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An Adult Steelhead Investigation of the Lower Santa Ynez River Drainage

A Report To The

U.S. Bureau of Reclamation

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August 1988

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INTRODUCTION

The purpose of the study was to document steelhead trout resources within the Santa Ynez River drainage using electrofishing surveys in waters where mature steelhead are likely to be found. Adult steelhead enter coastal river drainages from the ocean when winter storm events elevate river flows allowing sexually mature adult steelhead to migrate upstream and spawn.

Originally, this study was planned for only the 1986-87 spawning season, but a near drought condition that season precluded much of the contemplated field effort. Subsequently, plans were made to continue the study through the 1987-88 spawning season in hopes of having more opportunities (i.e. more rain events to allow adult migration) to document steelhead resources. However, even dryer winter conditions prevailed in 1987-88 to the point where it was uncertain whether any of the few small storm events that did occur were of a magnitude to allow for steelhead immigration to spawning areas.

Because of limited sampling opportunities, only one tributary, Salsipudes Creek, located 14 miles upstream from the mouth of the Santa Ynez River, was electrofished during the past two spawning seasons. During the 1986-87 season, one survey trip was conducted, on March 11-12, 1987, shortly after the only significant winter storm event of the season. Two field efforts

were attempted during the following 1987-88 season. The first survey on March 17, 1988, had to be abandoned after equipment failure. A second survey was subsequently conducted on March 31, 1988.

Life History

Steelhead trout, a subspecies or strain of rainbow trout that has a strong genetic urge to migrate to the ocean, is an anadromous species native to Pacific coast streams. Noted for their large size and game status, these migratory trout are highly sought after and support a large recreational sport fishery. Once found in nearly every coastal stream from Alaska to Mexico, steelhead numbers have plummeted the last half century as demands for water and urbanization has severely reduced the number of streams containing the hydrologic conditions to support annual steelhead runs, especially in southern California. Presently, Malibu Creek in Los Angeles County is considered the southernmost stream with a remnant run of steelhead.

Steelhead enter the Santa Ynez River on their spawning migration during periods of high flow from December through April. This requires a significant storm event as fish cannot enter the Santa Ynez River until flows are elevated enough to wash away a sand bar that forms yearly at the mouth of the lagoon. Upstream migrations can also be hindered or blocked as flows become too low; minimum depth of water required for successful migration of adult steelhead is considered about 7 inches (Thompson 1972).

not necessarily true - extreme high tides can wash fish over sandbar acc. to Lyle

Steelhead nearly always return to the same spawning stream from which they originated. This is possible through their keen sense of smell. Occasionally, steelhead will stray into other spawning areas.

The larger size of steelhead trout, compared to stream-dwelling fishes, is attributable to their anadromous existence. Steelhead grow rapidly in the ocean and their size at maturity is mostly a function of how much time is spent in saltwater. Steelhead trout native to California streams typically reside in the ocean for one to two years prior to commencing their initial spawning migration.

Once in their natal stream, steelhead spawn wherever suitable depth, current velocity and gravel size can be found. The female digs a pit or redd in the gravel, and with an accompanying male places her eggs in the excavation and then covers them with gravel. Steelhead have been documented spawning in streams having depths of three inches to five feet, current velocities of less than one to five feet/second, and gravel of one quarter to five inches in diameter. Spawning beds must be relatively free of fine sediments. Intermittent streams are often used by steelhead for spawning purposes, with most young fry emigrating to perennial waters soon after hatching.

Description of the Drainage

The Santa Ynez River originates in the Santa Ynez and San Rafael Mountains near the Santa Barbara-Ventura County line, flowing westerly for approximately 92 miles. The basin is generally mountainous with elevations ranging from 3,000 to 6,000 ft, most of which lies within the Los Padres National Forest. Typical of most southern California streams, flows are seasonally intermittent with most flows occurring during the rainy winter months. Much of the stream bed is characteristically dry during the summer. Most of the tributaries that enter the Santa Ynez go dry in their lower reaches during this period, but maintain flows or series of pools in the upper drainage. Three water impoundments, primarily developed to export water for irrigation, domestic purposes and groundwater replenishment, are present in the drainage. These are Jameson Lake, Gibraltar Reservoir and Cachuma Reservoir.

The climate of the Santa Ynez Basin is characterized by warm, dry summers and cool, wet winters. Precipitation consists almost entirely of rainfall, averaging yearly from about 10 inches near the coast to about 35 inches in the upper drainage. Most of the precipitation occurs from November to April.

History of the Steelhead Fishery

Historically, the Santa Ynez River was of major importance as a spawning ground and nursery stream for trout, supporting the

largest run of steelhead trout in southern California. It was also the source of many steelhead trout stocked in the waters of Santa Barbara, Ventura and San Luis Obispo Counties. Prior to the Cachuma Dam Project, completed in 1953, steelhead spawned in the Santa Ynez River and practically all accessible tributaries below Gibraltar Dam, some 72 miles from the ocean, with the heaviest spawning taking place in the portion of the drainage above Buellton (California Division of Fish and Game 1944). The Santa Ynez River was recognized as a fine steelhead angling stream that provided splendid fishing in its lower 34 miles. During this time sport fishing constituted one of the chief attractions to visitors of Los Padres National Forest. In 1941, 4,375 anglers took 262,000 trout in Santa Barbara County with the majority of catch coming from the Santa Ynez River consisting heavily of juvenile steelhead.

Personnel from the California Division of Fish and Game (1945) estimated the average adult steelhead run entering the drainage at 20,000 fish, ranging each year between 13,000 and 25,000 spawners. The large size of the run was evidence by the fact that CDFG records documented the rescue of over 1 million young steelhead in 1944 from drying portions of the Santa Ynez River. Considering that this number probably represented only a small fraction of the fish produced, as rescue operations were conducted only in easily accessible areas in the main stem and large numbers would have migrated downstream prior to the start of rescue operations, the recognition of the Santa Ynez River as

the most productive steelhead river in southern California (Kreider 1948) was well-deserved.

METHODS

A Model 12 back-pack electrofisher was used to sample creek waters for the presence of steelhead trout (Figure 1). When sampling for spawners, only pools of sufficient size and depth to hold adult fish were electrofished. However, some pools could not be effectively sampled, as the depth of the water limited access and movement of the survey team. Riffle areas, where juvenile trout were most likely to be found, were also occasionally sampled. All surveys were conducted in an upstream direction to reduce the effects of bottom disturbance and water turbidity.

Captured fish were measured in fork length to the nearest half centimeter. Scales were taken between the anterior portion of the dorsal fin and the lateral line for age analysis and fish were sexed through head shape. Degree of sexual maturity was noted and fish were released after examination.

RESULTS

Four adult trout were captured on March 11, 1987, during an electrofishing survey of the lower 3.2 miles of Salsipudes Creek. This survey was conducted [illegible]

during the 1986-87 spawning season. As such, this fish had not apparently migrated from the ocean or estuary. This trout could have entered the stream the previous rainy season and as flows receded could have become stranded in the stream. However, scale analysis did not indicate any previous spawning activity. Scale growth patterns indicated a rapid growth period beyond the initial slow growth phase, but whether this growth was a result of ocean or estuarine residence could not be discerned.

The third trout sampled was a female, 30.5 cm in length (Figure 4). This fish was silvery and had scales that were easily removed, suggesting recent entry into the freshwater environment. Scale analysis revealed that this fish had spawned previously but did not clearly show greater growth rates that would indicate ocean residence. The overall size of the fish suggests that it may have spent time in the estuary. A recent gill net survey conducted in the Santa Ynez River estuary captured a trout of this size indicating that trout (steelhead) may in fact spend time residing in the estuary (California Department of Fish and Game 1988).

The final adult captured during the March 11 survey was a brightly colored 30 cm ripe male. Again, this size of trout, even with scales to analyze growth patterns, is difficult to classify until more life history information becomes available and a greater number of fish can be studied.

At the end of the survey a large trout, of a size similar to that of the female steelhead taken earlier, was observed in a large pool just downstream of Bridge 51-95, 3.2 miles upstream. Attempts to capture this fish were unsuccessful as the depth and size of the pool did not allow for effective electrofishing. It should be noted that the larger pools in the survey area could not be effectively electrofished. With the low water conditions at the time of these surveys, adult fish were holding only in the larger pools. Therefore, it is very likely that some of the unsampled or ineffectively sampled pools could have held adult fish.

In addition to the adult trout, approximately 10 to 15 juvenile trout larger than 10 cm were taken in this lower sampling area. All of these juveniles were taken either at the head of larger pools or in riffle sections of the creek. Although not abundant, these fish were predictably in areas where faster flows provided trout habitat.

On March 12, 1988 electrofishing was resumed at Bridge 51-95, where a partial migration barrier exists, and proceeded upstream for 2.8 miles (Figure 5). Two adult trout were sampled in this reach of stream which changes in name to El Jaro Creek. The first, captured at the confluence of the first tributary above Jalama Road, was a 22.5 cm male (Figure 6). This fish was brightly colored and had a body shape characteristic of a resident trout. Scale analysis was inconclusive on determining whether this fish had any estuarine growth.

About 50 m further upstream, a second trout was taken. This fish, a 28.5 cm female, had a long slender body characteristic of a steelhead (Figure 7). Scale analysis showed a definite change in growth rate, indicating a likelihood of estuarine or ocean growth.

For the 1987-88 season, Salsipudes Creek was visited on two occasions, March 17, 1988 and March 31, 1988. The earlier effort was thwarted by failure of the electrofishing equipment; consequently, the creek was revisited and the lower 3.2 miles was electrofished on the latter date. Although no electrofishing took place on the March 17 visit, several juvenile trout about 16 cm in length were observed in a pool feeding at the surface. These fish appeared to be steelhead smolts as they had characteristics of smolting trout and, one juvenile clearly had black edges on its caudal fin indicative of juvenile steelhead about to migrate to the ocean.

No adult trout were taken during the March 31, 1988 survey. Electrofishing efforts did result in the capture of 8 juvenile trout ranging in fork length from 9.5 to 18.5 cm. All of these fish appeared to be residents and did not show any body characteristics typical of smolting fish.

DISCUSSION

Data collected from this study show that a self-sustaining steelhead population, based upon the presence of smolts and large adult fish, is present in Salsipudes Creek. However, the rather small number of juvenile trout observed in that portion of the stream indicates that the trout population is small. Available rearing habitat for young steelhead in Salsipudes Creek is restricted, especially in low water years like the past two seasons and is likely the most limiting factor to steelhead production.

Use of the lagoon at the mouth of the Santa Ynez River by steelhead trout remains unclear. In the past, juvenile steelhead were known to utilize the lagoon at times during the summer for rearing (California Division of Fish and Game 1940). However, a recent gill net study did not find any juvenile steelhead over a 7 month study period from July, 1987 to January, 1988 (California Department of Fish and Game 1988). One adult trout, 30.5 cm in length, was captured in this study during August and was similar in size to some of those captured in Salsipudes Creek; fish of this size found in tributary spawning streams may represent steelhead with estuarine growth.

With the general lack of life history information on the more southern populations of steelhead, it is difficult to interpret

what little information (i.e. scale analysis, estuarine studies, etc.) is available. It is clear from historical information that steelhead once thrived in southern California streams despite the arid nature of the area and its warmer stream temperatures. Many of these southerly streams have water temperatures in the mid-70's during the summer and early fall, yet they maintained year-round juvenile steelhead populations. This would indicate that these southern runs of steelhead are genetically distinct to some degree from the more studied northern populations that can not tolerate these higher temperatures.

Prior to the construction of Cachuma Dam in 1953, flows in the Santa Ynez River were nearly always high enough to allow adult steelhead each rainy season to enter the river and migrate to spawning areas. For example, during the period from 1928 to 1944, only two years, 1929 and 1931, had flows too low to allow immigration of spawning steelhead (Department of Interior 1948). Since construction of Cachuma Dam and its near total capture of the flow in the upper drainage, it is not uncommon during dryer years for the Santa Ynez River to have insufficient flow levels for upstream steelhead migration to potential spawning areas in the basin.

Based upon pre-project investigations by the U.S. Fish and Wildlife Service and California Division of Fish and Game, it was recognized that the construction of Cachuma Dam would reduce the run size of steelhead trout in the Santa Ynez River by 50 percent. This estimate was based on several assumptions. The

first was that the dam would block off access to about two-thirds of the best steelhead spawning grounds located in the upper drainage. The second was that flow releases from Cachuma Reservoir would not only maintain but enhance downstream main stem steelhead spawning and rearing habitat. Lastly, it was expected that some spawning would occur in tributary streams below the dam during years when run-off was sufficiently large to result in stream flow from February through June.

In contradiction to pre-project recommendations, water releases for fishery maintenance purposes was never instituted and virtually the entire run of steelhead entering the Santa Ynez River was lost. Initially, the Service, in its report "Comprehensive Basin Plan, Santa Barbara County Project, California", dated June 1945, called for a minimum release of 15 second-feet from Cachuma Reservoir for fishery maintenance. This was found unacceptable because of water cost to the project and this recommendation was later modified in a report to Congress (Department of Interior 1948) to include flows of 15 second-feet from December 16 to February 28 and 10 second-feet from March 1 to May 31. The failure to provide these water releases for fishery maintenance purposes resulted in the loss of some 11 miles of good steelhead spawning and rearing habitat in the Santa Ynez River between Cachuma Dam and the town of Solvang, and 22 miles of lesser quality steelhead spawning and rearing habitat between Solvang and the mouth of Salsipudes Creek. Lack of adequate year-to-year higher flows in the migration corridor of

the Santa Ynez River has also contributed to the demise of steelhead populations in the lower tributaries of the drainage. California Department of Fish and Game (1988) found that adult steelhead did not spawn in the main stem Santa Ynez River during the last two recent dry years and that juvenile steelhead did not rear in the river in 1988. Restoration of a main stem steelhead spawning run could be possible with water releases from Cachuma Reservoir as envisioned in Cachuma Reservoir pre-project studies. Instream flow studies, now being planned, need to be completed to determine present day feasibility of such an effort.

CONCLUSION

From this investigation it is apparent that a remnant run of steelhead trout is present in the Santa Ynez River drainage (Salsipudes Creek). The population of steelhead in Salsipudes Creek is small, with variations in run size likely most dependent upon the storm events of winter seasons during recent years. Other tributaries in the Santa Ynez River drainage accessible to steelhead, and where well-oxygenated, shaded pools can be found through the dryer summer and fall months, are likely to also have remnant runs of steelhead.

To insure the survival of the Salsipudes Creek population of steelhead and of other steelhead populations that may be present in other tributaries in the Santa Ynez River drainage, it is imperative that flows in the Santa Ynez River during the months

from December to March are, at times, of a sufficient level to periodically break the sand bar that forms at the mouth of the river each year and allow adult steelhead immigration into available spawning areas in accessible tributaries.

LITERATURE CITED

California Department of Fish and Game 1988. Cachuma Fish and Wildlife Resources 1988 Final Report. 149 p.

California Division of Fish and Game 1940. Report on Planting of Marked Steelhead Trout in the Lagoon of Santa Ynez River, Santa Barbara County, California. Admin. Rpt 40-15. 8 p.

California Division of Fish and Game 1944. Preliminary Report on the Fisheries of the Santa Ynez River System, Santa Barbara County, California. Admin. Rpt 44-14. 22 p.

California Division of Fish and Game 1945. Report on Relation to Maintenance of Fish Resources of Proposed Dams and Diversions in Santa Barbara County, California. Admin. Rpt 45-25. 11 p.

Department of Interior 1948. A Report and Findings on the Cachuma Unit of the Santa Barbara County Project, California. 80th Congress, House Document No. 587 120 p.

Kreider, C.M. 1948. Steelhead. G. Putnam's Sons. 182 p.

Thompson, K. 1972. Determining stream flows for fish life. Pages 31-50 in Proceedings, Instream Flow Requirement Workshop. Pac. N.W. River Basin Comm., Vancouver, Wash.

Figure 1. Back-pack electrofishing in El Jaro Creek

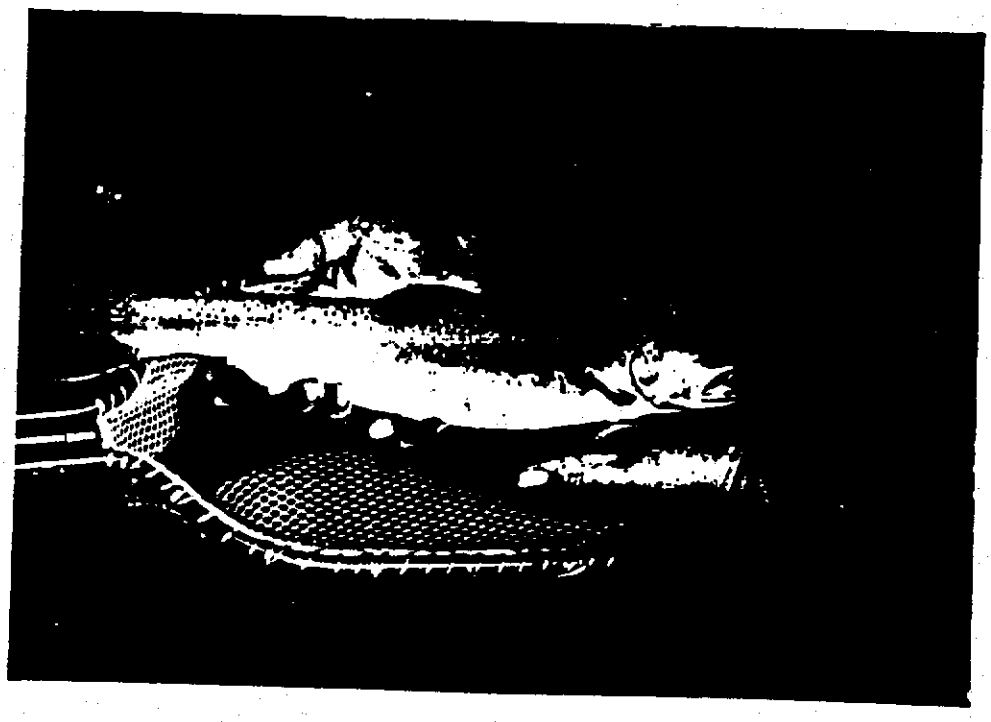

Figure 2. A 48 cm female steelhead trout captured in Salsipudes Creek on March 11, 1987.

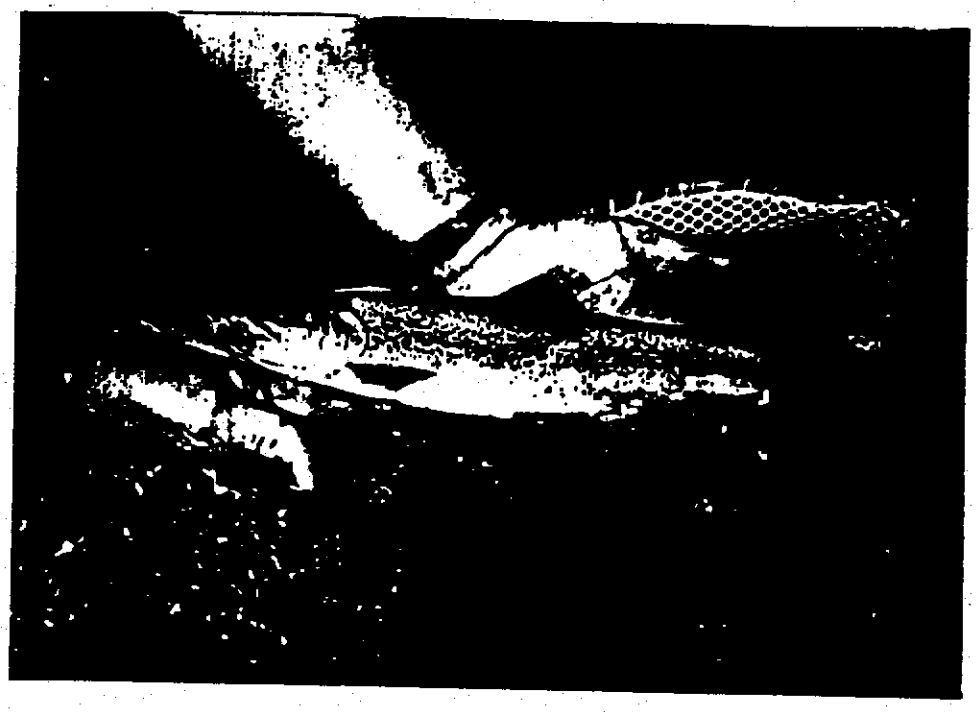

Figure 3. A 34.5 cm ripe male trout captured in Salsipudes Creek on March 11, 1987.

Figure 4. A 30.5 cm female trout captured in Salsipudes Creek on March 11, 1987.

Figure 5. Large pool and a partial migration barrier at Bridge 51-95 on Salsipudes Creek, 3.2 miles upstream.

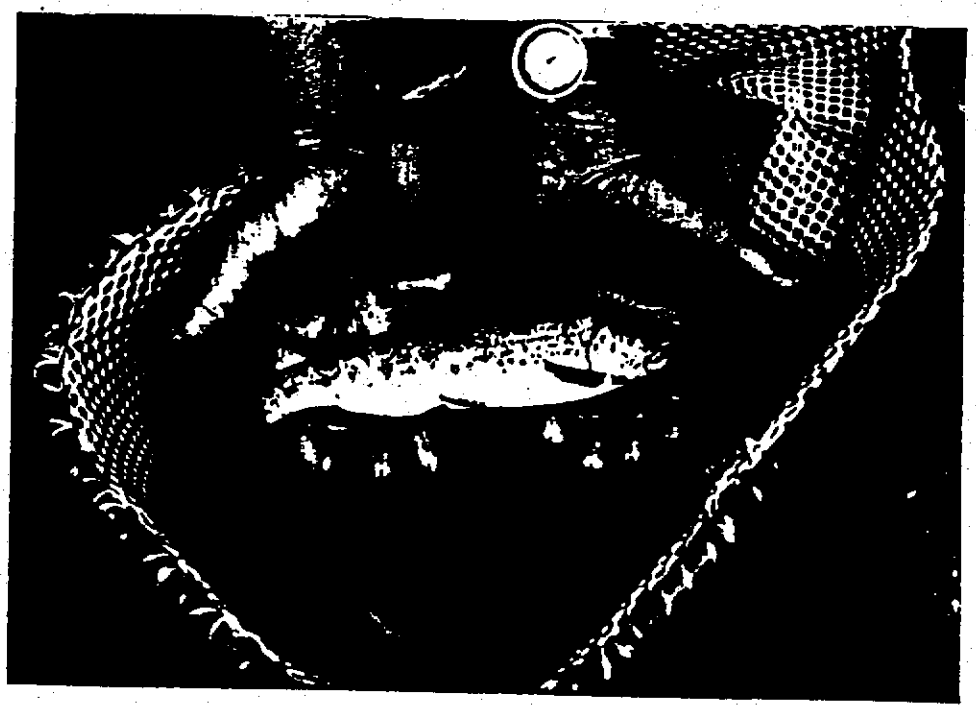

Figure 6. A 22.5 cm male rainbow trout captured in El Jaro Creek on March 12, 1987.

Figure 7. A 28.5 cm female trout (steelhead) captured in El Jaro Creek on March 12, 1987.