



SALMON PROTECTION AND WATERSHED NETWORK

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Fish Rescue and Relocation in the Tributaries of San Geronimo Creek (Lagunitas Watershed) in 1999

Summary

Surveys were conducted between June and October in the following tributaries (unnamed creeks were named by the streets and roads they parallel) of San Geronimo Creek: Arroyo, El Cerrito, Barranca, Montezuma, Larsen, Deer Camp, Bates Canyon and Redwood (also known as the south fork of San Geronimo Creek) (Figure 1). Juvenile salmonids were found in all streams except El Cerrito. A total of 1,301 salmonids (estimated to include 186 coho (*Oncorhynchus kisutch*) and 1,115 steelhead trout (*Oncorhynchus mykiss*) were relocated out of drying pools where the probability of survival was believed to be zero due to rapidly lowering water tables (Table 1). No mortality was observed from the relocation efforts. In addition, 4 coho, 58 steelhead and 142 unidentified salmonids were captured just prior to work at Roy's Dam and were relocated downstream of construction activities (Table 2).

Introduction

Two species of salmonids (coho salmon and steelhead trout) are found in the Lagunitas Watershed. Both species in this region (Central California Evolutionary Significant Unit) are listed as threatened under the Endangered Species Act. Though the

population of native or wild coho in this watershed is considered to be one of the healthiest in the state, the population is estimated to be only 10 percent of historical levels. Reasons for the decline include dam construction, which eliminated significant spawning and juvenile habitat, habitat degradation caused by urbanization and livestock operations; and reduction of water quantity caused by water impoundment, removal of water from creeks by pumping, and increased runoff from urbanization. Pollution of creeks from pesticide use, septic systems, and gas and oil from motorized vehicles and equipment and fuel tank storage has not been evaluated.

Methods

Creeks were walked and presence or absence of juvenile salmonids was recorded. As the summer – fall progressed and some tributaries began to break into isolated pools, the presence of trapped salmonids were noted and water temperatures recorded. As water levels decreased and it became obvious that pools would dry completely, fish

were dip-netted out of pools and placed in insulated coolers, which were sometimes equipped with a battery operated aerator. Approximately every 15-45 minutes, captured fish in coolers were transported near the confluence of the tributary stream where they were captured and San Geronimo Creek and were released. The exact release location in San Geronimo Creek was dictated by issues of access on private property and the availability of pool habitat nearby. Nonetheless, all fish were relocated to San Geronimo Creek, always downstream of the confluence and always within 500 m of the confluence. Because the time between capture and release was short, and because the battery operated aerator seemed to cause significant agitation of fish, use of the aerator was eventually limited to occasions when holding time was >30 minutes or the density of fish in the cooler was high. Water temperatures and pool depths were recorded.

Results

Eight tributaries were surveyed for salmonids (Figure 1). Salmonids were located in all tributaries surveyed except El Cerrito. Two streams (Deer Camp and Bates Canyon) maintained year-round flows and no fish were relocated from these sites. Water temperatures in the streams remained for the most part in the 50s (F), and were relatively constant and cool (54-63 degrees F.), even in isolated pools and right up until the time the streams or individual pools went dry (Table 1). Only two temperatures above 60 degrees were recorded: 61 degrees in one degraded pool along Redwood (recorded in June) and 63 degrees in a pool on Barranca recorded in July).

Four species of fish were located during relocation efforts including coho salmon, steelhead trout, mosquito fish (*Gambusia* sp.) And sculpin (*Cottus* sp.). A total of 1,301 salmonids estimated to include 186 coho (*Oncorhynchus kisutch*) and 1,115 steelhead trout (*Oncorhynchus mykiss*) were relocated (Table 1). No mortality was observed from the relocation efforts, though two dead fish were seen in pools prior to dip-netting activities. In addition, 4 coho, 58 steelhead and 142 unidentified salmonids were captured just prior to work at Roy's Dam and were relocated downstream of construction activities (table 2). *Gambusia* were located in Larsen Creek and in San

Geronimo Creek at Roy's Dam. Sculpin were recorded in San Geronimo Creek at Roy's Dam.

At the beginning of relocation efforts, the small size of the salmonids and uncertainty of staff in identifying between the two species resulted in many fish recorded as unidentified salmonids. As fish size increased over the season, and proficiency of collectors ability to identify fish improved, more fish were identified to species. We roughly estimate (based on later captures) that 12 percent (or 186) of rescued salmonids were coho and 88 percent (1,192) were steelhead.

El Cerrito- Approximately 30 m from the confluence of Arroyo and El Cerrito, the creek passes through a culvert under Arroyo Road. This is probably a barrier to passage, as fish would have to jump several feet to enter the culvert. Habitat upstream of the barrier appeared to offer significant spawning and nursery habitat, if it were to become accessible to fish.

Deer Camp- This stream did not go dry in 1999, and no fish were relocated from this stream. Deer Camp is located in a small steep canyon and steelhead were located only in the first hundred meters south of San Geronimo Valley Drive.

Bates Canyon – This stream did not go dry in 1999, and no fish were relocated from this stream. The creek in Bates Canyon is located in a small steep canyon and steelhead were located only in the first several hundred meters south of San Geronimo Valley Drive.

Montezuma- Less than 10 steelhead were located at only one site on Montezuma in 1999, approximately 500 m south of the confluence with San Geronimo Creek, and in very limited numbers. No fish were relocated from this stream before it went dry. In recent previous years, coho salmon have been observed spawning in this tributary and juvenile salmonids have been seen at various locations along the first ~1,000 meters of this stream.

Larsen Creek—Water temperatures in the stream remained relatively constant (54-59 degrees F.) and cool, even in isolated pools and right up until the time the streams went dry. Rescue operations occurred seven times between 11 July and 28 September in several isolated pools, all located on the property of Lagunitas School District. A total of 209 fish were located, including 20 fish definitely identified as coho and 111 as steelhead. The remaining 78 salmonids were not positively identified to species. Before winter rains resumed, this stream had gone completely dry in the lower reach where fish were rescued.

Arroyo—A total of 557 unidentified salmonids were dip-netted from a series of drying pools located along approximately 50 m of creek bed between 29 May and 20 June. Two dead salmonids were located in one pool prior to commencement of dip-netting operations. This site went completely dry before winter rains commenced.

Barranca- A total of 140 unidentified salmonids were dip-netted from approximately 30 meters of creek in three pools. This site went completely dry before winter rains commenced.

Redwood- Three separate pool sites were dip-netted between 30 May and 25 July, and a total of 445 salmonids were relocated.

Discussion

A significant number of salmonids were rescued from certain death in drying streams. Considering the fact that only approximately 500 coho spawners have been recorded in recent years in the entire watershed, and that this number of spawners may only represent the progeny of 6-10 successful redds (Paul Siri, 1999, pers. comm.); if some of these rescued fish survive to adulthood, and represent fish from redds that would not have otherwise survived, this project could have a significant and positive impact on the genetic diversity of this population.

In the future, we hope to improve on this first year of fish rescue and relocation by:

- increasing the number of streams monitored;

- increasing the number of threatened fish relocated;
- improving identification to determine whether fish are coho or steelhead;
- provide genetic samples for ongoing genetic study at Bodega Bay Marine Lab;
- consider installation of a smolt trap on one tributary in year 2000 to determine percentage (if any) of fish that successfully out-migrate before stream goes dry; and
- explore working w/ Paul Siri and Bodega Bay research staff to mark fish to determine if individuals survive and return to spawn in order to assess the success of the program.

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