

# ANNUAL PERFORMANCE REPORT

## FEDERAL AID IN SPORT FISH RESTORATION ACT

State: California

Grant Agreement: F-51-R-13

Grant Title: Inland and Anadromous Sport Fish Management and Research

Project No. 22: North Central District Salmon and Steelhead Management

Job No. 3: Salmon Spawning Stock Inventory

Period Covered: July 1, 1999 through June 30, 2000

- I. Summary: Adult chinook and coho salmon spawning surveys (carcass surveys) were conducted on four of five annually monitored streams during the 1999-00 spawning season to determine distribution and relative abundance. Caspar Creek, Little River, Ryan Creek and Willits Creek were surveyed between November 1999 and February 2000. Hollow Tree Creek was not surveyed due to low flow conditions. Overall, adult chinook and coho salmon numbers remain depressed. Many additional streams were briefly surveyed to determine presence/absence of spawning salmon and location of redds. However, due to the snapshot effect of brief surveys, presence could not be ruled out when absence may have been indicated.

Coho salmon numbers were very low for all streams. Once again, coho were not observed in the Outlet Creek system which was the longest run of coho salmon in the Eel River.

Overall, low precipitation produced problematic low flow conditions throughout the north coast, especially for salmon trying to return to smaller streams such as the streams monitored through this project. Although our surveys may reflect very low numbers, it should be noted that because of the low flow conditions, the center of our small stream spawning distributions would most likely have been located much farther downstream which are reaches not typically surveyed. This would result in a misrepresentation of actual numbers and trends.

Maps were produced to indicate where some of the important spawning reaches were located for coho and chinook salmon within Mendocino County (Appendix 1).

- II. Background: Heavy demands have been placed on chinook and coho salmon resources by an increasing number of sport and commercial fishermen, degradation of habitat and several other impacts. In response to the declining populations, the National Marine Fisheries Service (NMFS) listed coho salmon as threatened within the Central California ESU. Stricter regulations have been imposed to reduce angler harvest, and watershed restoration projects have been initiated to improve overall watershed health. It is important to our restoration efforts that we continue to inventory

our salmon resources to determine where production has occurred, and where it has not. The data is also needed in order to evaluate management programs and place future efforts where the greatest return can be obtained.

- III. Objectives: To determine the relative abundance and trends of salmon spawning stocks in selected North Central District streams. A second objective, as personnel and funds allow, is to survey additional streams to extend our knowledge of the distribution of salmon in the North Central District streams. Also, information on fish passage problems should be collected when pertinent.
- IV. Procedures: Carcass surveys were conducted on five selected North Central District streams during FY 99-00: Caspar Creek, Hollow Tree Creek, Little River, Ryan Creek, and Willits Creek. Information obtained included; species, length, sex, number of live fish, number of carcasses, number of skeletons, unidentified species, and number of redds. Redds were also mapped so as to identify critical spawning habitat. In addition, surveys were conducted on many additional streams. Samples were collected from carcasses and skeletons for DNA analysis. When possible, scales were also collected for analysis at a later date.
- V. Findings: Table 1 summarizes the number of salmon (live and dead combined) and redds for all streams surveyed during the 1999-00 spawning season. Of the more than 40 streams surveyed only 14 were surveyed on a consistent or multiple basis. Numbers of salmon (live and dead) and redds were down for the annually monitored streams. Despite a mark/recapture method being employed to determine population size, no recaptures were made on any stream. This, in essence, erases any chance of determining population size and instead a general estimate of abundance will have to suffice and this is the method of monitoring that has been used throughout this project's span. Table 2 summarizes information gathered for the five annually monitored streams since the 1990-91 spawning season.

Although Hollow Tree Creek is one the five streams that was supposed to be surveyed this year, it was skipped due to low flow. The section of stream typically surveyed is over 20 miles in length, with several 3 and 4 mile long anadromous tributaries contributing flow. A cooperative rearing project is located approximately 8 miles from the mouth and only a handful of fish made it to the station. If a trend in abundance is needed, the cooperative hatchery's records would probably be a more accurate record of abundance than spawning surveys.

Low flow conditions in November and December, in combination with man-made structures on the South Fork Noyo River, created several situations to create low flow barriers for coho salmon. More than half the redds observed on the South Fork Noyo River were concentrated below the Department's Egg Collecting Station (ECS). The first survey conducted on the South Fork Noyo River revealed over 80% of the spawning had taken place below the ECS. The coho salmon that did make it past the station were then blocked from passage by the water collection facilities (summer dams) on Parlin Creek and on the South Fork Noyo River at the Parlin Camp. The State needs to review these structures and make modifications for future low

precipitations years. The spawning and rearing habitat above the Parlin Camp associated water diversions is certainly preferred to that below the Camp. The ECS barrier arrests movement into the North Fork of the South Fork Noyo River as well as the rest of the South Fork Noyo River. The habitat below the ECS is marginal for rearing and reflects low complexity.

Chinook spawning activity was erratic and generally took place in Late November and the first half of December. It is very likely that chinook spawning activity continued through at least January, yet not within the study reaches due to inaccessibility as a result of low precipitation through December. This was the lowest amount of rainfall ever recorded for the month of December in Fort Bragg: 0.1 inch. The previous year was similar in the overall precipitation pattern as 1999-00. However, the previous year was higher in magnitude and this created higher sustained flows in November and early December allowing chinook access to smaller order streams.

Overall, Mendocino County salmon populations are small and this alone creates problems when trying to employ a mark/recapture program for determining population size. Coupling small population size with activities inherent to Mendocino County wildlife, results in a mark/recapture program doomed from the start. Bears, eagles, otters, mink, fox, to name a few, can and do have a profound effect on recapture probability, especially when salmon numbers are low. Competition for carcasses is high for a source of protein available for a very short period of time. On several occasions, even red-tailed hawks have been observed taking live and dead coho salmon on the Noyo River and Caspar Creek. The flashiness of our small streams also creates problems when retention is counted on.

Appendix 1 contains two maps revealing redd locations on the streams surveyed. These maps also indicate steelhead redd locations. However, surveys did not continue through the entire steelhead spawning season, therefore steelhead numbers and distribution were potentially greatly underestimated. Redd locations have been stored electronically as ArcView shapefiles and are available upon request.

Since 1994, Mendocino County has experienced very different precipitation patterns; El Nino to La Nina. Both patterns present pluses and minuses for salmonid populations and both present very different problems for biologists monitoring spawning activities. In the end we are left with databases with no method to standardize and therefore a question on the validity of the abundance trends we plot. There are so many problems inherent to spawning surveys, especially on small Mendocino County streams that any reference to population size increases and decreases should be treated with caution. Even the best methodology can fall prey to climatic conditions.

Even in the absence of a sound method for determining statistical significance in population trends, it is obvious that numbers of salmon are very low in Mendocino County. Moreover, coho salmon are in real trouble, both in the Eel River system and the small coastal basins. Luckily for chinook salmon, their life history simply skirts some of the problems faced by salmonid species that depend on natal streams and rivers for rearing. Outlet Creek, although it may not be obvious through this report, appears

to be maintaining a small population of chinook. Some restoration has taken place on several of the tributaries to Outlet Creek and more is slated for the future. Water issues in the upper Eel River (Potter Valley Project, City of Willits, Brooktrails) have been, and will continue to be, issues that need to be resolved, keeping in mind salmonid limiting factors (water quantity and quality).

During the 1999-00 spawning season, hundreds of chinook salmon were passed through the Van Arsdale Fisheries Station where they were then allowed to continue to travel approximately ten miles in the Eel River until reaching Scott Dam/Lake Pillsbury. Our crews found no sign of spawning in any of the tributaries along this stretch of river. If we believe the results of studies conducted by Steiner Consulting, which there is no reason not to, allowing those chinook to spawn in this stretch of river is a waste. Those studies have shown that out migration of the juveniles is extremely unsuccessful, because the flow in this stretch of river is regulated and in no way reflects natural events (temperature too). Juvenile chinook are denied the cues needed to set them into smolt. These cues are flow and temperature related. Both flow and temperature are regulated by the Potter Valley Project..

- VI. Recommendations: Continue to conduct spawning surveys on four of the five annually monitored streams to determine trends and add additional streams to extend our knowledge of the distribution and population composition of salmon populations in the North Central District streams as funds and personnel allow. Mapping of critical spawning habitat should also continue as it has proven to be an excellent tool in targeting areas for restoration.

Drop Hollow Tree Creek from the original five streams annually monitored. If trends in abundance of coho and chinook salmon in Hollow Tree Creek are needed they should be available through the cooperative hatchery and slightly more reliable than spawning surveys.

The Department should look into a different course of action for chinook arriving at Van Arsdale to maximize their potential for production.

Both the Department and the California Department of Forestry need to find solutions for fish passage problems on the South Fork Noyo River. It can no longer be business as usual as all salmonid species within Mendocino County are listed either by the State or Federal Government.

- VII. Estimated FY 99-00 Job Costs: \$22,361.00

- VIII. Preparer: Scott Harris, \_\_\_\_\_, Associate Fishery Biologist