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ENUMERATION AND LOCATION OF
SPRING CHINOOK IN THE BIG QUILCENE RIVER

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by

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INTRODUCTION

Initial returns of three-year-old Nooksack X Cowlitz spring chinook were expected to return to Quilcene National Fish Hatchery (NFH) in the spring of 1984. It was uncertain whether these chinook would hold in the Big Quilcene River over the summer or enter directly into the hatchery. The Olympia Fisheries Assistance Office initiated a series of snorkel surveys in an effort to:

- 1) estimate the number of spring chinook holding below the hatchery, and
- 2) determine the location of holding areas.

On June 1, a scale sample was obtained from a spring chinook that entered the hatchery voluntarily. Its age indicated it was a four-year-old chinook returning from a group reared at Quilcene NFH, but released into the Dosewallips River. These fish were released into the Dosewallips River because they were believed to be summer/fall chinook. From this development a third objective was adopted:

- 3) determine the timing of spring chinook entering the Big Quilcene River.

METHODS AND MATERIALS

Quilcene National Fish Hatchery is located at river mile 2.8 on the Big Quilcene River. The area surveyed extends from the hatchery to the lower bridge, located at river mile .3 (Figure 1). An electric weir prevented chinook from moving above the hatchery.

Surveys began on April 26 and were conducted at two week intervals, when water clarity permitted, until September 10, 1984.

Snorkel surveys were performed by two observers. The first observer drifted with the current viewing potential holding areas, with the second observer immediately following. Sighted chinook were recorded along with the specific holding location. At times observers drifted opposite sides of the river when river width exceeded viewing range.

To achieve accurate counts observers compared numbers after drifting through each holding area. If counts varied, a repeat drift was made through that holding area.

Specific holding locations were recorded on a detailed map of the holding areas (Figure 1). This map was developed by using aerial photos and visual descriptions of the river.

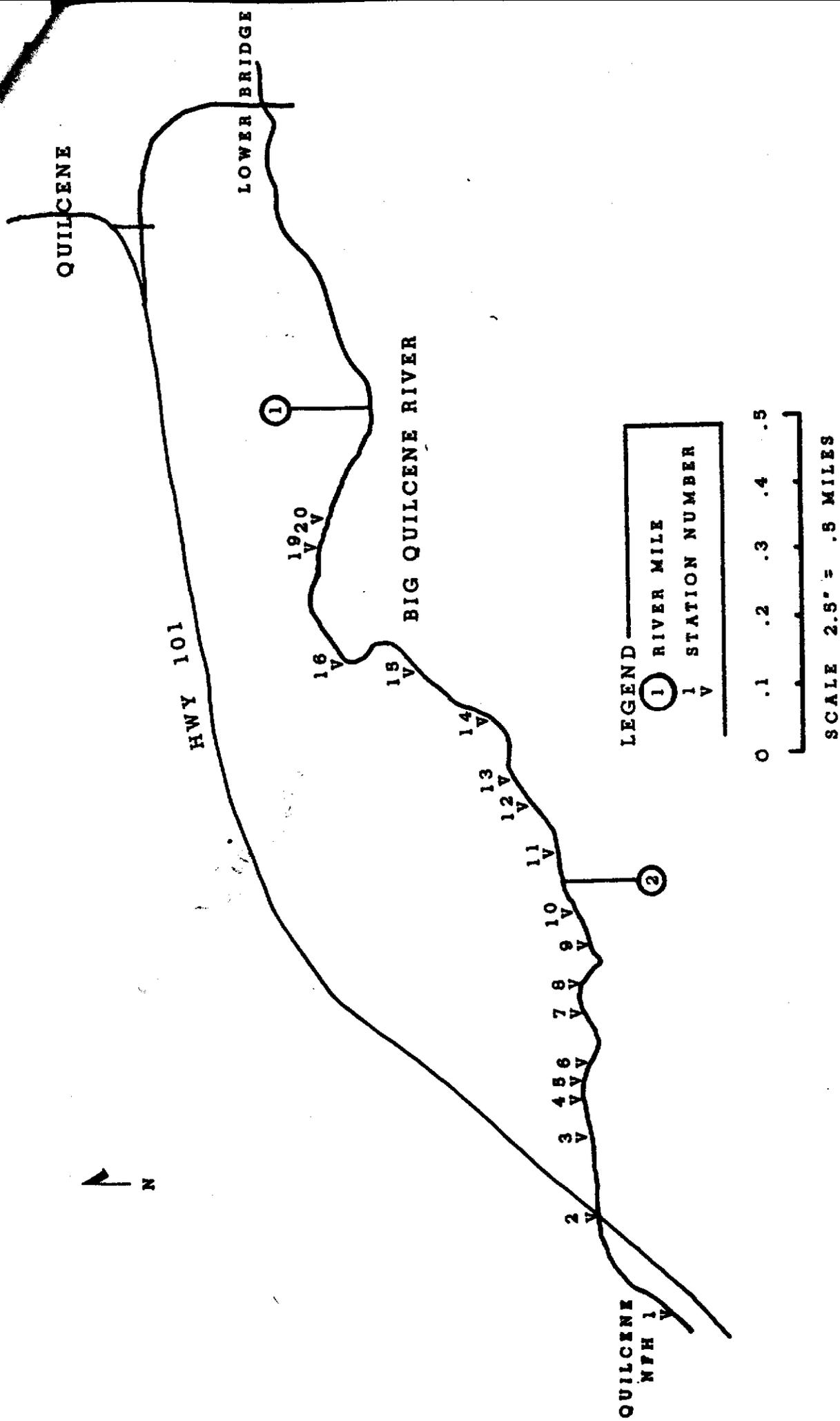


Figure 1. Location of utilized holding areas in the Big Quilcene River.

RESULTS AND DISCUSSION

The numbers of spring chinook observed during the 20 week survey period are shown in Table 1. Counts increased from five on April 26 to a high of 47 on July 17 (Figure 2). Snorkel surveys revealed chinook were not moving into the hatchery but holding just below in the hatchery hole. With this development two concerns arose: 1) poaching was occurring at the hatchery hole and 2) returning fall chinook would eventually inter-mix among the holding spring chinook. In response to these concerns, we captured and transferred 15 spring chinook to the hatchery on July 23.

Surveys conducted between July 3 and August 15 indicated few if any new chinook entered the river. With the need to obtain all available spring chinook eggs, it was decided to capture additional chinook from the river. On August 20, five chinook were captured from stations 1 and 2 and transferred to the hatchery.

Surveys conducted in late August and September showed a slight increase in counts (Figure 2). Three factors may have influenced this increase: 1) lower flows enhanced observations into certain holding areas, particularly at station 6; 2) two additional species (coho and chum) began residing in the upper holding areas making recognition between species more difficult; and 3) fall chinook may have been entering the river. The identification of two fall chinook which entered the hatchery voluntarily supports this assumption.

Williams et. al. (1975) report that spring chinook begin entering Puget Sound rivers in late March and continue into July. Our survey conducted in the Quilcene River on July 3 disclosed 44 chinook holding in the river with five more inside the hatchery. Their presence in the river at this time confirms that the three and four-year-old chinook were spring chinook.

Twenty-nine spring chinook and two fall chinook voluntarily entered the hatchery during the summer/fall of 1984. Hatchery records show that nine of these chinook entered on or before July 18 (Table 2). Entry timing of the remaining 22 fish was not recorded.

During the 20 week survey period snorkel surveys disclosed 18 areas which spring chinook utilized for holding. These areas were located in the upper half of the survey area (river mile 1.4 to 2.8) with the exception of two observations located at river mile 1.25 and 1.20. Areas most frequently used were stations 1-4 and 13-15.

Our observations frequently indicated spring chinook were utilizing the area of the holding pool which had instream cover. Instream cover consisted of submerged vegetation, boulders, and undercut banks. Of the 18 areas in which spring chinook were observed holding, 90% had instream cover.

Table 1. Counts of spring chinook observed in Big Quilcene River, 1984.

Station #	Holding Area	River Mile	4/26	5/16	6/11	6/26	7/3	7/17	7/23	7/31	8/15	8/28	9/10
1	Hatchery Hole	2.8	4	3	8	19	30	28	3 ^{2/}	4	5 ^{4/}	5	10
2	101 Bridge Hole	2.65		1	1		1	2	4	3	5	1	2
3	Lower 101 Hole	2.55		1	3		1	3	2	1	1	3	1
4	Mobile Home Hole	2.45		1	4	1	2	2			1	3	
5	Below Mobile Home Hole	2.40			2	1/		1		1		1	
6	Stump Hole	2.35							2			7	6
7	Riprap Hole	2.25			1		1				1	1	
8	Boulder Hole	2.20		2	1			1				1	
9	Below Boulder Hole	2.15			2		1						
10	Shallow Hole	2.05							1				
11	Pipe Crossing Hole	1.95			1								
12	Site #2 (Middle)	1.85		2				1	1		1		
13	Site #2 (Lower)	1.80			4		1	3	2	2	2	2	
14	Site #2 (Parking Area)	1.65	1		6		4	2	3/				1
15	Cliff Hole	1.55		1	5		2	1		1	2		
16	Debris Hole	1.45						3					
17	Log Jamb Hole	1.35											
18	Site #1 Hole (Above)	1.30											
19	Site #1 Hole	1.25					1						
20	Site #1 Hole (Middle)	1.20											1
Total Observed:			5	11	38	20	44	47	15	12	18	24	21

1/ Survey stopped because of poor visibility.

2/ On July 23, 15 chinook were captured from station 1 and transferred to the hatchery.

3/ 14 holding areas were surveyed.

4/ On August 20, five chinook were captured from station 1 and 2 and transferred to the hatchery.

Table.2. Numbers of spring chinook that voluntarily entered the hatchery.

<u>Entry Date</u>	<u>Entry Numbers</u>
June 1	1
June 11	2
June 12	2
July 18	<u>4</u>
Total:	9

* 15 spring were removed for broodstock on July 23

* 5 spring were removed for broodstock on August 20

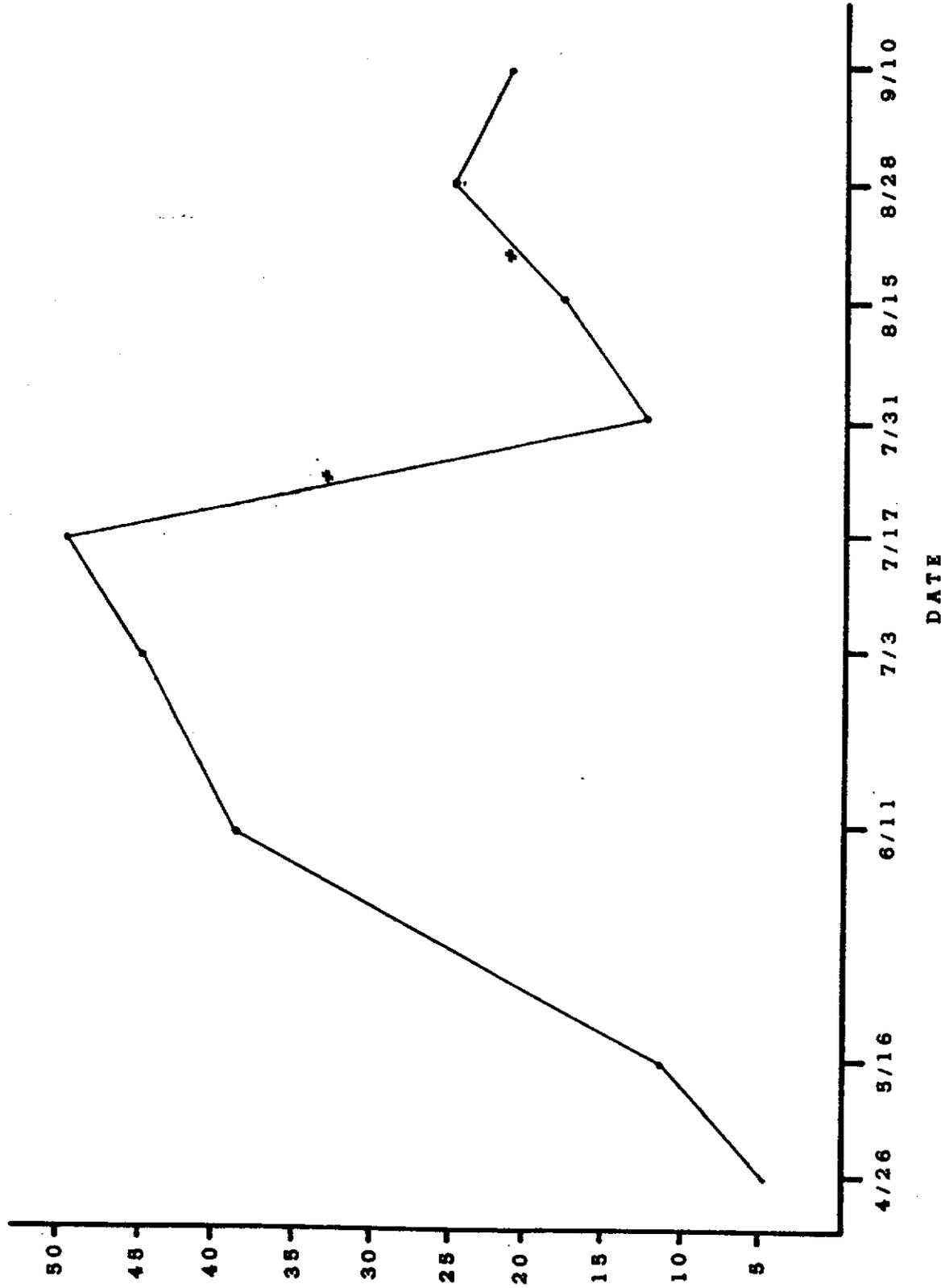


Figure 2. Counts of spring chinook in the Big Quilcene River, 1984.

CONCLUSIONS

1. Spring chinook counts in the Big Quilcene River increased from five on April 26 to a peak count of 47 on July 17. Constant changes in population abundance prohibit a total count in the river.
2. Spring chinook utilized 18 holding areas in the Big Quilcene River during the summer of 1984. All 18 areas were located in the upper half of the survey area (river mile 1.4 to 2.8), with the exception of two observations located at river mile 1.25 and 1.20. Of the 18 areas in which chinook were observed holding 90% of these had instream cover in the form of submerged vegetation, boulders, and undercut banks.
3. On July 3, 44 chinook were observed holding in the Big Quilcene River, and five more chinook had entered the hatchery. Subsequent surveys indicated few if any additional chinook entered the river after this date. With this evidence we concluded that these fish were indeed spring chinook.