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RECREATIONAL ANGLER USE AND CATCH IN THE MAINSTEM  
SMITH RIVER, CALIFORNIA, AUGUST - DECEMBER, 1984

by

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ABSTRACT

This paper presents the results of a Smith River, California, study designed to estimate the Smith River recreational angling use and the salmonid catch from August through December, 1984.

During the study period, Smith River anglers expended an estimated 48,693 hours to catch an estimated 718 chinook salmon (Oncorhynchus tshawytscha), 98 coho salmon (O. kisutch), 369 rainbow trout (O. mykiss), and 124 cutthroat trout (O. clarkii).

Length frequency distribution of salmonids and a list of marked fish observed in the catch are also presented.

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## INTRODUCTION

This paper presents results of a study conducted on the lower Smith River, which estimated angler use and catch from August through December, 1984. The Smith River (Figure 1) is California's fourth largest coastal river, draining slightly more than 600 mi. Most of the basin is in rugged mountains with forested terrain, and is within the Six Rivers National Forest. The drainage receives the highest rainfall of all California coastal streams; average annual rainfall is more than 90 inches in most of the basin.

The Smith River is one of the most important salmon and steelhead streams in California. It has approximately 288 miles of chinook salmon, 348 miles of coho salmon, and 368 miles of steelhead habitat in the drainage, making it the third largest California coastal river in the amount of salmon habitat, and the fourth in the amount of steelhead habitat.

The most important salmon and steelhead spawning and rearing tributaries are Mill Creek, Rowdy Creek, Patrick Creek, Hurdy Gurdy Creek, Siskiyou Fork, Goose Creek, and the Middle, North, and South forks.

Smith River angling regulations during the study allowed salmon and steelhead fishing with a three-fish bag limit (trout and salmon in combination) during the fall-winter season (November 16 through the last Saturday in April) only in the main stem, in the Middle Fork below the mouth of Patrick's Creek, the North Fork below the mouth of Stony Creek, and the South Fork below the mouth of Jones Creek. All other tributaries were closed during the fall-winter period, but open to fishing with a five-trout limit from the Saturday preceding Memorial Day through November 15.

Use is heavy when the success rate is high. The area open to fishing during the fall-winter period is very accessible to anglers. Most of the area open to fishing is within view of two-lane paved roads, with abundant pullout areas where anglers may park and walk to fishing areas within a few hundred yards.

This study was justified partially by the continuing need for systematic monitoring of fisheries, which is required for fisheries management in California's coastal rivers.

Additional impetus for this study, however, came from the results of a study conducted the preceding year by the University of California Extension Service (Waldvogel 1984). Waldvogel's findings indicated that Smith River chinook salmon recreational landings from September 1 through October 31, 1983, were at least 4,500 fish; virtually all of which were of Klamath River origin.

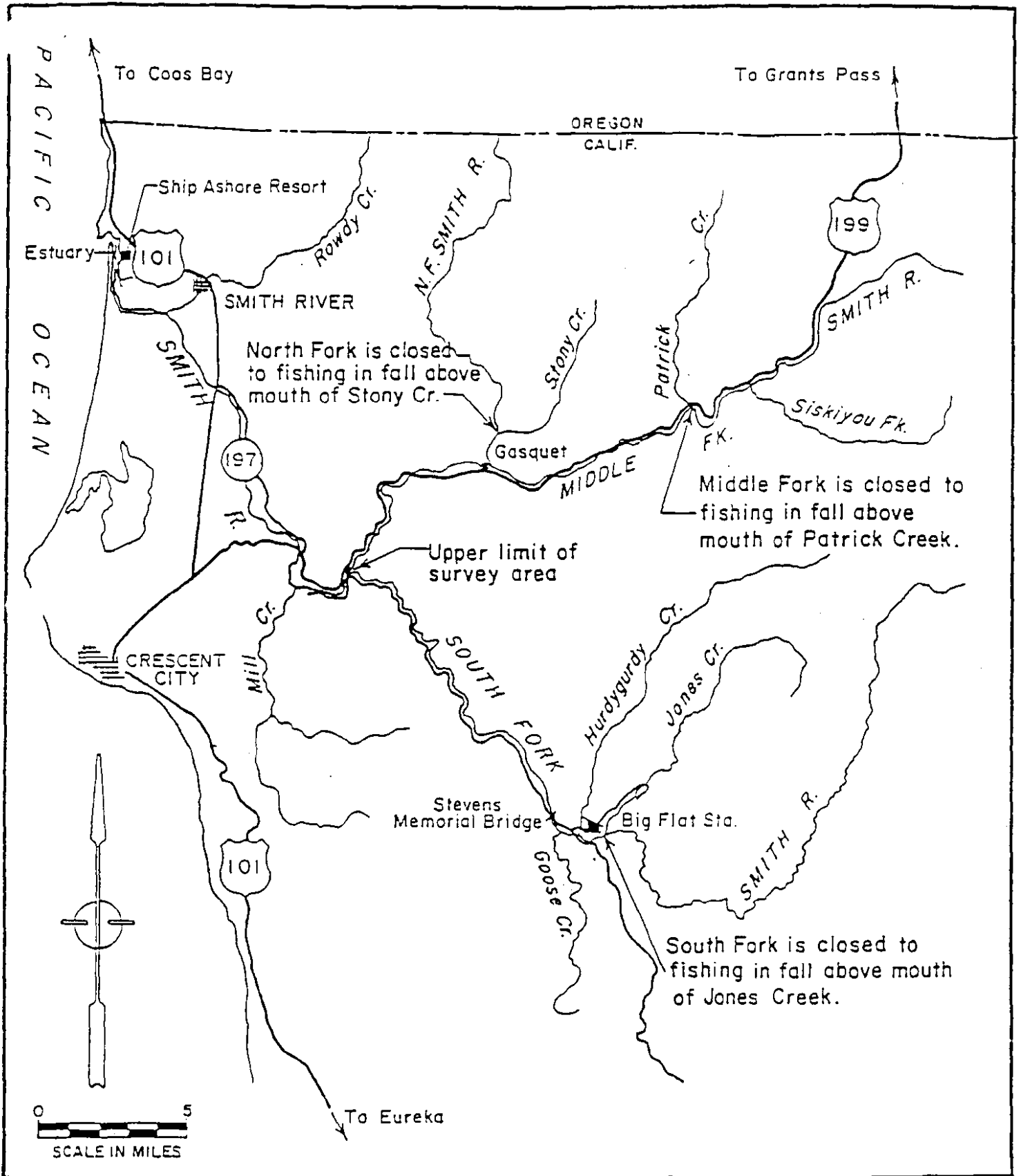


FIGURE 1. Map of Smith River Study Area, August - December, 1984.

A series of investigations on the Smith River was immediately undertaken by the Department of Fish and Game to verify whether the results, as reported by Waldvogel, were within the range of normal events one could expect for the Smith River. This is the first of the studies conducted for this purpose.

#### METHODS

The methods chosen to estimate angler use (hours) and catch involved making estimates of use and the catch separately for the following components of the recreational fishery:

- A. The estuary boat fishery.
- B. The estuary bank fishery.
- C. The upriver boat fishery.
- D. The upriver bank fishery.

Estimates of use were made separately for weekend-holiday days and for weekdays. The following days in 1984 were considered to be holidays: September 3, October 8, November 12, November 22, and December 25.

#### Estuary Boat Fishery

The estuary was defined as that portion of the lower river visible from either the river mouth or the parking lot/boat ramp area of the "Ship Ashore" resort. Essentially all of the boats fishing in this area eventually land at one of the two boat launching/landing areas on the east side of the estuary and are accessible to samplers. On sample days, samplers were on duty during all legal fishing hours and interviewed all boat anglers that day.

The following information was obtained from each angler interviewed (see blank record form, Appendix A):

- 1. Area of residence (last three digits of angler's zip code).
- 2. The length of time to the nearest 0.5 hr that the angler had been fishing.
- 3. Species and fork length to the nearest cm.

Estimates of use and catch for each stratum were made by dividing the number of hours and fish by species observed by the proportion of sample days to the number of calendar days in the stratum (the proportion was approximately one-half).

That is:

$$\text{Estimated Use (Angler-hours)} = \frac{\text{Observed Use} \times \text{Days in Stratum}}{\text{Sample Days}}$$

and

$$\text{Estimated Catch} = \frac{\text{Observed Catch} \times \text{Days in Stratum}}{\text{Sample Days}}$$

### Estuary Bank Fishery

Essentially all of the bank fishing in the estuary is visible from either the parking lot at the river mouth or the parking lot/boat ramp area at the "Ship Ashore" resort. On sample days, creel census clerks were on duty during all legal fishing hours, and they interviewed all shore anglers after their fishing was completed. Clerks recorded the same information recorded when interviewing boat fishermen. In addition, clerks noted whether or not the angler was finished fishing.

Estimates of the use in angler-hours and the catch by species in each stratum were made by dividing the number of hours of fishing reported by anglers and the number of fish by species observed during sampling by the proportion of sample days to the number of calendar days in the stratum (the proportion was approximately one-half).

That is:

$$\text{Estimated Use (Angler-hours)} = \frac{\text{Observed Use} \times \text{Days in Stratum}}{\text{Sample Days}}$$

and

$$\text{Estimated Catch} = \frac{\text{Observed Catch} \times \text{Days in Stratum}}{\text{Sample Days}}$$

### Upriver Boat Fishery

The area sampled was the mainstem Smith River below the mouth of the South Fork.

Boat fishing was categorized as being of one of two types - driftboat or pram. In general, pram fishing was restricted to several areas between the Highway 101 Bridge and the estuary. Typically, prams were readily visible to use-count clerks. Pram use in angler hours was based on counts of anglers and calculated exactly as was the estimate for upriver bank anglers.

Driftboat fishing was generally above the Highway 101 Bridge. Driftboats in this area often were not readily visible to

use-count clerks. Driftboat trailers were readily visible, however, and use count clerks counted and recorded the number of empty boat trailers in the same manner that shore anglers were counted.

Empty boat trailer counts were multiplied by 2.4\* and, thereafter, the estimate of use in angler hours was made for driftboat anglers exactly as was the estimate of use in the upriver bank fishery.

Catch, by species, each month was estimated as the product of the mean catch per hour and the estimated use in angler hours.

### Upriver Bank Fishery

No systematic sampling was conducted in the drainage above the mouth of the South Fork. Samplers drove through what were regarded as the more popular fishing areas of the Middle and South Forks, approximately once per week, and never saw more than four fishermen, thus sampling was never extended into these upriver areas.

Samplers conducted angler use counts in the regularly sampled area four times on each sample day, covering the entire sample area during each count, and counting shore anglers (Appendix B).

Monthly use estimates were made separately for weekend-holidays and weekdays. The estimate of use for each stratum was calculated as the product of (1) mean number of anglers/instantaneous count, (2) the number of possible sample days in the stratum, and (3) the mean number of legal fishing hours/day in each stratum (legal fishing hours are defined as one-half hour before sunrise to one-half hour after sunset).

Monthly catch estimates, by species, were calculated as the product of the use and the mean number of fish of each species per hour for that month.

## RESULTS

### Estimated Angler Use, Catch, and Success Rates

From August 25, 1984, through December 18, 1984, anglers fished an estimated 48,693 hours and caught an estimated 718 chinook salmon, 369 rainbow trout (including sea-run steelhead), 124 cutthroat trout, and 98 coho salmon (Table 1).

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\* This was based on a 1984 sample of 29 driftboat fishing parties totaling 70 anglers.

TABLE 1. Estimated Use (Angler Hours) and Catch in the Mainstem Smith River, August - December, 1984.

	Estuary			Upriver			Total		
	Boat Fishery		Angler Hours	Shore Fishery		Angler Hours	Boat Fishery		Angler Hours
	Catch	Hours		Catch	Hours		Catch	Hours	
August:	Chinook salmon	14	0	0	0	0	0	0	14
	Cutthroat trout	1	0	0	0	0	0	0	1
	Totals	1,041	0	0	0	0	0	1,041	15
September	Chinook salmon	80	22	0	0	74	0	0	176
	Rainbow trout	0	8	54	49	0	0	0	111
	Coho salmon	18	0	0	25	0	0	0	43
	Totals	8,102	960	4,137	54	650	148	13,849	330
October	Chinook salmon	76	15	142	130	0	0	0	363
	Rainbow trout	2	0	151	22	0	0	0	175
	Cutthroat trout	0	0	107	0	0	0	0	107
	Coho salmon	11	0	9	11	0	0	0	31
	Totals	5,573	1,927	8,990	409	2,469	163	18,959	676
November	Chinook salmon	5	0	72	69	0	0	0	146
	Rainbow trout	0	0	34	23	0	0	0	57
	Cutthroat trout	0	0	14	0	0	0	0	14
	Coho salmon	0	0	14	8	0	0	0	22
	Totals	159	44	4,634	134	5,623	100	10,460	239
December	Chinook salmon	0	0	4	15	0	0	0	19
	Rainbow trout	0	0	18	8	0	0	0	26
	Cutthroat trout	0	0	0	2	0	0	0	2
	Coho salmon	0	0	0	2	0	0	0	2
	Totals	0	0	2,262	22	2,122	27	4,384	49
Season	Chinook salmon	175	37	218	288	0	0	0	718
	Rainbow trout	2	8	257	102	0	0	0	369
	Cutthroat trout	1	0	121	2	0	0	0	124
	Coho salmon	29	0	23	46	0	0	0	98
	Totals	14,875	2,931	20,023	619	10,864	438	48,693	1,309



The chinook salmon catch peaked in October, with an estimated 363 chinook salmon (50.5% of the total) taken that month. Very few chinook salmon (less than 5% of the total) were taken before September or after November.

Overall, the anglers we interviewed expended an average of 37 hours to catch each salmonid, and 68 hours to catch each chinook salmon (average success rates for all anglers over the study period was 0.015 chinook/hr and 0.027 salmonids/hr (Table 2)).

TABLE 2. Success Rates in Chinook Salmon/Hour and Salmonids/Hour: Comparison of Shore Anglers With Boat Anglers

	<u>Estuary boat fishery</u>	<u>Estuary bank fishery</u>	<u>Upriver boat fishery</u>	<u>Upriver bank fishery</u>
Chinooks/ Angler-hour	0.012	0.013	0.027	0.011
Salmonids/ Angler-hour	0.014	0.015	0.040	0.031

There was no appreciable difference between the success rates of bank and boat anglers in the estuary, but in the upriver fisheries, boat anglers caught more than twice as many chinook salmon/hr as bank anglers.

Length Frequency Distribution of Salmonids Observed in the Catch

Chinook Salmon: Samplers measured 226 chinook salmon during the course of the study. Lengths (FL) ranged from 36 cm to 100 cm. The length frequency distribution (Figure 2) had two very distinct modes, one at 47 cm and one at 77 cm. There was a distinct minimum in the length frequency distribution at 57 cm, and this appears to be an acceptable approximation of the length one might use to distinguish between jacks and adult fish. Of the 226 chinook salmon measured, 59 (26%) were shorter than 57 cm FL.

Coho Salmon: During the course of the study, samplers measured 29 coho salmon which ranged from 26 to 75 cm FL. One mode appeared in the length frequency distribution at 48 cm (Figure 3), which presumably represented the modal length of Age 2 fish (grilse).

Steelhead Rainbow Trout: Samplers measured 65 steelhead during the course of the study, which ranged from 16 to 90

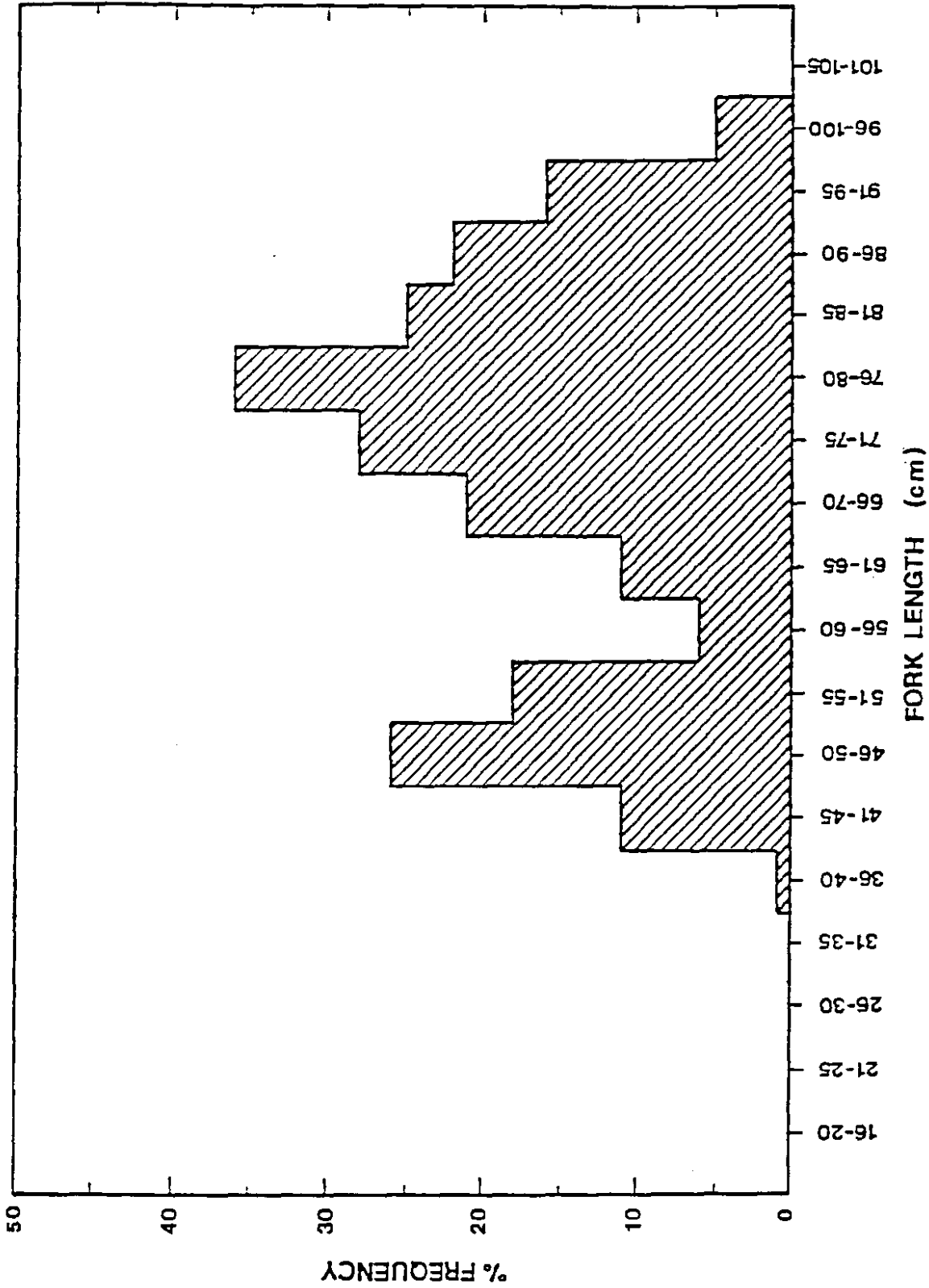


FIGURE 2. Length - frequency of chinook salmon observed in the Smith River recreational catch, August - December, 1984.

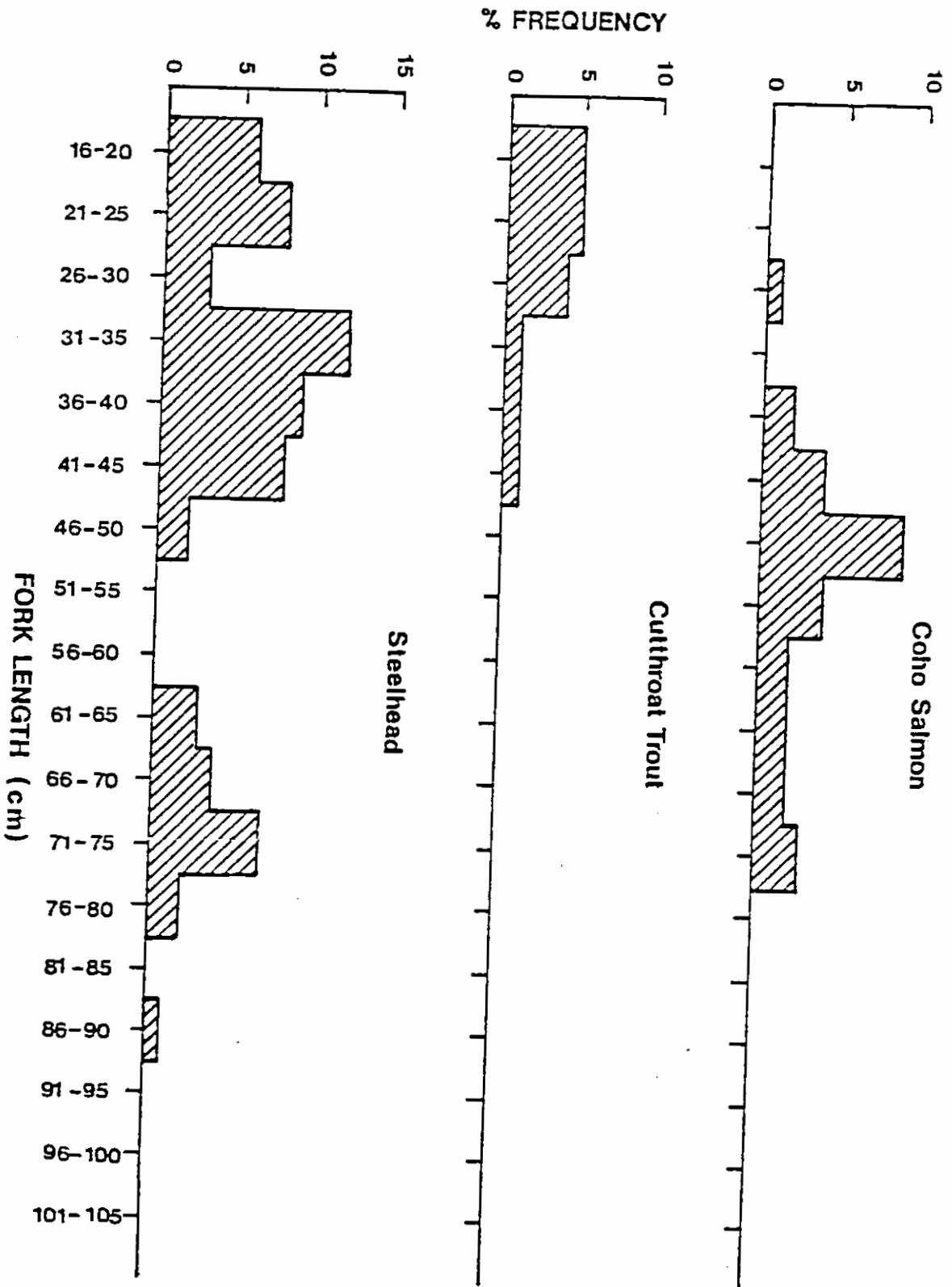


Figure 3. Length-frequency of coho salmon, cutthroat trout, and steelhead observed in the Smith River recreational catch, August-December, 1984.

cm FL. Three modes were apparent: one at 23 cm, which probably represents fish caught before they have had the benefit of any marine growth; another mode at 33 cm, presumably representing fish having completed one growing season in the marine environment; and another mode at 73 cm FL, made up of fish having spent two or more summers in the ocean.

Cutthroat Trout: Samplers measured a total of 17 cutthroat trout during the course of the study ranging from 16 to 45 cm FL (Figure 3).

#### Marked Fish Observed in the Catch

Chinook Salmon: Creel census clerks measured and examined 226 chinook salmon for marks during the course of the study. Of these, five (2.2%) bore marks indicating they had originated at State hatcheries in the Klamath River System, and three (1.3%) bore marks indicating they had been reared at Rowdy Creek Hatchery, a private nonprofit facility located on Domini Creek in the town of Smith River, California. One Ad-marked chinook salmon was recovered which did not contain a coded-wire tag and its origin could not be ascertained (Table 2).

Other Species: Creel census clerks examined 29 coho salmon, 65 rainbow trout (steelhead), and 17 cutthroat trout for identifying marks. Of these, one coho salmon and one steelhead were marked (Table 3). The coho salmon originated at Rock Creek Hatchery in the Umpqua River, Oregon. The origin of the steelhead could not be ascertained.

#### DISCUSSION

The estimates of the steelhead and cutthroat trout catch presented in this report do not necessarily reflect the season's catch for these species. The study was aimed primarily at the chinook salmon fishery and, for that reason, sampling was not begun until the earliest catches of chinook salmon were reported in the lower river. The study was terminated when our sampling indicated that the chinook salmon fishery was over, well before the winter steelhead fishery had fully developed.

The study area only encompassed that part of the drainage area below the mouth of the South Fork. There were parts of the South Fork, Middle Fork, and North Fork which were open to fishing during the study period, but were not included in the study area. Periodic counts of anglers in these areas (approximately one trip per week) indicated that use was very light - we never saw more than four anglers fishing in these upstream areas on a survey trip. Most anglers fishing in these upstream areas were

TABLE 3. Marked Salmonids Recovered During Creel Census Sampling, Smith River, August-December, 1984

Species	Mark	FL (cm)	BY	Release location	Release date	Release size
Chinook sal.	Ad + CWT <sup>1/</sup>	72.0	1981	Iron Gate H. Klamath R.	6/82	108/lb
Chinook sal.	Ad (no tag)	80.0	?	?	?	?
Chinook sal.	Ad + CWT	77.0	1980	Iron Gate H. Klamath R.	6/81	74/lb
Chinook sal.	Ad + CWT	78.5	1980	Rowdy Cr. H. Smith R.	10/81	13/lb
Chinook sal.	Ad + CWT	50.0	1981	Rowdy Cr. H. Smith R.	11/82	12/lb
Chinook sal.	Ad + CWT	49.5	1982	Rowdy Cr. H. Smith R.	11/83	11/lb
Chinook sal.	LV	53.0	1982	These fish probably represent Trinity Hatchery-produced fish marked in conjunction with the Klamath River "constant fraction-marking program."		
Chinook sal.	LV	51.0	1982			
Chinook sal.	LV	75.0	≤1981			
Coho sal.	Ad + CWT	74.5	1981	Rock Cr. H. Umpqua R.	5/83	10/lb
Steelhead	AG	35.0	?	?	?	?

<sup>1/</sup> CWT = Coded-wire tag

targeting either cutthroat trout or rainbow trout. We do not feel that in 1984 significant numbers of chinook salmon were taken in these unsampled portions of the drainage, but there may have been significant numbers of steelhead and cutthroat trout taken in these areas during the study period which are not reflected in our catch estimates.

Some chinook salmon are taken every season after December, but their numbers are normally insignificant compared to the pre-January catch. We do not feel that appreciable numbers were taken during the 1984-85 season after we terminated our sampling.

A similar study (Taylor, unpublished) indicated that the October plus November 1980 chinook salmon catch in the same study area was 1,331, and that 22% of the October-November catch was taken in areas which were not included in the 1984 sampling.

Conversations with anglers and employees of the Ship Ashore Resort supported the contention that the 1984-85 chinook salmon season was relatively poor, even among recent years.

The California Wildlife Plan (California Department of Fish and Game, 1965) indicated that the average annual Smith River chinook salmon catch during the 1960's was approximately 4,600 fish.

We conclude that the 1984-85 recreational chinook salmon season was a poor season. Available evidence supports the contention that the average annual catch in recent years is well below that of the 1960's, and the 1984 season was the worst of recent years.

Regarding the straying of Klamath River fish into the Smith River and contributing to the recreational fishery, the California Department of Fish and Game has marked salmon and steelhead extensively in the Klamath River over the last two decades. The appearance of these fish in the lower Smith River fishery, particularly early in the season (September and October), is a familiar occurrence. Our observation that slightly more than 2% of the fish in the 1984 Smith River catch bore Klamath river-origin marks is consistent with the opinions formed over the last decade based on scattered observations and discussions with Smith River anglers.

The abundance of Klamath River fish observed by Waldvogel in 1983 is probably unprecedented, and are uncommon enough at least to be considered nonrepresentative of the Smith River fishery. During 1982-83, strong El Niño conditions prevailed in the ocean off northern California, causing abnormally high water temperatures and a northward displacement of salmon stocks (Knutson and Lesh, 1984). Because the Smith River mouth is about 30 miles north of the Klamath River mouth, there is a strong possibility that El Niño conditions increased the straying rate of Klamath River fish into the Smith River in 1983. In 1984, cold water ocean conditions returned to northern California.

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