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DIABLO CANYON POWER PLANT SITE ECOLOGICAL STUDY  
QUARTERLY REPORT NO. 21

July 1 - September 30, 1978

by

Daniel W. Gotshall  
Laurence L. Laurent  
and  
John J. Grant

PACIFIC GAS AND ELECTRIC COMPANY  
COOPERATIVE RESEARCH AGREEMENT 5-26-77

MARINE RESOURCES

Administrative Report No. 79-5

March 1979

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ABSTRACT

Rough seas and the hiring freeze further delayed completion of our field and laboratory work.

All random 1/4-m<sup>2</sup> stations were completed in Diablo Cove but ten stations remain in the North Control. Nine random fish species counts were conducted in Diablo Cove.

Very few sea otters, *Enhydra lutris*, were observed during this quarter, none in Diablo Cove.

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<sup>1/</sup> Marine Resources, Administrative Report No. 79-5, May 1979.

<sup>2/</sup> Operations Research Branch, P.O. Box 98, Avila Beach, CA 93424.

This is the 21st quarterly report submitted in partial fulfillment of Research Contract No. 5-26-77 between the Department of Fish and Game and the Pacific Gas and Electric Company. Through this contract the Department of Fish and Game is to conduct ecological monitoring studies to determine what changes have occurred since 1970 and 1971 in the base line inventory of the marine biota with special reference to fishes and abalones.

Quarterly reports will be followed by annual reports. Full tables and species lists will be included in each annual report.

**Submitted To:**

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## INTRODUCTION

Rough seas prevented us from completing planned field work. In addition, the statewide hiring freeze has caused further delays in processing algae samples.

Our quarterly reports are interim progress reports and do not function as Department of Fish and Game environmental impact reports.

## OPERATIONS

All 24 random subtidal 1/4-m<sup>2</sup> (micro) stations were completed in Diablo Cove and 14 stations were surveyed in the North Control. None of the permanent subtidal or intertidal stations were surveyed. Laboratory time was spent processing subtidal algae samples and continuing computer analyses of data for the preoperational final report due in 1979.

## METHODS

No changes in methods have taken place since our last report (Gotshall, Laurent and Grant, 1978).

## CONTROL STATIONS

### Subtidal Activities

We completed surveys of 13 random North Control micro stations with each station consisting of four 1/4-m<sup>2</sup> quadrats. None of the permanent stations were surveyed.

### Algae

### Results

Forty-two species of algae were identified from 1/4-m<sup>2</sup> samples during this quarter. The most frequently encountered species was *Botryoglossum farlowianum* which occurred in 67% of the samples. *Polyneura latissima* (53%),

*Microcladia coulteri* (48%), *Callophyllis flabellulata* (45%), and *Neoptilota densa* (38%) were also common.

#### Invertebrates

##### Results

The orange cup coral, *Balanophyllia elegans*, was the most frequently observed animal in the 52 quadrats surveyed; they were present in 61.5% of the quadrats. Sea bats, *Patiria miniata*, and brown turban snails, *Tegula brunnea*, were the second and third most frequently observed animals appearing in 44.2% and 40.4% of the quadrats, respectively. Red abalone, *Haliotis rufescens*, were not observed in any of the quadrats. Giant red sea urchins, *Strongylocentrotus franciscanus*, present in 9.5% of the quadrats were, for the most part, juvenile animals occurring under mats of articulated coralline algae.

#### Fish

We did not conduct any fish studies at permanent or random control stations during this quarter.

#### Miscellaneous Activities

##### Sea Otters

Nineteen sea otters, *Enhydra lutris*, were sighted in our control areas from shoreline observation points during 23 observation days this quarter. All of these animals were observed rafting in a *Macrocystis* bed at the northern end of Fields Cove. This kelp bed seems to be a common resting place for animals foraging in the Diablo Canyon study area.

#### NORTH DIABLO COVE

##### Subtidal Activities

Eleven random micro stations, each consisting of four 1/4-m<sup>2</sup> quadrats,

were surveyed this quarter. The surveys of these stations, plus the one station surveyed in June, completes the subtidal studies in this part of the Cove for 1978. There are no permanent stations in North Diablo Cove. Four fish species counts were completed.

### Algae

#### Results

*Microcladia coulteri*, appearing in 70% of the samples, was the most common red alga of the 49 species found in North Diablo Cove quadrats. *Polyneura latissima*, *Botryoglossum farlowianum*, *Hymenena flabelligera*, *Iridaea cordata v. splendens*, and *Polysiphonia pacifica* all were common, appearing in over 40% of the samples.

Three new species from North Diablo Cove were added to our list, these were *Antithamnionella* sp., *Tiffaniella snyderiae*, and *Phycodryx setchellii*.

North Diablo Cove quadrats yielded considerably more species than South Diablo Cove.

### Invertebrates

#### Results

Brown turban snails, orange cup corals, and sea bats were the three most frequently observed animals at the 44 quadrats surveyed. They occurred at 59.1%, 54.5%, and 54.5% of the quadrats, respectively. Red abalone were not encountered in any of the quadrats, and giant red sea urchins (mostly juveniles) were present in 8.3% of the quadrats.

### Fish

#### Results

Blue rockfish, *Sebastes mystinus*, were the most common fish encountered and striped surfperch, *Embiotoca lateralis*, was the next most frequently observed species. Gopher rockfish, *S. carnatus*, and senorita, *Oxyjulis*

*californica*, were the third most frequently counted species.

### Miscellaneous Activities

#### Sea Otters

##### Results

No sea otters were observed in North Diablo Cove during the 23 observation days this quarter.

#### SOUTH DIABLO COVE

##### Subtidal Activities

All of the 12 scheduled random 1/4-m<sup>2</sup> micro stations were completed during the quarter. We also made five random fish species counts. We did not attempt to survey any of the permanent stations.

#### Algae

##### Results

Analysis of random 1/4-m<sup>2</sup> samples from South Diablo Cove yielded a total of 36 species of red algae. The most abundant species were *Polyneura latissima* and *Hymenena flabelligera* which were present in 43% of the samples. Also common were *Callophyllis flabellulata* (27%) and *Neoptilota densa* (25%).

*Gymnogongrus platyphyllis*, *Phycodrys setchellii*, and *Antithamnion defectum* were new species identified in South Diablo Cove quadrats this quarter.

#### Invertebrates

##### Results

The three most frequently observed animals at 48 quadrats were miniature turban snails, *Homalopoma luridum* (75.0%); orange cup corals,

(54.1%), and sea bats (45.8%). Giant red sea urchins were observed at 4.2% of the quadrats. Red abalone were not observed.

### Fish

#### Results

Senoritas were the most frequently observed fish, followed by blue rockfish and painted greenling, *Oxylebius pictus*. Very few young-of-the-year rockfish were encountered during any of the fish counts.

#### Miscellaneous Activities

There were twenty-three sea otter observations during this quarter.

### Sea Otters

#### Results

No sea otters were sighted in South Diablo Cove during this quarter. Several periods of rough seas and high winds during this time made observations difficult.

#### Discussion

The relatively few sea otter sightings during this quarter reflect the usual annual trends in their behavior. The peak of sea otter activity in this area over the last several years has occurred during the late spring and early summer months. If this trend holds, we anticipate there will be no increase in sightings during the final quarter of 1978.

### DIABLO POINT

#### Miscellaneous Activities

### Sea Otters

#### Results

No sea otters were sighted in the Diablo Point area during the 22 observation days this quarter.



REFERENCES

Gotshall, D.W., L.L. Laurent and J.J. Grant, 1978. Diablo Canyon Power Plant Site Ecological Study Quarterly Report. MR Administrative Report No. 20; 1-15.

APPENDIX I

MAN-DAYS SPENT AT DIABLO CANYON POWER PLANT SITE

July 1 - September 30, 1978

Subtidal Surveys: July 3, 5, 10, 11, 13, 20, 24, 25, 27, 28  
August 23, 25, September 6, 7, 20, 21, 22

Participants: Gotshall, Laurent and Grant

July 7

Participants: Laurent, Grant

July 14, 31, August 22, September 5

Participants: Gotshall, Grant

July 18

Participants: Gotshall, Laurent

Total Man-Days During Quarter: 292.5      Total Man-Days at Site\*: 240

Total Stations Surveyed: 45      Travel Time Man-Days+: 10

Boat Time (Hours): 18.3

\*Excludes time off for vacation, sick leave, etc., but includes both laboratory as well as field time.

+Includes all trips away from site.

Project Personnel:

Daniel W. Gotshall	Senior Marine Biologist, Project Leader
Laurence L. Laurent	Associate Marine Biologist
John J. Grant	Assistant Marine Biologist
Sally A. Barker	Stenographer
Rosemary C. Bowker	Graduate Student Assistant
Steven W. Wiley	Graduate Student Assistant
Katharine M. Wright	Student Assistant