

Copy 3 of 3

R E P O R T

000014
NOS/ODES
Land Use Library

TES

**Diablo Canyon Natural Resource
Management and Land
Stewardship Program
Inventory and Assessment
of Aquatic Resources**

TECHNICAL AND
ECOLOGICAL SERVICES

TES

**Diablo Canyon Natural Resource
Management and Land
Stewardship Program
Inventory and Assessment
of Aquatic Resources**

Prepared by
Stuart W. Moock

December 1990

**Pacific Gas and Electric Company
Technical and Ecological Services
3400 Crow Canyon Road, San Ramon, California 94583**

CONTENTS

	Page
INTRODUCTION	1
STUDY AREA	2
METHODS	4
RESULTS	5
COON CREEK	5
DIABLO CREEK	6
PECHO CREEK	7
IRISH CANYON CREEK	7
NORTH POND	8
RECOMMENDATIONS	9
COON CREEK	9
DIABLO CREEK	9
PECHO CREEK AND IRISH CANYON CREEK	10
NORTH POND	10
REFERENCES	11

INTRODUCTION

A Natural Resource Management and Land Stewardship Program for the Diablo Canyon Properties is being developed for Nuclear Plant Operations by the on-site staff, with assistance from TES biologists. The TES role has been to assist in describing existing natural resources, in assessing past and current land management practices, and in developing land management alternatives.

One of the major limiting natural resources on the property is freshwater in the form of scattered springs, small streams, and a few man-made ponds. In the past, the aquatic resources have been managed and developed to support cattle grazing and small-scale agriculture operations. This report presents the results of a basic fish inventory of the major freshwater aquatic systems found on the property, assesses the current status and value of the fish populations, and evaluates enhancement options and management alternatives for those populations.

STUDY AREA

The freshwater systems and the specific study sites that were inventoried are shown on Figure 1. Coon Creek and Diablo Creek are the only streams that contain water year-round in the study area. Coon Creek is adjacent to the northern boundary of the property. The section of Coon Creek located on PG&E property extends approximately 1.1 miles from the Montana de Oro State Park boundary to its mouth at the ocean. Diablo Creek enters PG&E property about 1.5 miles upstream of the power plant's switch yard, passes under the switch yard, runs adjacent to the fenced plant site, enters the frontage road culvert, and then drops down to the ocean. Both streams were known to contain populations of rainbow trout (Oncorhynchus mykiss) prior to this inventory. It is unclear whether the fish in either stream are resident rainbow trout and/or steelhead rainbow trout that migrate from the ocean to freshwater for spawning. Coon Creek is definitely accessible to upstream migrants, but Diablo Creek is probably not, due to potential barriers located near the mouth of the stream.

The remaining streams on the property are either dry or intermittent during the late summer and fall. These types of streams do not constitute viable systems for steelhead because the young steelhead require two or three years in freshwater before returning to the ocean as smolts during the winter and spring high flow periods (Moyle 1976). However, Pecho Creek and Irish Canyon Creek are two intermittent streams that were evaluated during the inventory because small irrigation ponds have been developed on each stream. Pecho Creek and Irish Canyon Creek are located on the southern portion of the property.

The ponds on Pecho Creek and Irish Canyon Creek were included in the fish inventory. Fish were not observed in either pond or in the stream sections upstream of the ponds during the September reconnaissance visit.

In addition, a single pond located on the north property was also evaluated. This pond is located on the marine terrace within 50 meters of the ocean, providing a unique habitat for the area. It was originally a spring fed seep that was expanded into a medium-sized (1/4-acre) pond for cattle watering purposes.

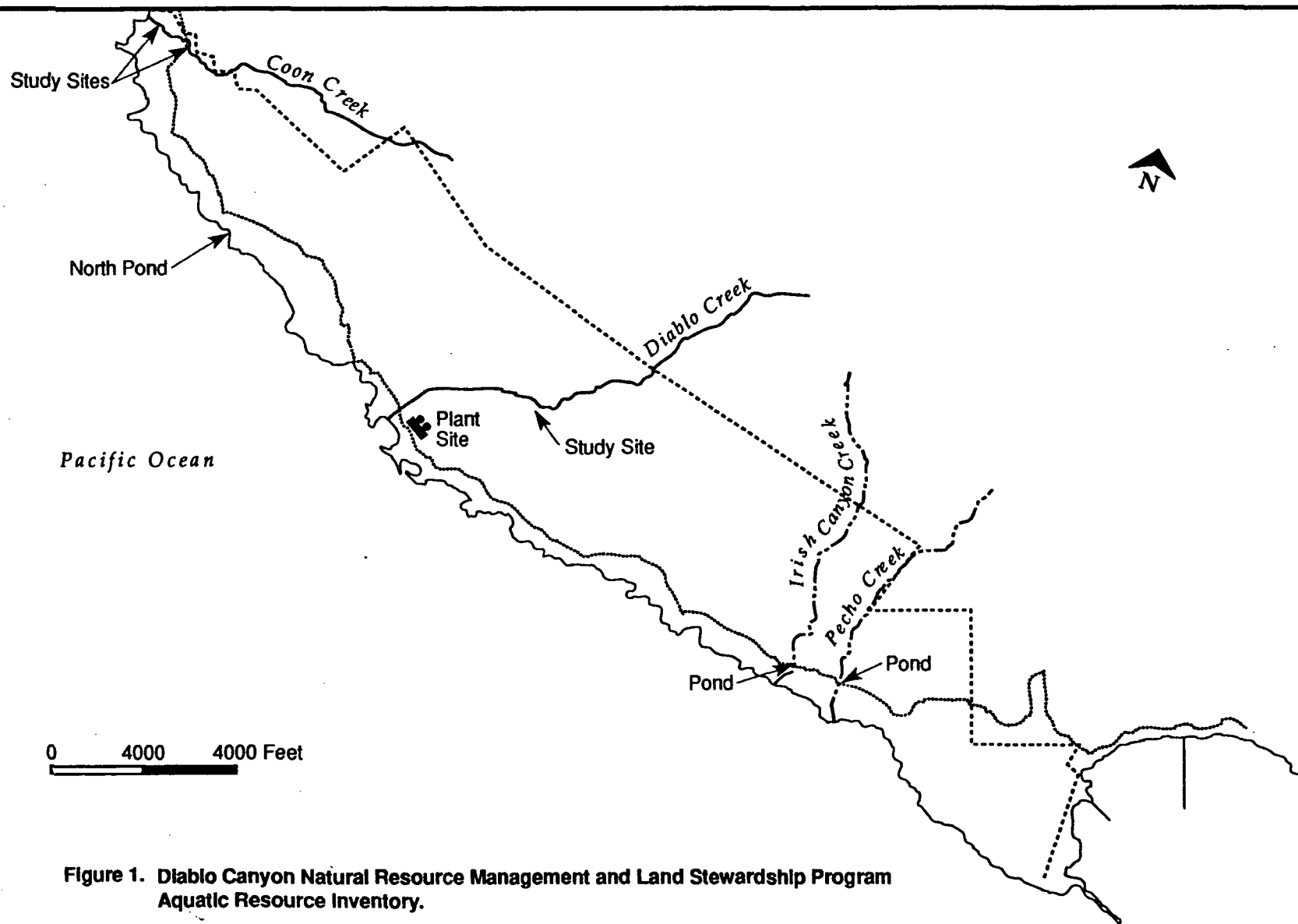


Figure 1. Diablo Canyon Natural Resource Management and Land Stewardship Program Aquatic Resource Inventory.

METHODS

A reconnaissance visit to potential study sites was conducted on September 6, 1990. The September visit was followed by the fish inventory which was conducted on November 7 and 8 by TES personnel. Visual observations were used to document fish occurrence, barriers to migration, and general stream characteristics. A backpack electrofisher was used to complete species verification checks at specific locations. The electrofishing unit was deployed from a canoe to sample the North Pond site.

RESULTS

COON CREEK

Coon Creek is a small coastal stream located adjacent to the boundary between PG&E property and the Montana de Oro State Park. Streamflow was very low at the time of the inventory, and the creek was actually blocked from entering the ocean by a sand bar located at the mouth. The formation of the sand bar occurs periodically, particularly during dry periods. The stream breaks through the sand bar during periods of heavy rainfall in the winter and early spring.

The electrofisher was used at two sites on Coon Creek. The lower site extended from the mouth into an area of thick riparian cover located approximately 100 meters upstream. Most of the stream habitat at this site was shallow riffle with small, shallow pools. Rainbow trout were the only fish collected during the sampling effort. A total of seven fish were collected and ranged in length from 55 to 190 mm (Table 1). Three of the seven were young-of-the-year. All fish were collected in the shaded riparian area at the upper end of the site.

Table 1
Coon Creek
Rainbow Trout Lengths - Electrofishing

LOWER SITE (Below Road Crossing)		UPPER SITE (Above Road Crossing)	
<u>Species</u>	<u>Length</u>	<u>Species</u>	<u>Length</u>
RT ¹	74	RT	100
RT	55	RT	105
RT	155	RT	108
RT	190	RT	110
RT	143	RT	72
RT	138	RT	130
RT	85	RT	80

1) RT = Rainbow Trout

The upper site started immediately upstream of the road crossing and extended to an point approximately 75 meters upstream. An impenetrable wall of thick riparian cover prevented further upstream sampling. Seven rainbow trout were collected in the upper site ranging in length from 72 to 130 mm. Two of these fish were young-of-the-year.

The electrofishing results demonstrate that fish occur both above and below the road crossing. None of the fish collected showed the morphological features of steelhead smolts which the young fish develop just prior to downstream movement. However, a conversation with the caretaker for the northern property, Mr. Tom Tolman, which occurred during the north pond sampling effort on November 8, adds to the speculation that steelhead use Coon Creek. Mr. Tolman indicated that he had never seen an adult steelhead in Coon Creek, but he had seen "silvery trout" on occasion (T. Tolman, Personal communication 1990). Silver sides without parr marks is one of the classic morphological characteristics of steelhead smolts (Shapovalov and Taft 1954).

The road culvert was also evaluated during the site visit. The low flow conditions made it difficult to ascertain whether adults could successfully enter the lower end of the culvert. If fish can enter the bottom of the culvert, they should be able to pass through it. The lower 20 feet is somewhat steep, but the upper section is easily passable.

In addition, an approximate 1.5-mile section of Coon Creek above the road was checked for potential barriers and suitability of spawning gravel. The State Park boundary is located about 0.5 miles upstream of the road crossing. No obvious barriers were identified in this section, and the gravel was suitable for steelhead spawning. The general slope of the stream was very gradual, indicating adequate passage for upstream migrating adults. However, most of this section could not be seen due to the heavy riparian growth. Fish were observed in this section at various spots where the State Park path crossed the stream.

DIABLO CREEK

During the inventory, Diablo Creek contained intermittent flow in the lower section from the mouth to the lower end of the switchyard culvert. Approximately 1/4-mile upstream of the switchyard culvert and above the diversion structure for the power plant's freshwater supply, a slight continuous flow was found. Electrofishing was conducted in a section starting 50 meters above the diversion site to a point about 100 meters upstream. A total of 11 rainbow trout were collected during the sampling effort (Table 2).

Table 2
Diablo Creek
Rainbow Trout Lengths - Electrofishing

Above Diversion Site			
<u>Species</u>	<u>Length</u>	<u>Species</u>	<u>Length</u>
RT ¹	143	RT	88
RT	74	RT	82
RT	113	RT	78
RT	108	RT	84
RT	111	RT	90
RT	86		

1) RT = Rainbow Trout

In a previous sampling effort conducted in 1986, TES biologists found rainbow trout throughout the stream from the lower section below the frontage road to a point upstream from the diversion structure (Running 1986). A total of 34 and 27 trout were collected in two separate efforts conducted in April and May of that year. Only rainbow trout were collected.

The rainbow trout presently in Diablo Creek may be descendants of fish transplanted from Coon Creek (Personal communication from T. Tolman, 1990). It is doubtful that adult steelhead are able to access the lower section of Diablo Creek, because of the steep gradient immediately above the mouth.

PECHO CREEK

Pecho Creek upstream and downstream of the irrigation pond was checked visually. No fish were observed in either section during the inventory. The lower section was dry. The pond was also checked visually and spot checked with the backpack electrofisher. Fish were not observed or found at this site.

IRISH CANYON CREEK

Irish Canyon Creek upstream and downstream of the irrigation pond was checked visually, and no fish were observed in either section. The lower section contained only a trickle of water

near the mouth. The pond itself was very low, and exhibited a gray, murky appearance. No fish were observed.

NORTH POND

A total of 39 three-spined sticklebacks (Gasterosteus aculeatus) and 11 mosquito fish (Gambusia affinis) were collected in the shallows adjacent to bands of tules during the North Pond Inventory. Two larger unknown specimens were observed in the deeper section of the pond, but were not netted successfully. One of the larger specimens was estimated to be 18 inches in length. The backpack electrofishing unit is not very efficient in deep water.

Sticklebacks, mosquito fish, black bullheads (Ictalurus melas), largemouth bass (Micropterus salmoides), and rainbow trout have been planted in the pond by the property caretaker, Mr. Tom Tolman (Personal communication, T. Tolman 1990). The rainbow trout were collected from Coon Creek and transplanted to the pond. Rainbow trout often have a difficult time surviving in shallow ponds where water temperatures are high and oxygen levels in the water are low. In many shallow ponds, the oxygen content of the water limits the types of fish that can survive, particularly through the summer and fall months. Measurements of dissolved oxygen from samples collected on November 20 by the on-site staff ranged from 6.4 mg/l on the bottom to 7.0 mg/l at the surface. These surprisingly high levels suggest that lack of oxygen may not preclude trout survival in the pond. The open exposure of the pond and the windy nature of the location may be keeping temperatures down and oxygen levels up. In any case, the habitat provided by the pond is very unique for the area, even though the pond contains a somewhat, artificial community of fish.

RECOMMENDATIONS

COON CREEK

1. A Restoration Plan for Coon Creek is currently being developed by the on-site staff. The plan includes exclusion of cattle from the mouth by fencing, revegetation of the impacted areas, and cutting down the cutbank slopes. Controlling the heavy growth of riparian vegetation along the stream at isolated spots has been suggested, but the thermal and physical protection provided by the thick growth outweighs the improved visibility and access aspects of a vegetation control program. Coon Creek is a very small stream in the late summer and fall, and could be very sensitive to any man-induced control. The fish collected were in good condition, indicating that the stream is in adequate shape, even at this time of extremely low water levels. Any vegetation control may be best left up to natural flooding events.
2. Documentation of steelhead smolts could be verified during a field trip in the winter or early spring when the smolts are distinguishable from resident rainbow trout. Adult steelhead could also potentially be found during this effort.
3. As far as providing adequate passage to areas upstream of the road crossing, the culvert seems adequate. Inspecting the culvert during high flows should be done to verify that no changes occur during high flow conditions that may prevent adult fish from moving through and utilizing spawning areas upstream of the road. In addition, documenting smolts or adults in the section above the road crossing would be evidence of successful passage through the road culvert.

DIABLO CREEK

1. Diablo Creek contained a population of rainbow trout in the upper section of the stream during the inventory, but the lower section below the diversion site had almost no water, and no fish were found. This lower section did contain fish in the 1986 spring survey (Running 1986). Flows in this lower section probably become intermittent each summer, and stranded fish remain in isolated pools through the dry period. In extremely dry years, the stranded fish do not survive. It may be possible to provide more flow to the lower section during dry periods to increase fish survival in the intermittent sections.

2. In both the 1986 survey and the recent inventory, a large amount of mud edging the streambed was noted. A source of sediment may exist upstream of the diversion site. It may be useful to search further up into the drainage to locate sediment sources that could potentially be controlled in the future.

PECHO CREEK AND IRISH CANYON CREEK

1. Pecho Creek and Irish Canyon Creek do not contain fish, and there is no potential of developing a seasonal anadromous fishery or planting program for the ponds. However, the systems do provide a source of water and specialized pond habitat for wildlife species in the area. As an aside, it may be beneficial to determine what has caused the grey, murky appearance of the pond on Irish Canyon Creek.

NORTH POND

1. The North Pond is solely an artificial system, but provides a very unique habitat for this area. The pond acts as a freshwater oasis, providing not only pond habitat for the introduced fish species, but marsh habitat for wildlife species in the area. During the pond sampling effort, a wild Ross' goose was found taking up winter residence at the pond. Other observations included a common snipe and an unknown rail.

REFERENCES

- Moyle, P.B. 1976. Inland Fishes of California. University of California Press. Berkeley, California.
- Running, S.K. 1986. Diablo Creek Aquatic Survey. Unpublished Report. Pacific Gas and Electric Company, Department of Engineering Research (currently Technical and Ecological Services).
- Shapovalov, L. and A.C. Taft. 1954. The Life Histories of the Steelhead Rainbow Trout (Salmo gairdneri gairdneri) and Silver Salmon (Oncorhynchus kisutch). California Department of Fish & Game, Fish Bulletin No. 98.