

**Summary of Chinook and Coho Salmon Observations in 2001
Shasta River Fish Counting Facility,
Siskiyou County, CA**

INTRODUCTION

The Klamath River Project (KRP) of the California Department of Fish and Game is responsible for estimating the number of fall-run chinook salmon (*Oncorhynchus tshawytscha*) that return to the Klamath River Basin, excluding the Trinity River Basin, each year. To achieve this monumental task the KRP employs several techniques which include a survey of sport fishing efforts, recovery of fish returning to Iron Gate Hatchery, completion of cooperative spawning ground surveys in major tributary streams and rivers, and operation of a video fish counting weir on the Shasta River near its confluence with the Klamath River.

Video equipment was first installed at the Shasta River Fish Counting Facility (SRFCF) in 1998 and has been used to describe the fall-run chinook salmon migration into the Shasta River ever since. Although the primary responsibility of the KRP is to enumerate and describe fall-run chinook salmon populations within the basin to assist harvest managers, data is recorded for other fish species observed at the SRFCF during its normal period of operation from September through the first week of November.

The petition to list coho salmon under the California Endangered Species Act (CESA) was received by the California Fish and Game Commission on July 28th of 2000. Prior to and following receipt of this petition, the Department of Fish and Game intensified efforts to document coho salmon presence within the Klamath River Basin and elsewhere. Consistent with this effort, this year the KRP elected to continue operating the Shasta River Fish Counting Facility well beyond its normal period of operation in an effort to document coho salmon migrations into the Shasta River. The Southern Oregon Northern California Coastal coho salmon were listed as threatened by the National Marine Fisheries Service under the Federal Endangered Species Act in 1997.

This report describes the characteristics of the chinook and coho salmon runs that entered the Shasta River from September through December 14, 2001.

BRIEF SUMMARY OF METHODS

Monitoring of the salmon run within the Shasta River is accomplished through three primary efforts, operation of video weir, collection of data from salmon carcasses that become impinged on the weir panels as they float downstream (washbacks), and completion of spawning ground surveys to document habitat use and collect biological data on salmon carcasses. The SRFCF consists of an Alaska Weir strategically placed in a diagonal direction across the river channel. Fish immigrating upstream are directed to swim through a narrow flume, which passes in front of a video camera. The camera is connected to a time lapse video recorder and monitor. Each recorded video tape receives a cursory review by staff stationed at the SRFCF, which is followed by two more detailed reviews conducted by biological staff at the KRP video laboratory.

SRFCF personnel maintain and inspect the weir panels throughout the day. Any salmon that drift downstream and become impinged on the weir are recovered and processed. Data collected includes species, sex, and forklength. Scales are removed from each fish when feasible, and every fish is examined for fin clips, marks and tags. Each fish is also examined to determine spawning condition.

In addition to the operation of the SRFCF, KRP personnel also conduct spawning ground surveys twice a week throughout the chinook salmon spawning period and early portion of the coho salmon spawning season. The purpose of the surveys is to collect biological data necessary to describe the physical characteristics of the run which includes a description of the size and age characteristics, sex composition, and allows for collection of any clipped or tagged fish. Several private landowners cooperate in this effort by allowing the KRP staff access to the river as it passes through their property and the Klamath River Project greatly appreciates their cooperation. Unfortunately, there are also many areas of the river where KRP staff have been denied permission to survey. Therefore, the distribution of the runs and habitats used by chinook and coho salmon throughout the entire river cannot be fully described.

PRELIMINARY RESULTS AND DISCUSSION

Chinook Salmon

The video camera and Alaska Weir were installed at the SRFCF on September 6th. The first chinook salmon was observed passing through the video weir on September 11th and the last chinook salmon passed the weir on November 29th. The run peaked on October 1st when 805 fish passed through the weir. Over the entire season 11,093 chinook salmon passed through the SRFCF and by October 27th over 95% of the total run had already entered the Shasta River to spawn (Figure 1).

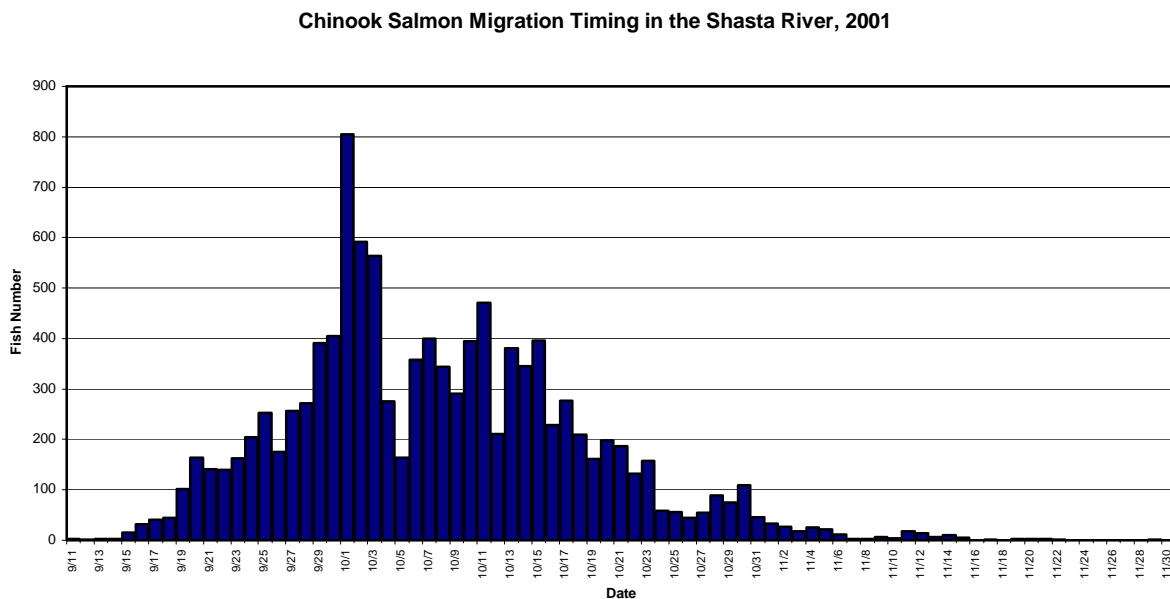


Figure 1. Fall chinook salmon run timing in the Shasta River as recorded at the Shasta River Fish Counting Facility during the 2001 season.

Based on information collected during spawning ground surveys primarily conducted in the lower 6 miles of the river approximately 57% of the run was comprised of males and 43% were females. Grisle or jacks (2 year old males) comprised approximately 22% of the entire run and ranged in fork length from 32 cm to 63 cm long. Adult chinook salmon males ranged in fork length from 64 cm to 105 cm, and averaged approximately 82 cm (Figure 2).

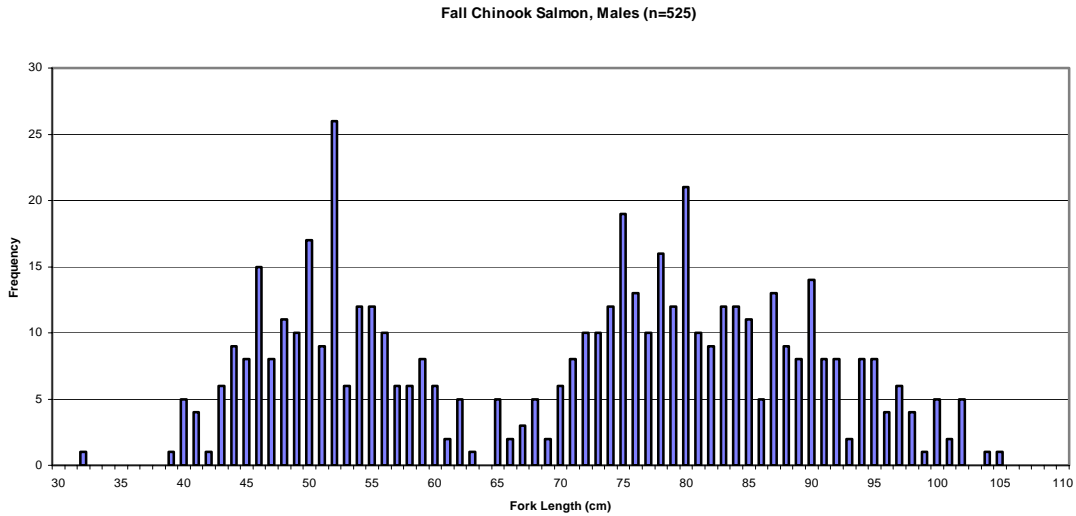


Figure 2. Fork length frequency distribution for male chinook salmon spawners observed during spawning ground surveys in the Shasta River, 2001.

Female fall chinook salmon ranged in fork length from 48 cm to 94 cm and had an average fork length of 73 cm (Figure 3).

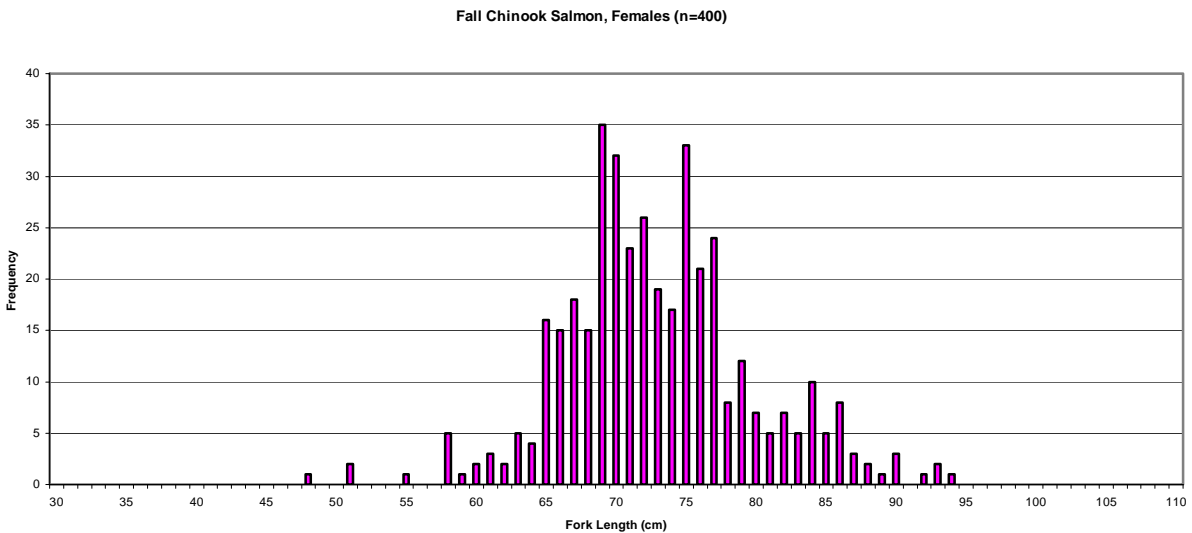


Figure 3. Fork length frequency distribution for female fall chinook salmon observed during spawning ground surveys in the Shasta River during the 2001 season.

Overall, the 2001 fall chinook salmon run in the Shasta River was strong. Since 1978, when the KRP began estimating the fall chinook salmon in the Shasta River the escapement has averaged 5,630 salmon. This years run exceeded the average run size by 5,463 fish (Figure 4).

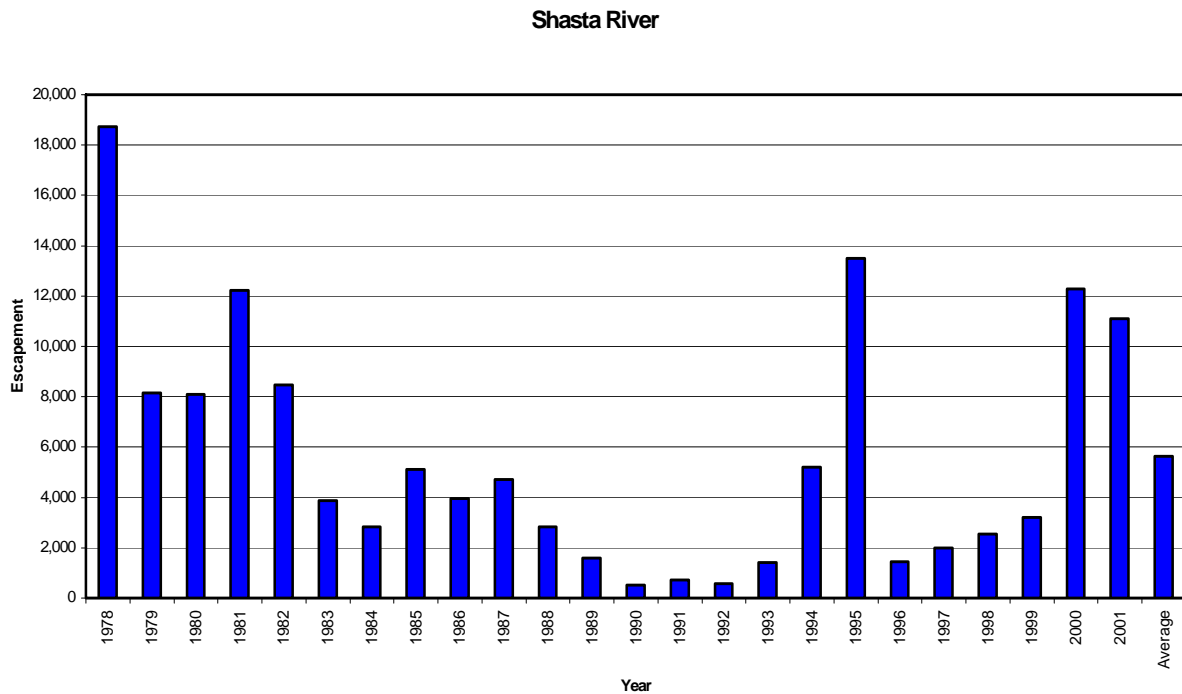


Figure 4. Escapement of fall chinook salmon in the Shasta River from 1978 through 2001.

Coho Salmon

Coho salmon were first observed passing the SRFCF on October 22. From October 22nd until December 14th a total of 291 coho salmon were observed entering the Shasta River to spawn (Figure 5). Two of the coho salmon on the video tape had a left maxillary clip indicating that they were progeny from Iron Gate Hatchery. The maxillary bone is the bone located along the upper jaw to the corner of the mouth. Although only two coho salmon with a left maxillary clip were positively identified during the video review, it is possible that additional maxillary clipped hatchery coho salmon entered the Shasta River and were not identified. Turbid water conditions are more prevalent later in the season, and under these conditions it is more difficult to determine whether or not the maxillary bone is clipped on all migrating fish that pass in front of the video camera.

In the early morning hours of December 14th increasing river flows combined with a large debris load consisting primarily of submergent aquatic vegetation caused the weir to fail. It's likely that coho salmon continued to enter the Shasta River well passed December 14th after the weir ceased to operate. The largest number of coho salmon (46 fish) were observed entering the river on November 22nd. This movement of fish coincided with an increase in mean daily flows from 159 cfs on November 20th to 204 cfs on November 22nd. Instantaneous flows peaked on November 22nd at a level of 219 cfs.

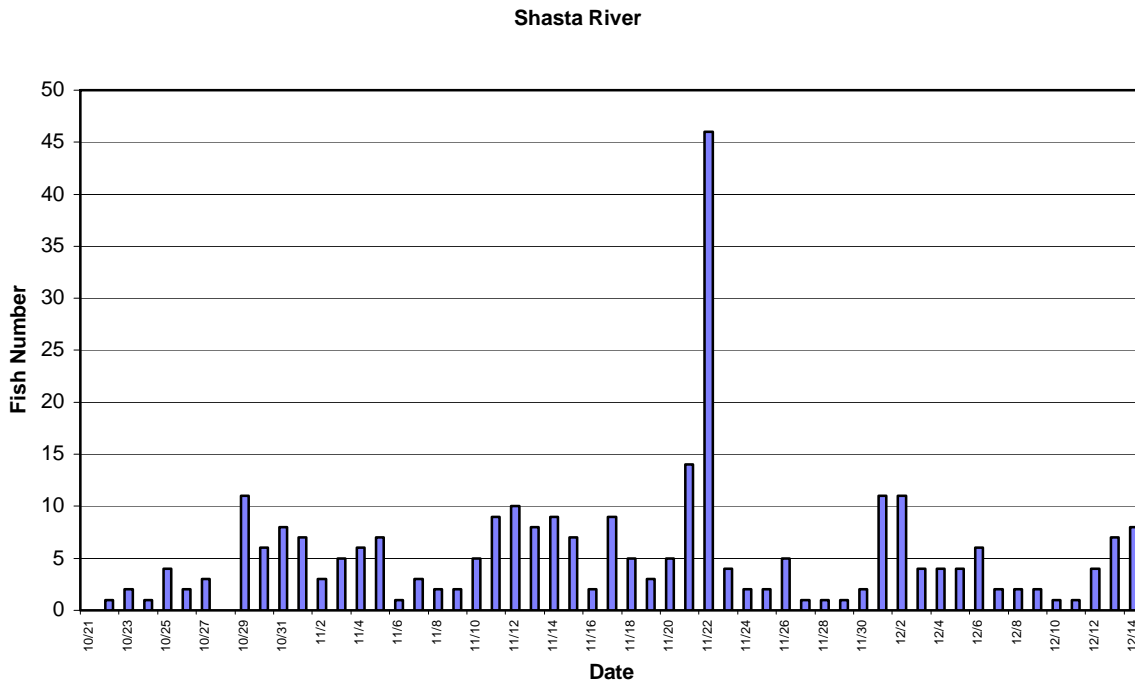


Figure 5. Migration timing of coho salmon in the Shasta River as observed at the Shasta River Fish Counting Facility during 2001.

A total of 21 coho salmon were recovered as washbacks at the SRFCF between November 14th and December 12th. These fish ranged in size from 60cm to 96cm and exhibited an average fork length of 71cm (Table 1). Eleven (11) were male and ten (10) were female. Six (6) or twenty nine percent of those fish recovered had a left maxillary clip indicating that they were progeny from Iron Gate Hatchery.

Two coho salmon were recovered during the spawning ground surveys on November 27th and both of these fish were found just upstream of the SRFCF. One was a female and the other a male and both of them had a fork length of 70 cm. The male also had a right maxillary clip indicating that it was progeny from the Trinity River Fish Hatchery. The video equipment at the SRFCF records the left side of each fish as they swim upstream.

Since 1998, when video equipment was first installed at the SRFCF, the 2001 coho salmon run (291 fish) appears to be the largest run recorded. However, a direct comparison between these years cannot be easily made, because in years previous to 2001 the video equipment and Alaska weir have been removed following the end of the chinook salmon run, which usually occurs around the first or second week of November. In 2001 the weir was kept in place through December 14th, approximately 5 weeks longer than the previous three years of record. Twenty seven (27) coho salmon were observed at the SRFCF through November 9th of 1999. For the same period of record, through November 9th, forty one (41) coho salmon were observed at the SRFCF in 2001.

Table 1. Summary coho salmon recovered at the Shasta River Fish Counting Facility (SRFCF) or during spawning ground surveys conducted on the Shasta River, Siskiyou County, CA during 2001.

Date	Sex	FL (cm)	Clips	Spawned (Yes/No)
SRFCF Washback Observations				
11/14/01	F	69		Yes
11/15/01	F	74		Yes
11/17/01	M	81		
11/23/01	M	75		
11/26/01	M	66		
11/26/01	F	65		Yes
11/29/01	M	70	Left Maxillary Clip	
12/1/01	F	70		Yes
12/3/01	M	96		
12/5/01	M	79		
12/5/01	F	62		Yes
12/6/01	F	70	Left Maxillary Clip	No
12/6/01	F	70	Left Maxillary Clip	Yes
12/6/01	F	72	Left Maxillary Clip	Yes
12/7/01	F	65	Left Maxillary Clip	Yes
12/7/01	F	70		Yes
12/8/01	M	70	Left Maxillary Clip	
12/8/01	M	60		
12/9/01	M	62		
12/11/01	M	74		
12/12/01	M	76		
Spawning Ground Survey Observations				
11/27/01	F	70		Yes
11/27/01	M	70	Right Maxillary Clip	