



BIG RIVER ESTUARY TRANSECT FISH COUNT

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ABSTRACT: This report presents information on Coho and Steelhead salmon present in the Big River estuary during September 2001. Data for this report was collected by SONAR along with biologists from the California Department of Fish and Game and the Campbell Timber Management, LLC. Coho and Steelhead are endangered and threatened species that have historically been found in Big River. In the past few decades there has been a decline of 49% of Coho returns along the California coast, (see Brown, et. al., 1994). The SONAR program is in the process of collecting data on salmonid populations through snorkeling counts as part of a biodiversity study of the Big River estuary.

Key Words: Coho, Steelhead, salmonid, fish populations, Campbell Timberland Management Group, Big River, estuary, SONAR, Mendocino High School, *Oncorhynchus kisutch*, *Oncorhynchus mykiss*

INTRODUCTION: The banks of Big River were lined with giant redwood trees until the 1850s when white settlers began to cut them for lumber. Since that time the lands in the Big River watershed have passed in ownership from one logging company to another. Georgia Pacific recently sold the land to the Campbell Timberland Management Company (CTMG). The 8.3 mile Big River estuary is the longest undeveloped estuary in California. Historic records show that salmonids were once abundant in this watershed.

The School of Natural Resources (SONAR) is an advanced placement environmental science class based in Mendocino High School with an emphasis on doing field research and restoration work. SONAR received a grant from the National Fish and Wildlife Foundation to conduct an extensive biodiversity study on Big River. A study such as this has not been done in over twenty years. This snorkeling study was done in collaboration with CTMG and Fish and game biologists to identify

estuarine fish species and determine their relative abundance. This information is especially important because it concerns the Coho salmon *Oncorhynchus kisutch*, a species that is in danger of extinction. Over the last fifty years, Coho populations have plummeted. According to the National Marine Fisheries Service, “current abundance of west coast Coho salmon populations have declined to small fractions of their historic levels and continuing declines and local extinctions are widespread within this range. Statewide returns of wild adult Coho are estimated at 5,000 to 13,000 as of 1987-1990.” (Brown, et.al., 1994).

METHODS: Our training did not begin in the Big River Estuary. Because of the known abundance of both Coho and Steelhead in Pudding Creek, the CTMG and Fish and Game biologists decided Pudding creek would be the best place to learn how to identify species of salmonids. There are many things that make Coho and Steelhead juveniles easily distinguishable: Coho juveniles, for example, have a sickle shaped anal fin, meaning the leading edge is longer than the base. Their anal and dorsal fins have white leading edges with a strip of black below. Their adipose fin has a dark edge with an opaque center. Their caudal, anal and adipose fins all have pale orange coloring. They also have an obvious dip in their caudal fin. The pupil of their eyes is very round in shape. The par marks found on the side of the fish are elliptical and are comparatively light in color. (See Fig 1). The average length of a fry is approximately 35 mm. (Edgell, Phil; Groot, C; Hartman, G.F.; Pollard, W.R. Field Identification of Coastal Juvenile Salmonids).



(Juvenile Coho salmon) Fig. 1

Many of the juvenile Steelhead’s physical traits differ greatly from those Coho. The caudal and dorsal fins of Steelhead are evenly speckled with melanophores. The dips found in their caudal fins are also slight. The median dorsal area has about five par-like marks. There is a white tip on their dorsal fin that

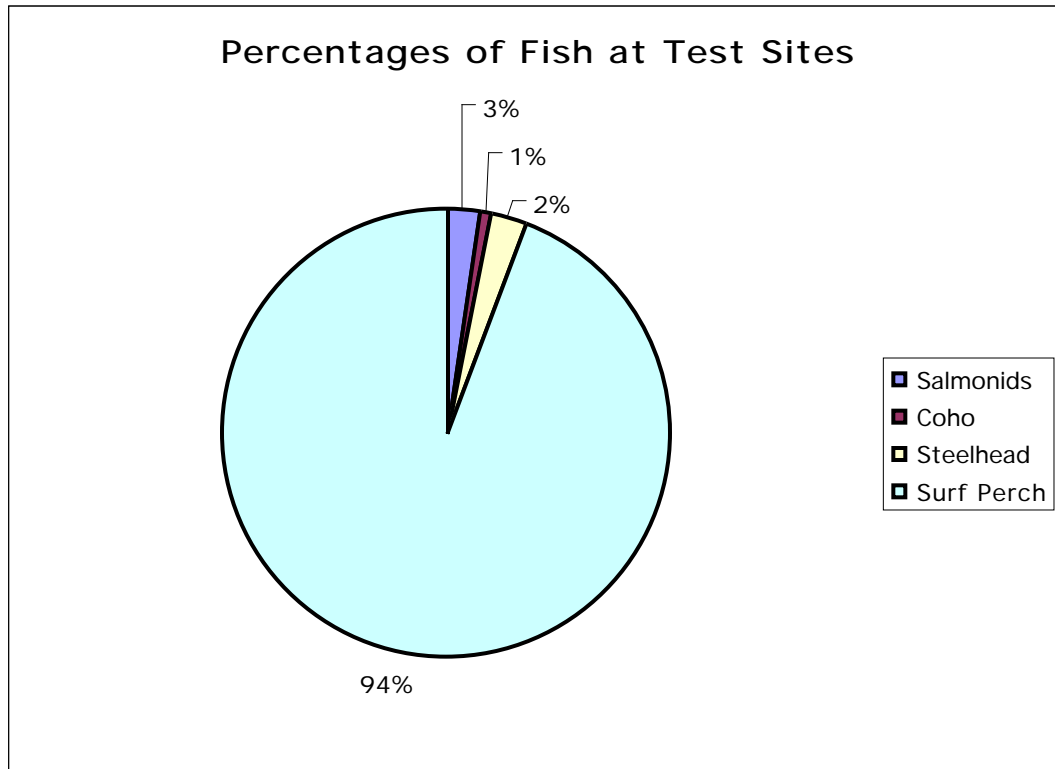
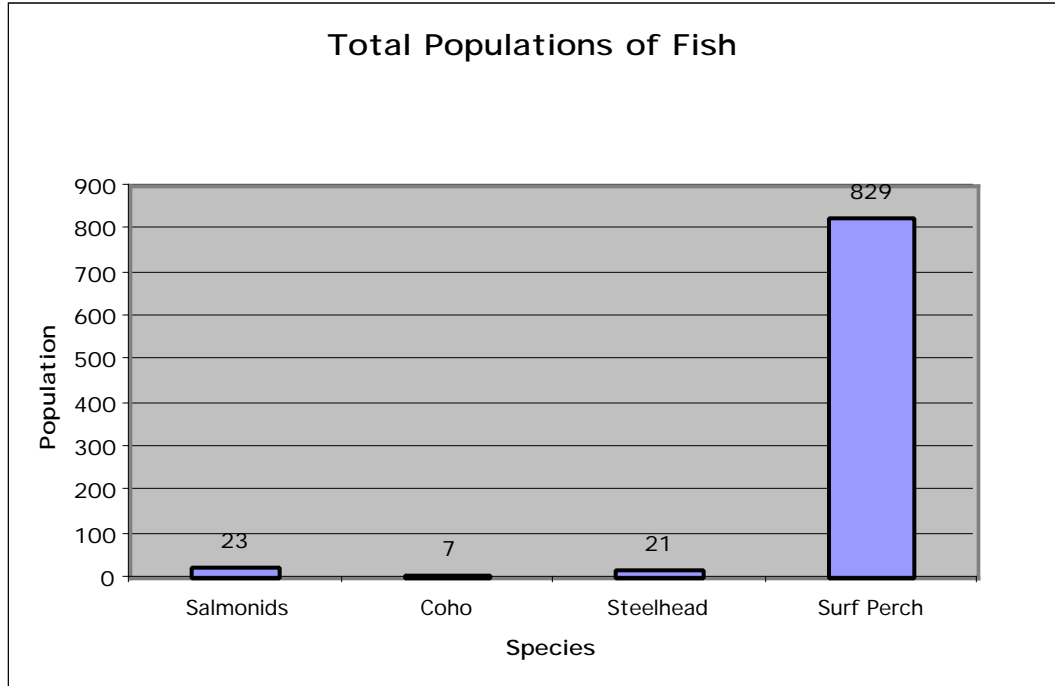
covers three to five interspaces between dorsal fin rays. On fry, the first ray of the dorsal fin is black. The adipose fins of juvenile Steelhead have a continuous rim of pigment that occasionally has one break. The pupils of Steelhead are more oblong than that of Coho. Their par marks are also darker and rounder. (See Fig 2) Another aspect that differs from the Coho species is the reddish pink line that bisects the body of juvenile steelhead horizontally. (Edgell, Phil;Groot, C; Hartman, G.F.; Pollard, W.R. Field Identification of Coastal Juvenile Salmonids).



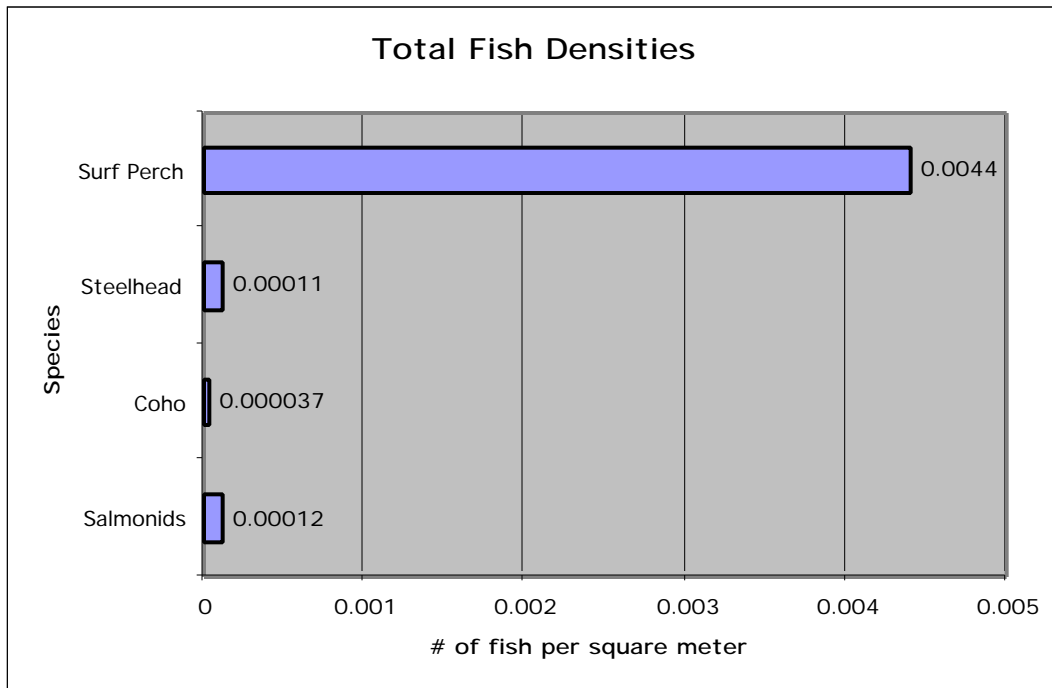
(Juvenile Steelhead salmon) Fig. 2

After we studied these differences in live specimens, and with our handouts that illustrated and labeled their physical traits, we began our study. In teams of two, each team began inching along the shallow stream's floor to count the numbers of Coho and Steelhead in the water. The Coho were more abundant than the Steelhead. After this training on Pudding Creek we were ready to begin our study on Big River's fish populations. Because the areas of Big River in which we dove were much bigger than the areas of Pudding Creek, we needed to use more people in the dive. We formed a line of people perpendicular to the river's path. As we stayed in a straight line, we each saw different parts of the river. We counted the number of fish we saw and identified them the best we could despite the river's depth. There were six sections where this method was used by both the SONAR class members and the Fish and Game biologists. The length, width, and three depths of each of the six study sections were measured prior to the dives.

RESULTS:



RESULTS:



DISCUSSION: The identification training given to us on the Pudding Creek dive by the Fish and Game biologists proved to be very important. It was important to see the Coho and Steelhead in their natural habitat. We learned first-hand their behavioral and physical differences. The Big River Estuary was a much harder identification environment to work in. Without the Pudding Creek training, it would have been hard to make successful identifications using only pictures and explanations of the fish.

In the first four sections of the Big River study we found a surprising amount of fish. The data that we gathered and the results we came up with seem to be within reasonable range of the expected fish populations. The dive team found small populations of Coho in the first section only, and small populations of Steelhead in the first, second, and fourth sections. There were also some fish that could only be identified as a type of Salmonid. This occurred in the first three sections of the study. The members of the SONAR class are currently enrolled in a NAUI Scuba Diving Instruction Course. Once this is completed, we will be able to view fish populations closer to the river's floor. Therefore, we anticipate getting much larger, more precise numbers with more accurate identification. With only a mask and snorkel, divers were only able to see the fish from the top

view. When we are able to get on the level of the fish and look at them from a side view, they will be much easier to identify.

SUMMARY: SONAR along with biologists from the Department of Fish and Game and Campbell Timber Management Group conducted an underwater survey in various sections of Big River Estuary to identify and count the types of fish while snorkeling. In this snorkeling study we determined that Coho salmon, Steelhead salmon, and Surf Perch live in the Big River estuary. These studies will serve as baseline data for subsequent studies to be performed on a regular basis by SONAR.

It is hoped that the discovery of Coho salmon in Big River estuary will promote more research by environmental groups and provide impetus for the wise management of this biologically diverse estuary.

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SONAR Research Team at Pudding Creek, September 2001: Standing left to right: Cecily Kishbaugh, Nathan Sharples, Jacob Clapsadle, Lucille Lawrence, Lynette Simpson, Danielle Frey, April Tone-Heckerroth, Robert Jamgochian. Front left to right: Bill Lemos, Mischa Hedges, Fletcher Pinkham, Sam Wojack. Photography by David Silva. Not pictured: Peter Jacobs, Emily Anderson.

Cover Photography by Cecily Kishbaugh



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