

Palmer's Point Enhancement Project

Annual Report



December 2010

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INTRODUCTION

Palmer's Point found within Patrick's Point State Park (PPSP) is a very popular area along the north coast of California for many ocean related activities, such as rocky intertidal habitat exploration, whale watching, and seal and sea lion viewing. Many local and out of the area school groups, from kindergarten to college students, visit the tide pools at Palmer's Point to study and learn about this fragile coastal ecosystem.

In 1999, the dredge *M/V Stuyvesant* (the "*Stuyvesant*") spilled at least 2,100 gallons of Intermediate Fuel Oil 180 into the Pacific Ocean near the mouth of Humboldt Bay, California (DARP 2007). The expanse of the spilled oil reached from the mouth of the Eel River to PPSP. Both state and federal law require that liability be established for natural resource damages caused by the oil spill and require the responsible parties to make the environment whole for the damage and loss of natural resources resulting from the oil spill into navigable and/or marine waters (DARP 2007). The Stuyvesant Trustee Council was established to fulfill this mandate. The Stuyvesant Trustee Council was designated and authorized to act on behalf of the public to assess and recover natural resource damages, and to plan and implement actions to restore, replace, or acquire the equivalent of the affected natural resources injured as a result of the oil spill (DARP 2007). A Damage Assessment and Restoration Plan/Environmental Assessment (DARP) was prepared for the oil spill and describes the injuries resulting from the spill and proposes restoration alternatives (DARP 2007). As part of this process the Stuyvesant Trustee Council identified and evaluated restoration alternatives and provided the public with an opportunity to review and comment on the proposed restoration alternatives (DARP 2007).

One of the proposed projects put forth by the DARP was the Palmer's Point Enhancement Project (DAPR 2007). The Palmer's Point Enhancement Project was designed to compensate for losses of recreational uses by humans and to provide a beneficial impact through educational and access opportunities (DARP 2007). This project should greatly enhance the outdoor experience and increase the visitor's appreciation of this unique ecosystem by providing high quality interpretation, education, and protection of our delicate coastal ecosystem.

PROJECT LOCATION

The project is located at Palmer's Point in PPSP within the North Coast Redwoods District. Palmer's Point is found at the southern end of PPSP and can be accessed by the main park road. The project area includes the rocky intertidal habitat, parking lot, day use area, and trails located at Palmer's Point (Figure 1).

PROPOSED PROJECT

The project includes three components which aim to enhance the visitor's experience and increase their appreciation of this fragile ecosystem by providing increased interpretation and educational opportunities. In addition, the monitoring of the rocky intertidal habitat will provide baseline data that will help in the protection of our delicate coastline. The three components of this project include facilities and trail enhancement, interpretation, and monitoring.

FACILITIES AND TRAIL ENHANCEMENT

The project includes the enhancement of two undeveloped vista points at Palmers Point by creating two new viewing areas with a bench, spotting scope, and two interpretative signs at each location. The associated trails, benches, interpretative signs, spotting scope, and viewing areas will be Americans with Disability Act (ADA) accessible. In addition, an additional ADA parking space will be added and an existing interpretive sign will be relocated near the trailhead. Finally, the fencing surrounding the portable outhouse will be realigned to meet ADA standards.

INTERPRETATION

There are three elements to the proposed interpretation enhancements. These elements include the development and instillation of six interpretative signs, the DVD reproduction of an educational tide pool video, and the development and printing of a colored tide pool brochure.

ROCKY INTERTIDAL HABITAT MONITORING

The establishment of baseline data for this popular rocky intertidal habitat will enable California State Parks to monitor the health of this natural resource. The baseline monitoring and assessment will also help determine the success or failure of the educational materials produced. In addition, should any future natural or human made disasters occur, the baseline data will allow for the assessment of impacts. This portion of the project includes the consolidation of all existing information on the rocky intertidal habitat at PPSP and the design and implementation of the baseline monitoring.

PROJECT ACCOMPLISHMENTS

The project began in 2009 with the focus on project planning, environmental documentation and permitting, and monitoring of the rocky intertidal habitat. This report focuses on the accomplishments that occurred during 2010. The majority of the work completed included preparing for the instillation of the facility and trail enhancements, completing the interpretative elements, and the continuation of the rocky intertidal habitat monitoring.

FACILITIES AND TRAIL ENHANCEMENT

Preparation for the instillation of the two new viewing areas, interpretative signs, benches and parking lot improvements included the ordering of all construction materials, scheduling work crews, and obtaining the required permits for construction. The construction of these elements is scheduled to begin construction in January 2011.

INTERPRETATION

All interpretation elements are close to being completed. The 6 interpretive signs have been fabricated. The rocky intertidal habitat brochure is currently being mass reproduced at the California State printing shop (Appendix A). The DVD replication of the tide pool etiquette video has been completed and 40 copies are available for local teachers to use prior to students visiting Palmer's Point. Multiple rocky intertidal habitat guided walks have been conducted by the PPSP Interpretative Specialist. In 2010 approximately 767 people enjoy one of these guided walks and approximately 615 people attended one of the tide pool campfire programs given at PPSP over the last year.

ROCKY INTERTIDAL HABITAT MONITORING

The project includes the baseline monitoring of the rocky intertidal habitat at Palmer's Point and the establishment of permanent monitoring plots. In spring and summer of 2009 baseline data was collected using two (band transect surveys and point-count surveys) of the three macroplot transect sampling designs (Forys 2009). In the spring and summer of 2010, monitoring of the rocky intertidal habitat at Palmer's Point continued. From the baseline data collect in 2009, a total of 30 permanent monitoring plots were established; 25 photo monitoring plots and 5 sea star monitoring plots. Five permanent photo plots per target species were established to record percent cover of California mussel (*Mytilus californianus*), leaf barnacles (*Pollicipes polymerus*), rockweed (*Fucus gardneri*); wild Nori (*Porphyra lanceolata*), and *Endocladia muricata* (Photo 1-5). These five species were chosen for monitoring because they are conspicuous, bed-forming, abundant, and ecologically important. The photo plots were established throughout the monitoring area and each location was established based on the target species concentrations (Figure 2.0).

Based on the results obtained from the band transect sampling effort in 2009, 5 permanent sea star monitoring plots were established. The plots are irregular in shape in order to encompass areas with high densities of sea stars (Figure 2.0). Within the permanent plots the species and abundance of all stars were recorded. In addition the size and color of ochre stars were recorded. The average size of the ochre stars were 7.52 cm and approximately 88% of the ochre stars were purple and 12% were orange. A total of 328 stars were found within the 5 monitoring plots. These plots are meant to provide areas where abundance and size distribution of sea stars can be monitored over time. Table 1.0 summarizes the data collected form the permanent sea star plots.

Table 1.0. Results from the sea star permanent monitoring plots during the 2010 sampling effort.

Scientific Name	Common Name	Total	Percent Present
<i>Pisaster ochraceus</i>	Ochre Star	42	12.8%
<i>Ophiopholis aculeata</i>	Daisy Brittle Star	2	0.6%
<i>Dermasterias imbricata</i>	Leather Star	7	2.2%
<i>Orthasterias koehleri</i>	Painted Star	1	0.3%
<i>Leptasterias hexactis</i>	Six-Rayed Star	273	83.2%
<i>Pycnopodia helianthoides</i>	Sunflower Star	3	0.9%

In addition to establishing the permanent monitoring plots mobile species were monitored using the quadrat sampling design (Forys 2009). Mobile invertebrate abundances were determined using 50 x 50 cm quadrats placed randomly at 3 locations along each of the 11 transect lines. A quadrat was placed on the transect line in each tidal zone and all mobile species found within the quadrat were identified and counted. A GPS point and digital photograph was be taken at each quadrat location (Photo 6-8).

As part of establishing a good working knowledge of the species found within the intertidal rocky habitat at Palmer's Point algae specimens were collected, processed, and made into herbarium samples. Each herbarium sample was photographed and labeled according to standard labeling protocols. These specimens are being kept in an appropriate storage

area at the NCRD office. In addition multiple invertebrate species were identified and photographed. The photos have been labeled and are stored at the NCRD office.

Due to staffing levels and workloads only preliminary results have been obtained from the data collected in 2009 and 2010. A complete analysis of the data collected in 2009 and 2010 will be completed after sampling occurs in the spring of 2011. The permanent monitoring plots will be monitored on an annual basis and the three transect sampling designs will be conducted every 5 years depending on funding availability.

PROEJCT TIMELINE

The proposed project timeline was based on general estimates of when funds would be made available and staff work loads. In 2009, unforeseen delays occurred due to staffing levels and other DAPR related projects (Dune Restoration and Snowy Plover Nest Protection Project) taking priority. As such, some of the tasks were not completed by the original proposed completion date. Implementation of the project began in late 2008 and table 2.0 summarizes the tasks that have been completed to date. Table 3.0 summarizes the remaining tasks to be completed and the estimated date of completion.

Table 2.0. Proposed tasks and the date of completion for the Palmer’s Point Enhancement Project.

Tasks to be Completed	Month of Completion	Tasks Completed to Date
Environmental Documentation (CEQA, coastal permits)	January 2010	All environmental documentation and permitting completed
Tide pool base line study and assessment	June 2011	Two seasons of monitoring (2009 and 2010)
Design and produce brochure and reproduce video to DVD	January 2011	Brochure design is complete and is at the printer; 40 copies of the DVD have been produced
Development and fabrication of interpretative signs	August 2009	Design is complete and signs have been fabricated
State Park Interpretative Specialist (Tide pool guided tours)	June 2011	Two seasons of guided tours (2009 and 2010)
Instillation of trails and trail marker, fence railings, viewing platforms, benches, and interpretative signs	February 2011	No construction has been completed, but all material has been order, and crews are scheduled for January 2011
Paving and re-stripping of parking area	June 2011	No paving has been completed

Table 3.0. Revised project timeline for the completion of the Palmer's Point Enhancement Project.

Tasks to be Completed	Completion Timeline
Tide pool base line study and assessment (one season)	June 2011
State Park Interpretative Specialist (Guide tide pool tours)	June 2011
Instillation of trails and trail markers, viewing areas, benches, and interpretative signs	February 2011
Paving and re-stripping of parking area and installation of parking signs	June 2011
Annual project report	December 2011

PROJECT EXPENDITURES

The proposed budget of \$102,000.00 was based on preliminary estimates and was to be spent over a four year period (2008-2011). Actual costs may have varied due to unforeseen costs associated with the actual implementation of the project. The project expenditures through 2010 have been summarized below in Table 4.0

Table 4.0. Project tasks and associated expenditures through 2010 for the Palmer's Point Enhancement Project.

Tasks	Estimated Cost
Tide pool base line study and assessment monitoring (season)	\$27,232.03
Trail improvements (Planning, CEQA, Coastal Development Permit)	\$2,000.00
Instillation of trails, trail markers, fencing, railings, interpretative signs	\$1,585.78
Interpretive signs (6), design and fabrication	\$11,724.37
State Park Interpretive Specialist (guided tide pool tours)	\$494.32
Educational brochure (design)	\$5,039.00
Administration Cost (10%)	\$10,200.00
Total Budget Spent to Date	\$58,275.50

LITERATURE CITED


Forys, Michelle. 2009. Palmer's Point Rocky Intertidal Community Monitoring Protocol. California State Parks, North Coast Redwoods District, Eureka, California.

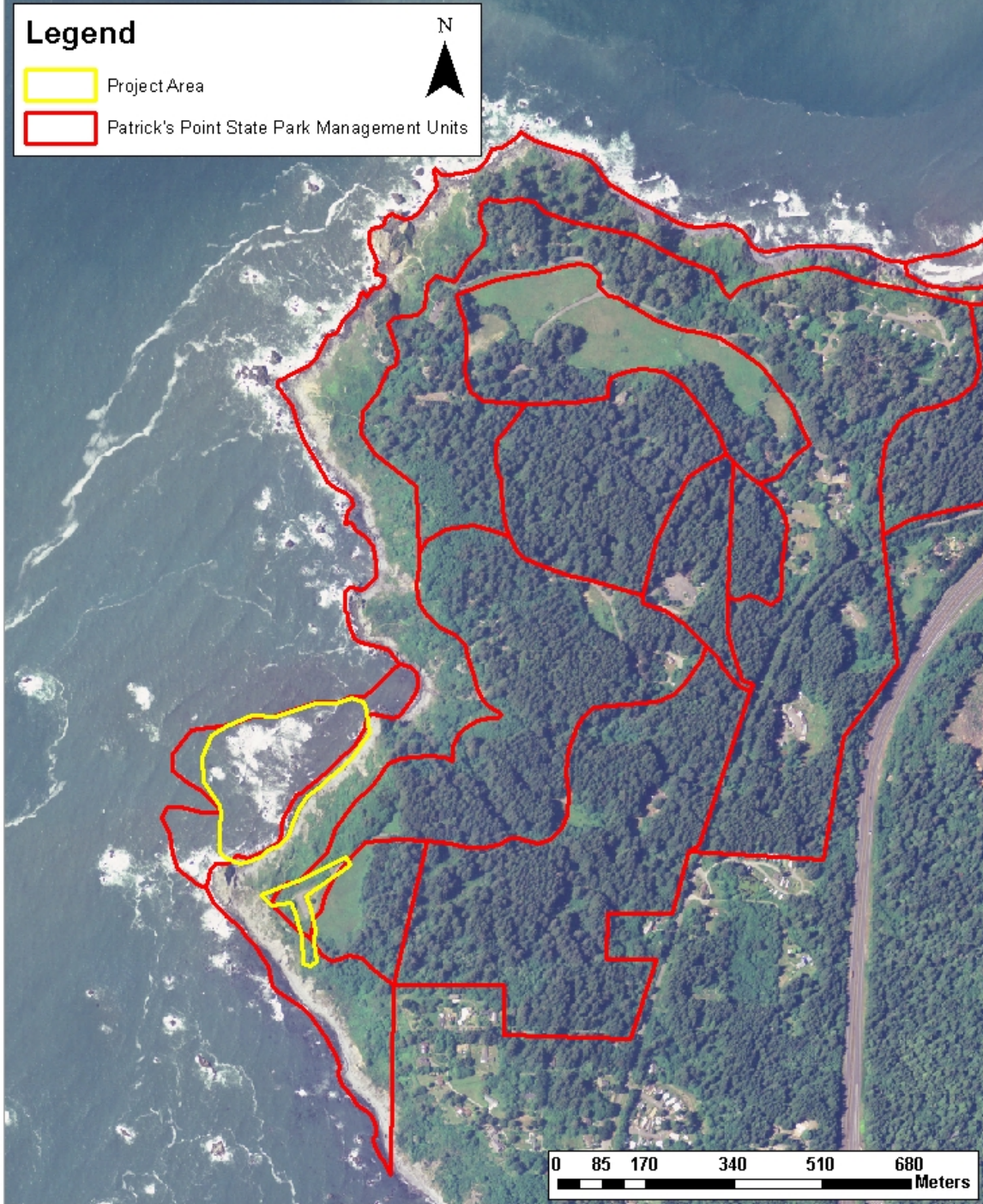
Hampton, Steve, Matt Zafonte, Julie Yamamoto, Katherine Verrue-Slater, Daniel Welsh, Charlene Hall, Janet Whitlock, Charles McKinley (Stuyvesant Trustee Council). 2007. Stuyvesant/Humboldt Coast Oil Spill Final Damage Assessment and Restoration Plan/Environmental Assessment. California Department of Fish and Game, California State Lands Commission, United States Fish and Wildlife Service.



Legend

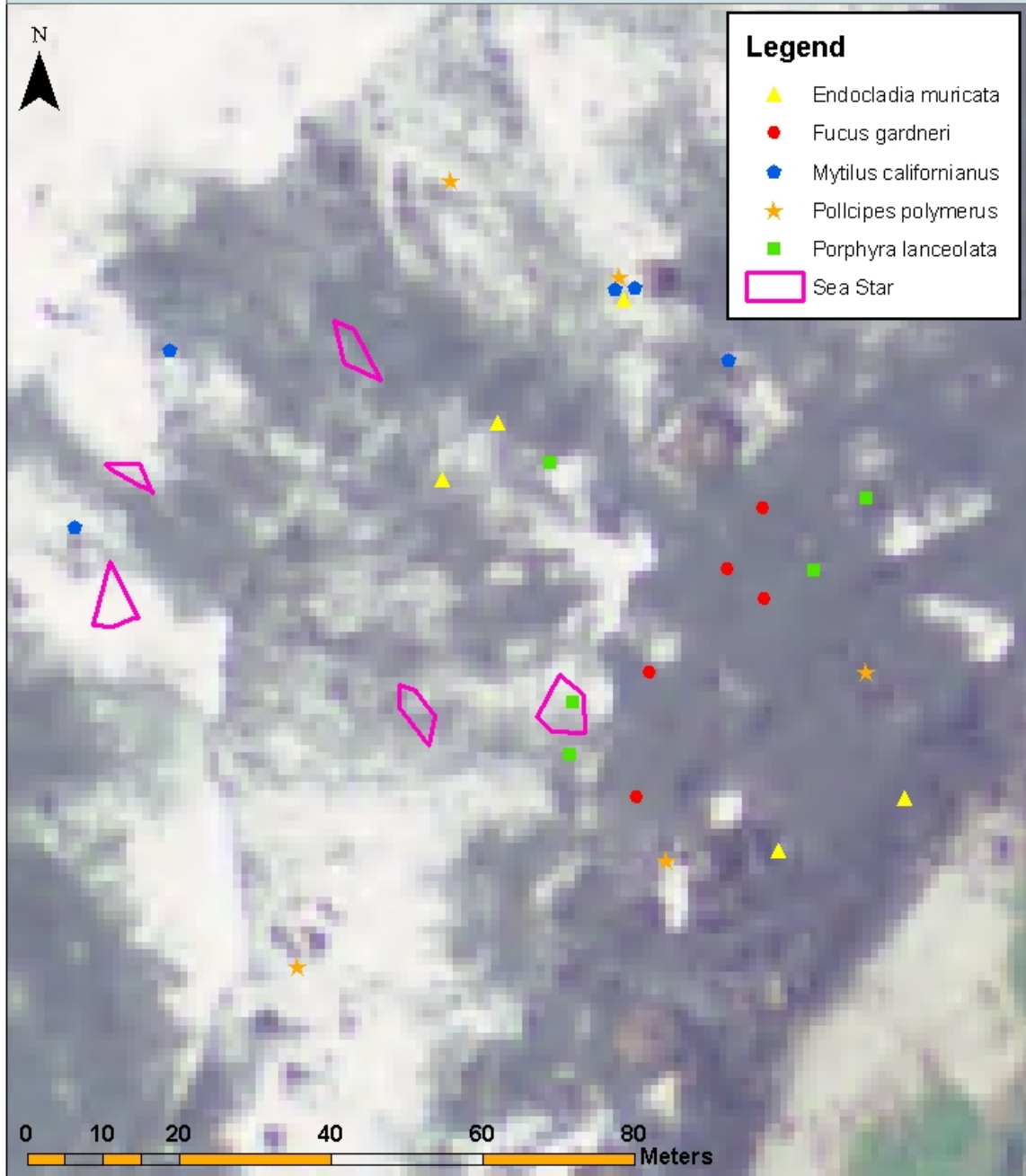
 Project Area

 Patrick's Point State Park Management Units



Palmer's Point Enhancement Project

FIGURE 1
Project Location



Palmer's Point Rocky Intertidal Community Monitoring Project

FIGURE 2
Permanent Monitoring Plots

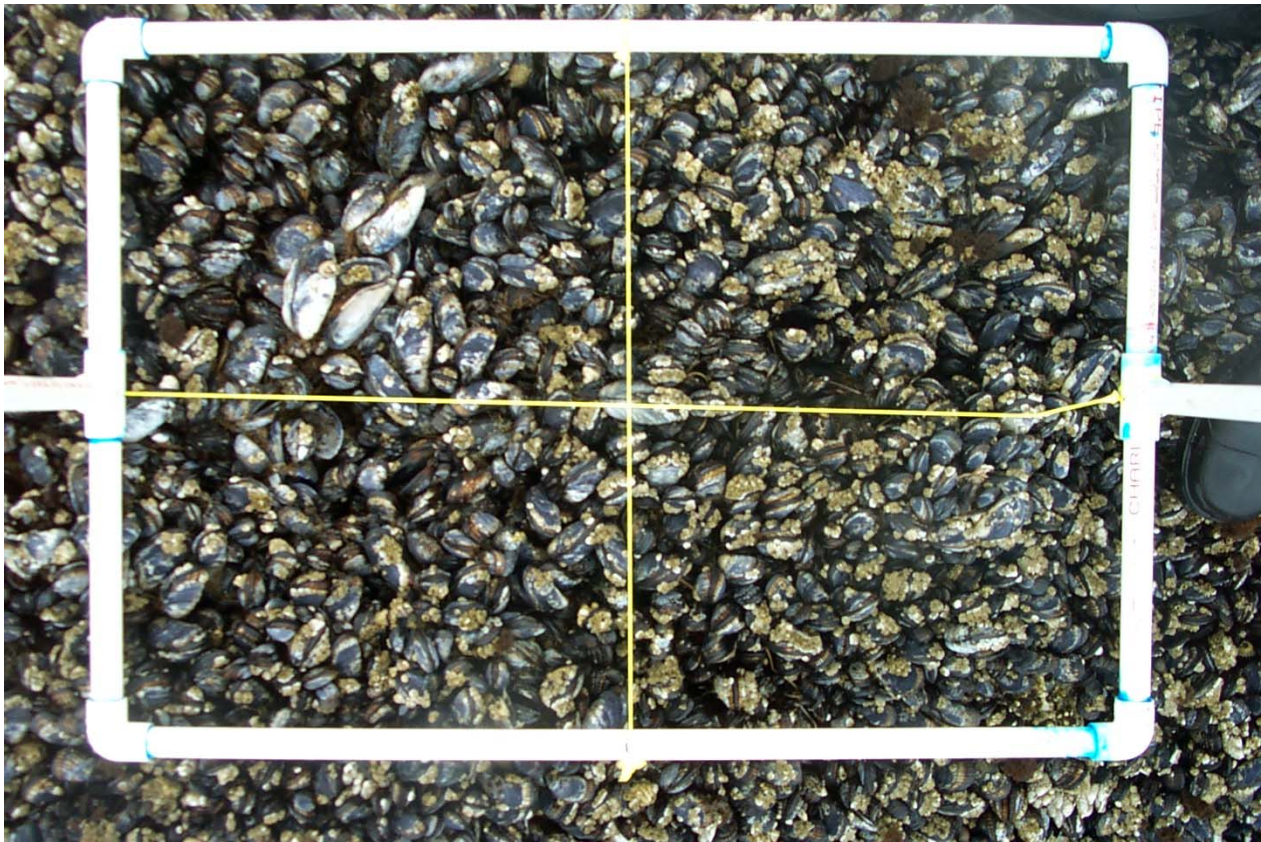


Photo 1. One of the five California mussel (*Mytilus californianus*) photo plots.

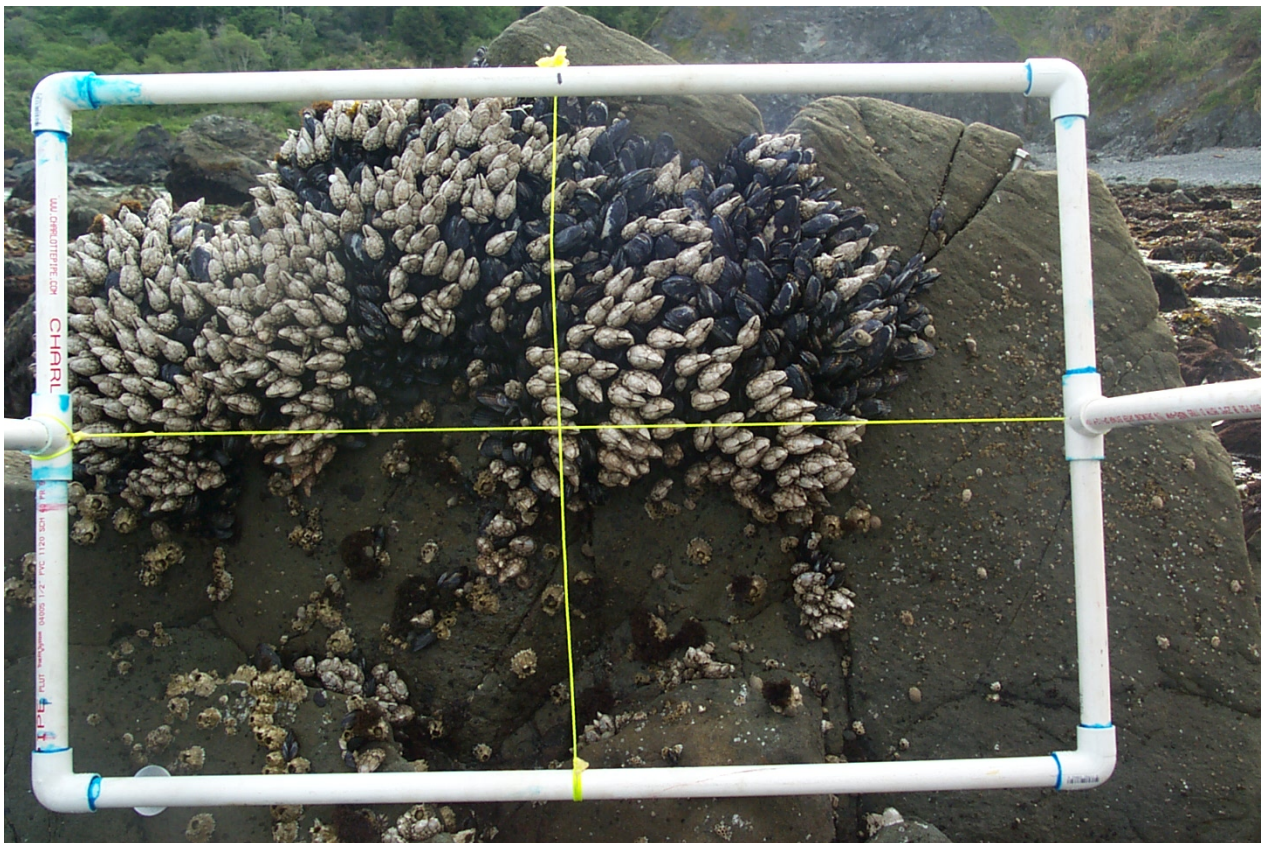


Photo 2. One of the five leaf barnacles (*Pollicipes polymerus*) photo plots.

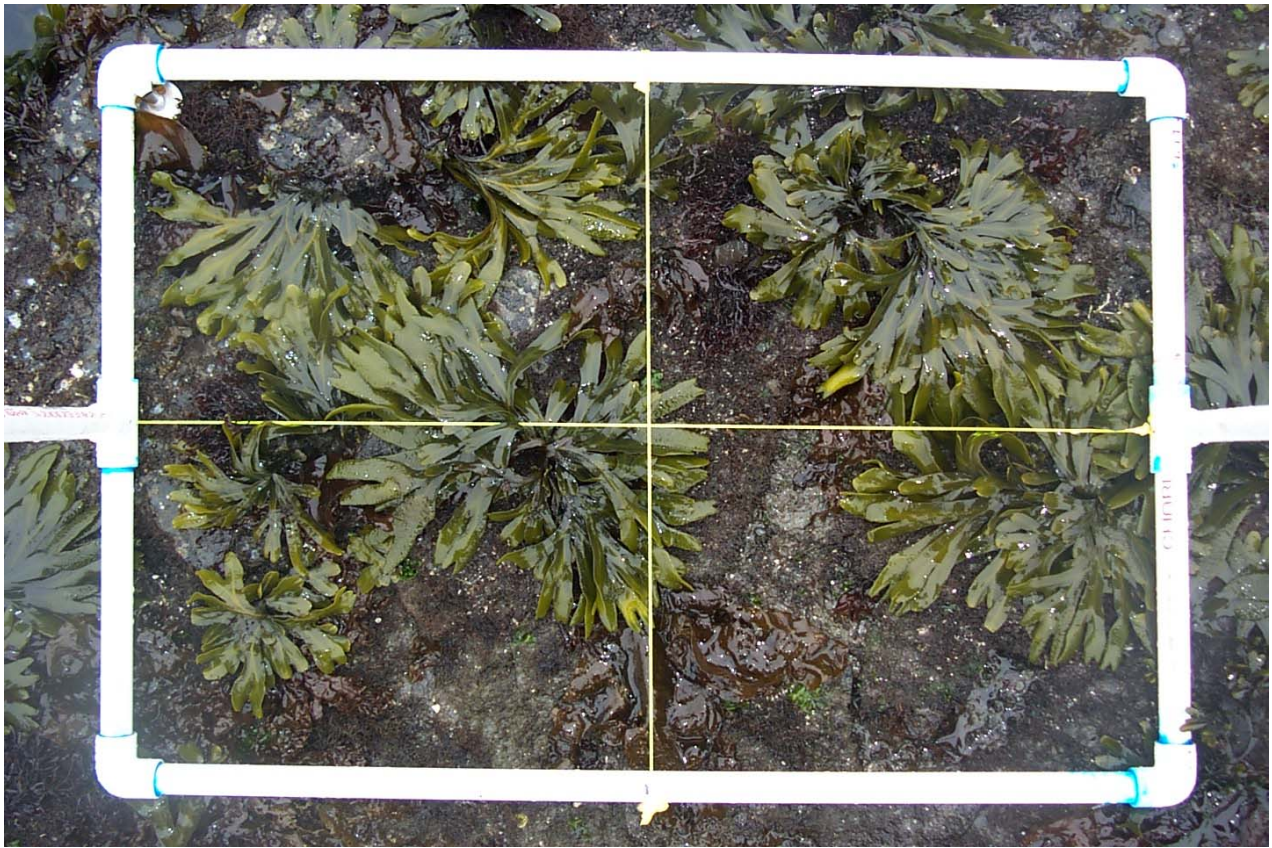


Photo 3. One of the five rockweed (*Fucus gardneri*) photo plots.

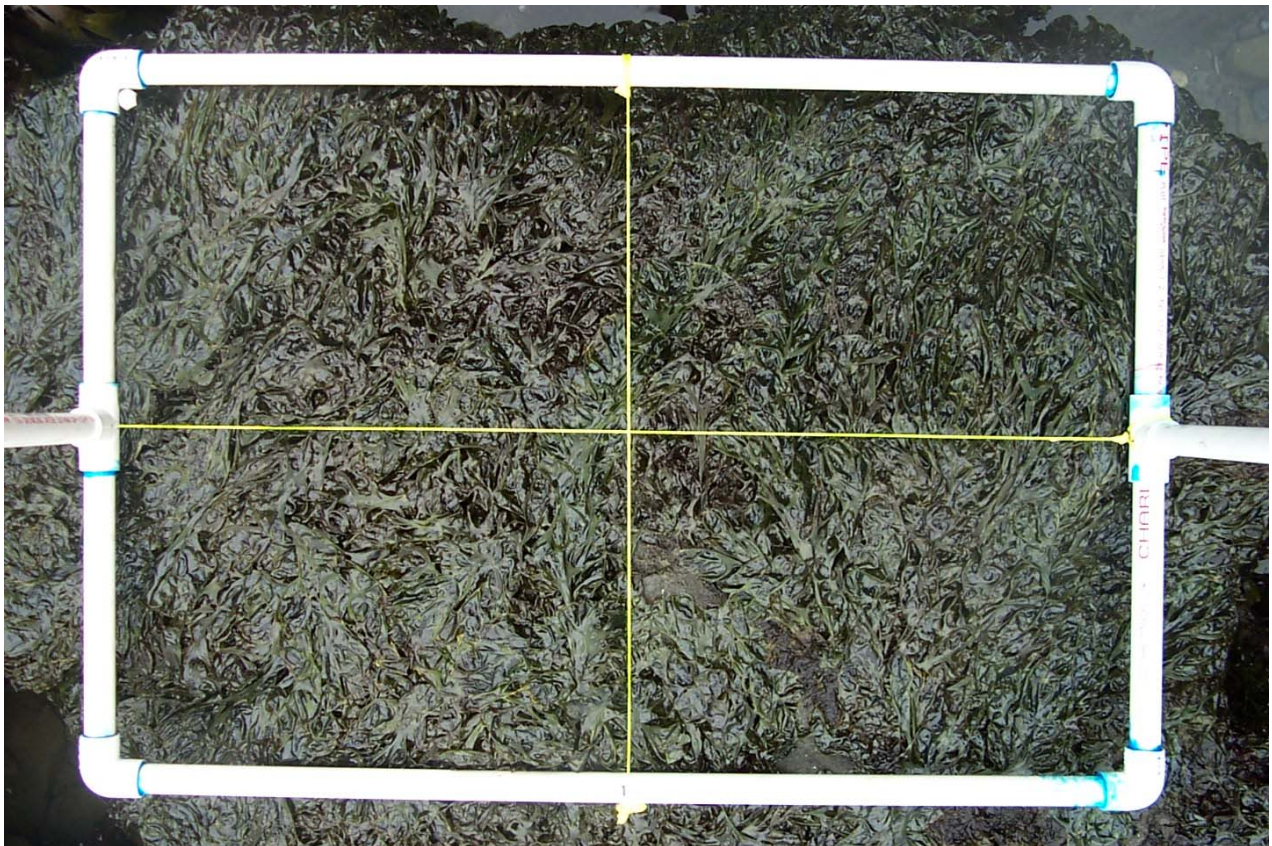


Photo 4. One of the five wild Nori (*Porphyra lanceolata*) photo plots.

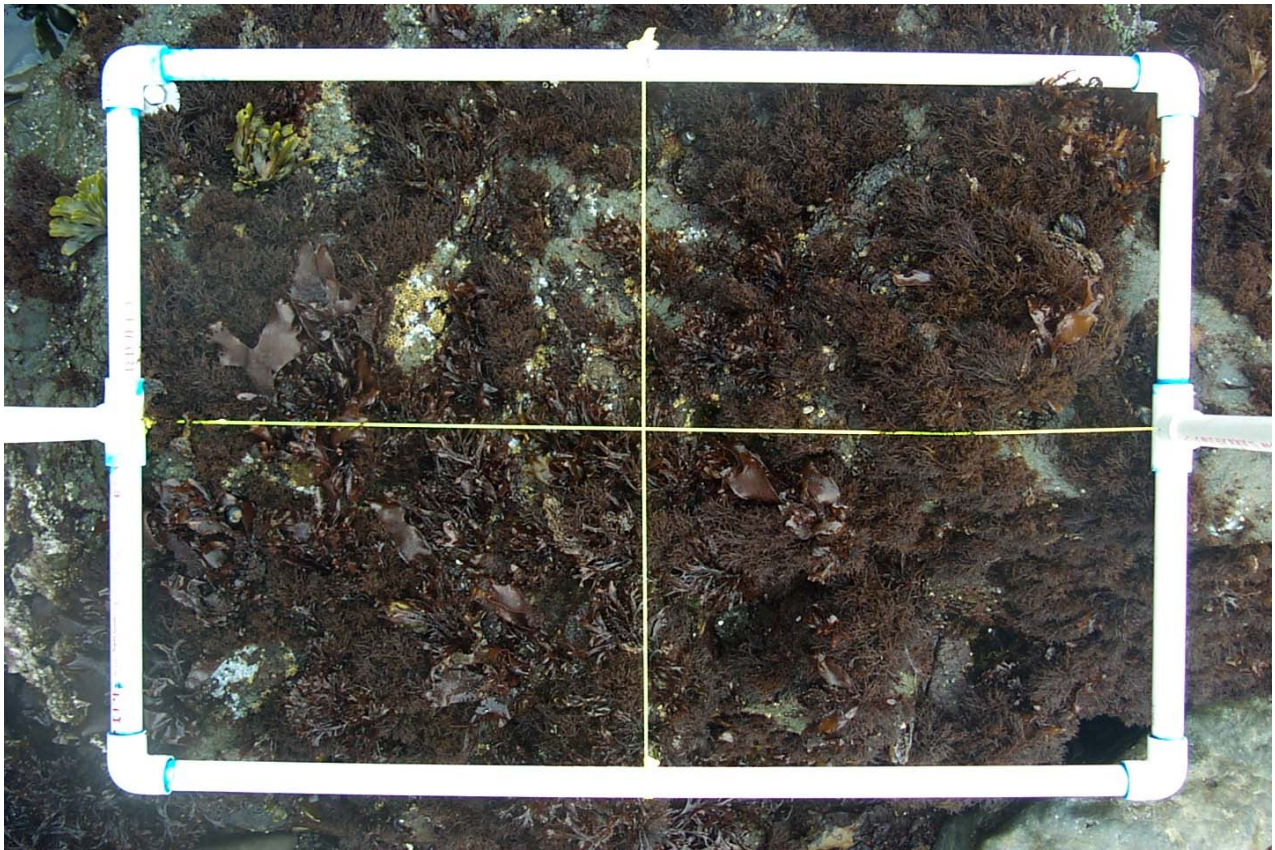


Photo 5. One of the five *Endocladia muricata* photo plots.

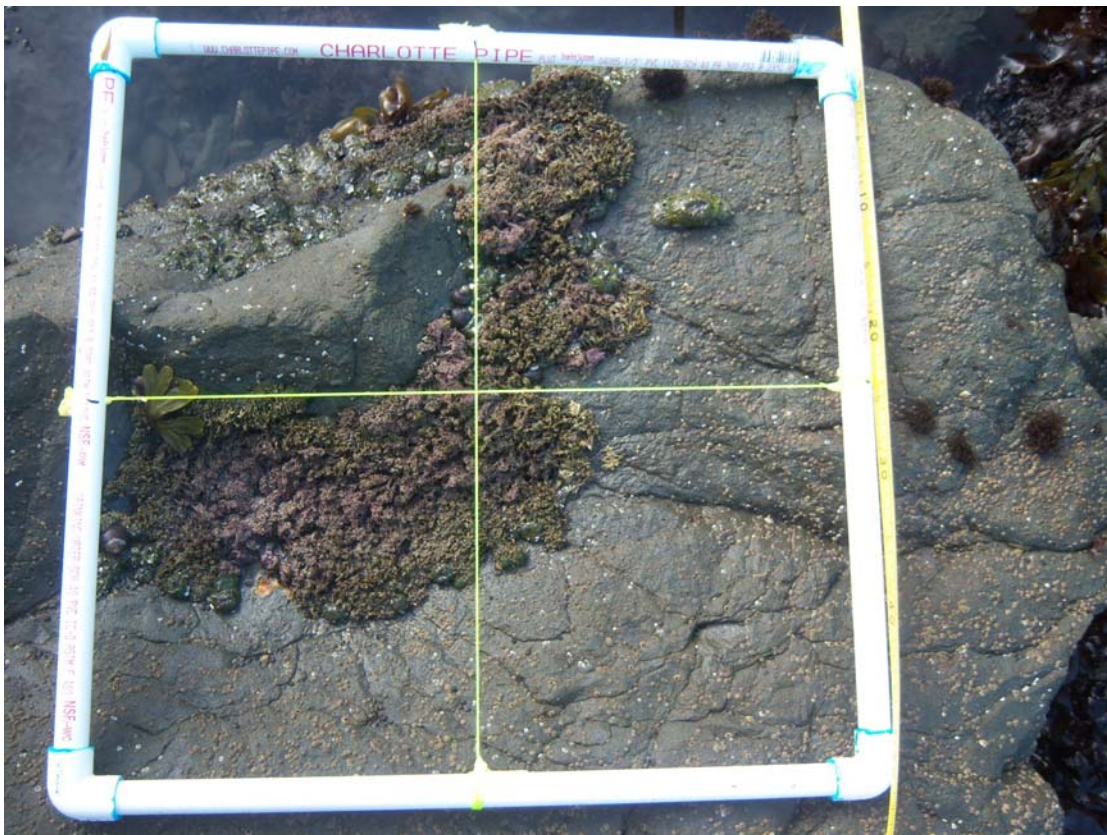


Photo 6. Quadrat for sampling mobile species in the high tidal zone along transect 2.

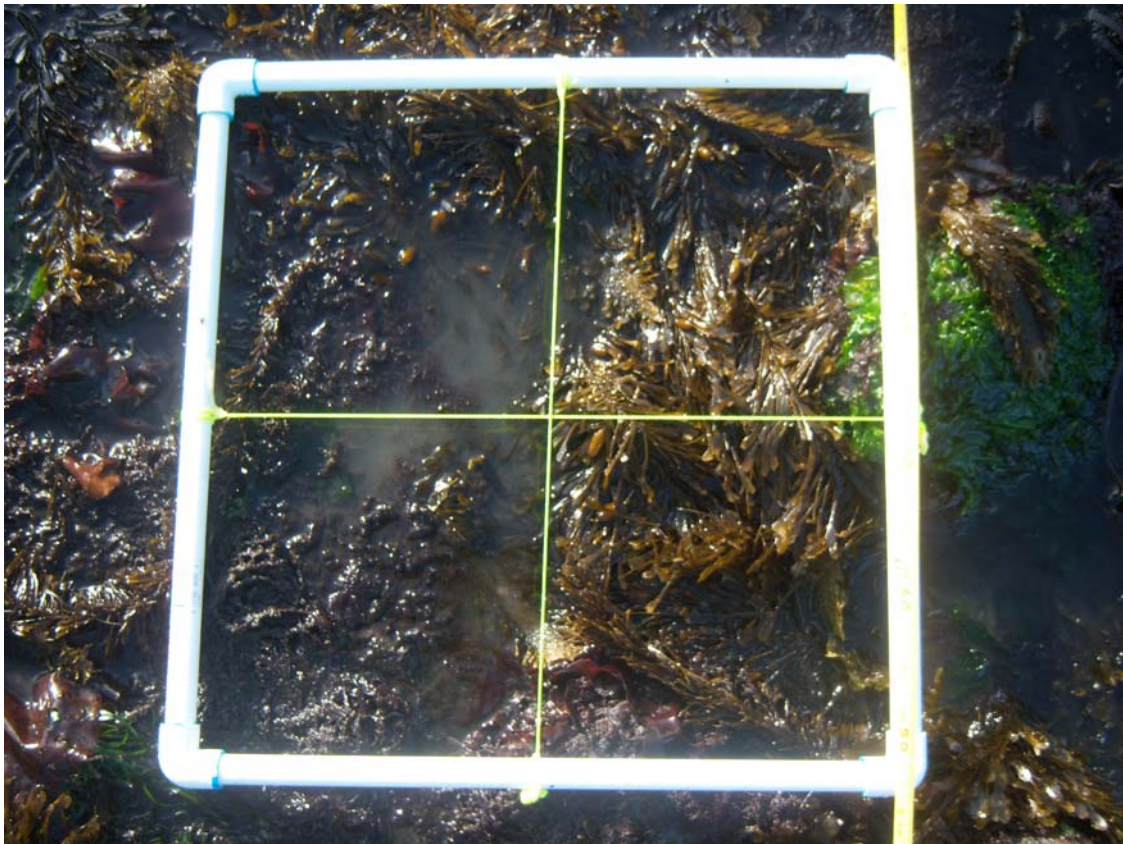


Photo 7. Quadrat for sampling mobile species in the mid tidal zone along transect 2.

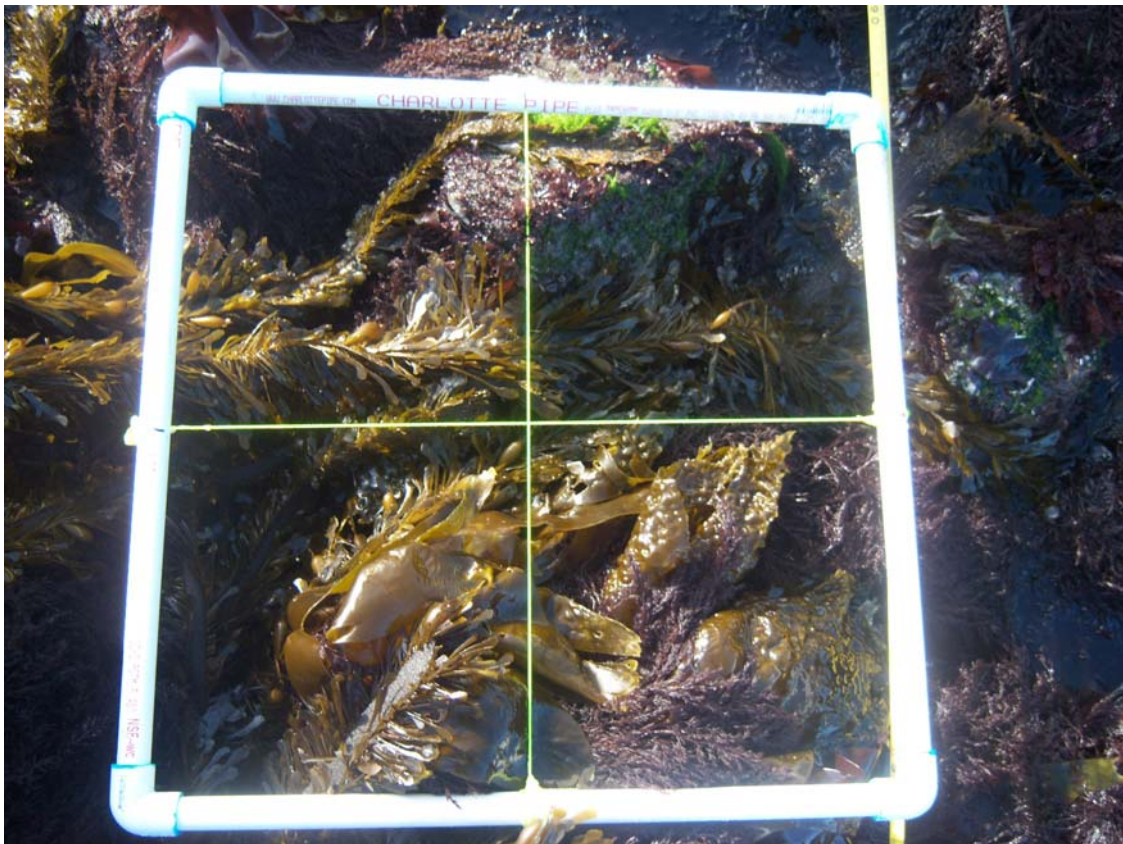


Photo 8. Quadrat for sampling mobile species in the low tidal zone along transect 2.

APPENDIX A. PALEMR'S POINT ROCKY INTERTIDAL HABITAT BROCHURE

Tidepool Etiquette

Intertidal zones are very fragile environments. Tidepool life can be easily harmed or killed by human disturbance.

- ◊ There is no collecting of plants and animals at any California State Park!
- ◊ Life is everywhere! Try to walk on sand and bare rocks when possible.
- ◊ Never throw rocks or sticks in tidepools, you may harm or kill something!
- ◊ Prying animals off surfaces hurts them! Please observe them in place.
- ◊ If you look under rocks or seaweed for animals, return them to their original position. Organisms living under rocks may die if the rock is left overturned.
- ◊ Please pick up and properly dispose of debris left by people.

For Your Safety!

Tidepools are great fun to explore! Keep these tips in mind while **In The Zone!**

- ◊ Your feet will get wet and the rocks are slippery! Wear appropriate shoes/boots.
- ◊ Even on a cloudy day, a hat and sunscreen are a good idea.
- ◊ Carry a good windbreaker for breezy days.
- ◊ Don't be weighed down! Pack lightly!
- ◊ An ID guide, binoculars and a camera are good to have.
- ◊ **Watch the Waves!!** The buddy system is best. If a wave hits you, don't try to run. Make like a Limpet and hold on tight! Let the wave wash over you!

Low Intertidal Zone

Only uncovered at the lowest of tides, organisms found here rarely deal with extreme changes, and they cannot survive long if exposed to the air.



Tidepool Ecology

Some of the richest and most diverse intertidal habitat in the world can be found in the tidepools of Patrick's Point State Park. An upwelling of nutrient rich bottom water, lack of winter ice that could kill marine life near shore and the ever present coastal fog that protects pools from summertime sun all contribute to this rich environment.

Due to a diurnal tidal pattern, meaning two low and two high tides daily, life must adapt to some of the most drastic changes in living conditions every day!

Temperatures can vary from near freezing to extremely hot. Sunny days can cause heated pools and low oxygen levels. Evaporation leads to high salinity, or salt, content in the water, causing organisms to lose body fluid through seepage.

A rainy day can cause salinity levels to drop, making organisms soak up too much fresh water, swelling their tissues, and often leading to death.

There are three main factors that determine in what zone an intertidal organism lives: wave strength, the type of surface to grow on, and the amount of time an organism spends exposed to air and water.

Mid Intertidal Zone

Organisms in this zone deal with many of the same issues as those in the high zone, except there is more water readily available. This is where most tidepools you see are found.

Intertidal Zones

Tidepools are divided into four different intertidal, or littoral zones: splash, high, mid and low. The splash zone is moistened by the highest waves, ocean spray and rain. The high zone is rarely under water and only at high tide. The mid zone is covered part of the time between tides. The low zone is almost always covered in water and is only prominent during low tide. Life must adapt to these conditions and does so in amazing ways!

High Intertidal Zone

Life here must cope with intense wave action and extreme changes in water availability. When the tide is low, many organisms retain water inside their bodies while others find a place to hide in crevices or under rocks.

Splash Zone

Life in this zone must withstand extreme salinity and temperature changes on a daily basis.



Tidepool Organisms



Leaf barnacle and California mussel
(*Balanus glandula* and *Balanus glandula*)
Found in High to Low Zones

Green tuft
(*Cladophora columbiana*)
Found in High to Mid Zones



Sea cauliflower
(*Leathesia difformis*)
Found in High to Mid Zones

Moonglow anemone
(*Anthopleura artemesia*)
Found in Mid to Low Zones



Rockweed
(*Fucus garneri*)
Found in Mid to Low Zones

White-lined dorina
(*Dirona albolineata*)
Found in Mid to Low Zones



Gumboot chiton
(*Cryptochiton stelleri*)
Found in High to Low Zones

Giant green anemone
(*Anthopleura xanthogrammica*)
Found in Mid to Low Zones



Leather or Garlic star
(*Dermasterias imbricata*)
Found in Mid to Low Zone



Bladder chain kelp
(*Cystoseira osmundacea*)
Found in Mid to Low Zones

Lined chiton
(*Tonicella lineata*)
Found in Mid to Low Zones



Red tube worm
(*Serpula vermicularis*)
Found in Mid to Low Zones

Dwarf rockweed
(*Pelvetiopsis limitata*)
Found in High Zone



Sea lemon
(*Anisodoris nobilis*)
Found in Low Zone

Six-rayed Star
(*Leptasterias hexactis*)
Found in Mid to Low Zones



Surf grass
(*Phyllospadix scouleri*)
Found in Low Zone

Purple shore crab
(*Hemigrapsus nudus*)
Found in High to Low Zones



Leopard doris
(*Diaulula sanddiegensis*)
Found in High to Low Zones



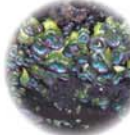
Feather boa kelp
(*Egregia menziesii*)
Found in Low Zone

Black Katy chiton
(*Katharina tunicata*)
Found in Low Zone



Sea Sacs
(*Halosaccion glandiforme*)
Found in High to Low Zones

Aggregating anemone
(*Anthopleura elegantissima*)
Found in High to Low Zones



Northern Red Anemone
(*Tealia crassicornis*)
Found in Low Zone

Black turban snail
(*Tegula funebralis*)
Found in High to Mid Zones



Red eyed medusa
(*Polyorchis penicillatus*)
Found in Mid to Low Zones

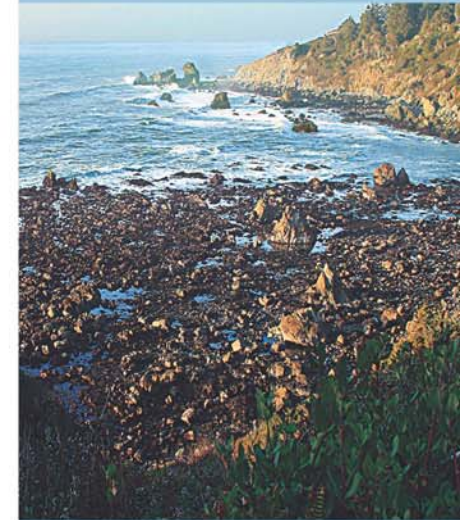
Monterrey stalked tunicate
(*Syela montereyensis*)
Found in Mid to Low Zones



Daisy Brittle star
(*Ophiopholis aculeata*)
Found in Mid to Low Zones

Get in the Zone!

Life in the Intertidal Zones of
Patrick's Point State Park



We would like to thank the Stuyvesant Trustee Council for funding the Palmer's Point Trail and Interpretation Improvement Project

