is between 2 and 12 meters along that length, and 2.5 m on each side (the southwestern portion of the plot extends down the side of the platform).

- Using the random number table, choose a number between 00.0 and 10.0. Locate this number along the base transect line.
- Choose a second random number between 0.0 and 2.5. This number indicates how far from the base transect line you will place your quadrat. Use the third random number table to decide whether your location will be east or west of the base transect. Lay down a second transect tape, perpendicular to the first, to find this location.
- Center the quadrat over the meter tape.
- Record data for taxa within the quadrat as directed on the data sheet.

- Some species will be counted as individuals.
- Some species will be estimated as the number of squares in the $1/4m^2$ quadrat containing any attached portion (total possible, 25).

Note: In some cases, the random numbers will place the quadrat in a deep pool or drop-off. When this happens, place the quadrat on a level area as close to the designated coordinates as possible, or halve the random number.

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2. Total Organism Count

Ochre sea stars are large invertebrates that can have a major impact on the rocky intertidal community, but are not adequately counted in the $1/4m^2$ quadrats.

Ochre sea stars are counted on all sides of the outermost high outcrop (oceanward), extending from the innermost tunnel through the "neck" that separates the two portions of the outcrop. All three sides of the triangular-shaped outcrop total about 24m in length, and the sea stars occur in a band about 1.5m wide. The total area counted is about $36m^2$.

- Mark the boundaries of the permanent area with cones or a transect tape.
- Systematically search the whole area in teams of 2 or 3. Look carefully in cracks and crevices, and under ledges.
- Record ochre sea stars as "orange" or "purple/ brown". Record all the ochre sea stars you can find as you go.

3. Size Measurements

Owl limpets are counted and measured only on the northeastern (inner) side of the outermost high outcrop (oceanward), from the tunnels to the southwestern-most corner of the outcrop, a distance of about 6 m. The limpets occur in a band mainly above the mussels about 1 m wide. The total area counted is about $6m^2$.

- Mark the boundaries of the permanent area with transect tapes or cones.
- In teams of 2 or 3, systematically search the whole area. Look carefully in cracks and crevices and under ledges.
- 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 calipers to measure the length of individual limpets.

Note: Of course, some individuals will be missed, so total counts are just estimates of the true abundance. If 5-10 teams count the selected species in the same defined area, the average number counted provides a reasonable estimate that can be compared over time.