ANNUAL REPORT

1997 SKAGIT RIVER WILD 0+ CHINOOK PRODUCTION EVALUATION

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April 1998

Funded by Seattle City Light

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ACKNOWLEDGMENTS

The 1997 directed-evaluation of the wild 0+ chinook production from the Skagit River was made possible with funding by Seattle City Light. This support, combined with funds from the Dingle-Johnson/Wallop-Breaux program and matched with Washington Department of Fish & Wildlife funds, enabled the *Wild Salmon Production & Survival Evaluation Unit* to trap downstream migrants in the lower Skagit River from mid-February through early-September.

We acknowledge the contributions of field staff who installed, operated and maintained traps to capture, enumerate, and mark wild coho in the upper Skagit Basin: the National Park Service-Sedro Wooley personnel; Skagit System Cooperative fish biologists and technicians; and WDFW's SHEAR technicians. We also appreciate the contributions of a number individuals who provided logistical support: Dike District Commissioner Neal Hamburg for providing access to and use of the dike adjacent to the traps; and Sherman and Pat Courier, adjacent property owners, for providing drinking water and utility access at the site, and over-winter trap storage; Burlington Northern continued to allow us to anchor the traps to the railroad bridge.

The success of this project relies on the hard work of a number of dedicated permanent and temporary WDFW personnel. Scientific Technicians Dave Collins, Jim Repoz, Scott McGrath, and Sean Wilson worked long hours operating and maintaining the traps, and enumerating and sampling catches. Scientific Technicians Robert Darting, Paul Lorenz, and John Kunz filled in near the end of the season. Unit biologists Mike Ackley and Pete Topping provided valuable logistical support during trap installation and removal.

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INTRODUCTION

Skagit River chinook returns (spring and summer/fall combined) have steadily declined over the last fifty years (PSSSRG 1992, PSSSRG 1997). In 1994, the Joint Chinook Technical Committee of the Pacific Salmon Commission designated the status of these stocks as "Not Rebuilding." To address this poor stock status, in 1995, resource managers formed the Skagit River Chinook work group. Composed of state, tribal, and federal fish biologists, this group recommends and coordinates restoration and monitoring programs. A major goal of this work group is to determine the limiting factors for chinook. Necessary data for this purpose include an indicator-stock tagging program, habitat inventory, annual adult escapement estimation, and wild juvenile chinook assessment. The production assessment is a vital link in this process because it provides a direct measure of freshwater survival.

Seattle City Light (operators of several dams on the Skagit River), through a 1991 fisheries settlement agreement with WDFW, Federal agencies (NMFS, USFWS, USFS, and NPS), and the Skagit Tribes created the Skagit Non-Flow Plan Coordinating Committee (NCC). The NCC is responsible for funding several non-flow fisheries programs including the "Chinook Research Program." Beginning in 1997, this program provided funding to conduct chinook studies. This report documents our 1997 downstream migrant trapping project in the Skagit River which, with funding from the NCC, we expanded to improve our estimates of wild 0+ chinook production.

Understanding the major sources of interannual variation in run size is critical to improving harvest and habitat management. Quantifying anadromous salmonid populations as seaward migrants near saltwater entry is the most direct assessment of stock performance in freshwater because the components of variation resulting from marine survival and harvest are excluded. Relating smolt production to adult spawners over a number of broods empirically determines the watershed's natural production potential (provided escapement and environmental conditions are sufficient), its stock/recruit function if escapements are less than that required to achieve maximum production, and enables identification of the major density-independent source(s) of interannual variation in freshwater survival. To accomplish these and other fish management objectives, the WDF implemented a long-term research program directed at measuring wild salmon production in terms of smolts and adults in selected watersheds, beginning in 1976 (*Seiler et al.* 1981). In 1981, this program, which was directed primarily at coho salmon, was expanded to include additional large watersheds (*Seiler et al.* 1984).

In 1990, we initiated downstream migrant trapping in the Skagit River system to quantify wild coho smolt production to, among other objectives, resolve a discrepancy in escapement estimates (*Hayman* 1991). The program, which is now in its eighth year, involves trapping and marking wild coho smolts emigrating from a number of tributaries, and sampling a portion of the entire population via floating traps in the lower mainstem (R.M. 17, Burlington Northern railroad bridge). In addition, we coded-wire tag wild coho smolts captured at the gulper in Baker Lake because the upstream migrant trap below the dam provides a reliable accounting of all salmon

returning to this system. Applying the marine survival estimated from the tag-based estimates of harvest and escapement to respective estimates of total system wild coho smolt production yields estimates of adult recruits, escapement, and harvest for the entire Skagit River system (*Seiler et al.* 1995).

Although our trapping in the mainstem has been directed at coho smolts, we identify and enumerate all fish captured. For the first seven years (1990-1996), season total 0+ chinook catches in the one scoop trap have varied six-fold, from 1,700 to 10,500 chinook. (As of 1993, we have simultaneously operated both a scoop and a screw trap). In addition to abundance, these catch totals are influenced by fishing effort (the time fished on each date and for the season), migration timing relative to the interval we trapped, and instantaneous trap efficiency. Many such variables as discharge, water velocity, turbidity, debris, channel configuration, trap placement, and fish size combine to affect instantaneous trap efficiency.

Preliminary expansion of these 0+ chinook catches, based on the season average recapture rates of wild coho and several other assumptions held consistent between years, has yielded chinook production estimates that range from 0.5 to 3.0 million. The statistical precision of these estimates is presently incalculable because the assumptions remain unverified. We believe, however, that these estimates reflect the abundance of wild 0+ chinook production from these broods, at least in a relative sense. We base this contention upon the significant negative correlation between the freshwater survival estimates and the severity of flow during the period that the eggs were incubating in the gravel. The survival rates in this relationship are the ratio of total 0+ chinook emigrants estimated past the traps to the potential egg deposition. System total egg deposition is simply the product of the estimated total adult chinook escapement, an assumed even sex ratio and a fecundity of 4,500 eggs/female. This relationship indicates that overall egg-to-migrant survival for Skagit River chinook may have varied twenty-fold or more within just these seven broods, almost entirely as a function of flow during egg incubation.

Measuring the biological attributes of outmigration timing and size contributes to our understanding of juvenile chinook freshwater life history. This information is useful for flow management (dams and other flow controls), habitat protection, and designing hatchery programs to minimize hatchery/wild interactions.

We estimate coho smolt production from the Skagit River with the mark and recapture strategy that we developed and have used successfully in a number of large watersheds throughout the state over many years. This method involves the following components:

1. Trapping all the wild coho smolts emigrating from a number of tributaries located throughout the basin;
2. Identifying each of these smolts with an external mark; and
3. Capturing a portion of the smolt population migrating through the lower mainstem and examining each fish for the mark.

This design produces relatively precise (CV<5%) and (we believe) unbiased production estimates, because a significant and representative portion of the coho smolt population is marked at the

tributary traps. Therefore, trapping in the mainstem does not have to be continuous or even representative with respect to timing (*Seber* 1982). We explicitly developed this design to avoid the requirement of estimating gear efficiency.

Because of the early life history characteristics of chinook in freshwater, estimating their smolt production with the same statistical precision we achieve for coho smolts is not possible. Chinook originate in discrete portions of the mainstem, and subsequently rear for variable intervals in various reaches. Therefore, the methodology we use with coho, capturing and identifying a representative portion of the entire population is not feasible for chinook. Each component likely has different survival patterns that result from the complex interactions of a number of factors: their parent's spawning timing and distribution; genetically-programed juvenile rearing strategies; and the flow and habitat conditions each sub-population and brood encounters. In a system as wide as the lower Skagit River, the migration pathways selected may vary between sub-populations, which would affect capture rates. The susceptibility of migrants to capture also varies as a function of flow and environmental conditions in effect upstream of the trap and at the trap.

Operating downstream migrant traps over an extended period in the dynamic environment of the lower mainstem of a large river is challenging when conditions are optimal. During the spring runoff, however, as flows and debris levels exceed some threshold, it becomes impossible. Capture efficiency is generally some negative function of flow but it is zero when the traps are inoperable. For these periods, migration has to be estimated by interpolation. Such estimates are biased if smolt migration rates are affected by flow changes, which we believe they are.

Calibrating the traps in the lower Skagit River with wild chinook caught in the traps is not feasible; catches within a sufficiently narrow time strata are simply too low. While hatchery chinook offer the potential of sufficient release group sizes on some broods, the requisite assumptions that they survive, distribute vertically and laterally, behave, and consequently, are caught at the same rate as wild chinook, are unverifiable and therefore problematic as well.

Sources of Variation Affecting Wild 0+ chinook Estimates

Given the foregoing problems, estimating wild juvenile 0+ chinook production from the trapping data we have collected in the lower Skagit River involves a number of assumptions. Accuracy of the resultant estimates are a direct function of the veracity of these assumptions. Each assumption deals with the uncertainty resulting from the following five major sources of variation we have identified.

1. **Trap efficiency**
   Expanding catches to estimate wild 0+ chinook production requires estimates of instantaneous gear efficiency, ideally as a function of some measurable variable such as discharge.

2. **Day vs night trap efficiency**
Trap efficiency may be influenced by light. If it is different, it is probably lower during the daylight than at night.

We have operated the traps primarily at night because catch rates for coho are higher at night than during the daylight. Estimating instantaneous trap efficiency during the daylight hours, however, is probably not possible because it would require that a sufficient and known number of marked wild chinook pass the traps within a single daylight period. The traps fish only the top 4 ft of the water column, and the depth at our site is 20-30 ft, depending on discharge. If, as a function of increasing light intensity, juvenile chinook migrate at greater depth and/or their ability to avoid the trap increases, then trap efficiency during daylight hours would be lower. The behavior of juvenile chinook and the biases imposed by releasing marked fish immediately upstream of the traps precludes estimating instantaneous efficiency within such a limited time interval as a single daylight period. Catches during daylight hours appear to be positively affected by turbidity. If true, this results either from increased migration rate and/or from an increase in trap efficiency because the trap is less visible.

3. **Day vs night migration**
Efficiency-based estimates rely on trapping either continuously or randomly throughout the time strata that migration is estimated. We developed our experimental design for estimating coho production to avoid the requirement of continuous trapping in the mainstem. Therefore, trapping in previous years was conducted almost entirely at night.

4. **Migration interval**
Skagit River 0+ chinook emigrate over a wider season than coho smolts. Chinook may begin their downstream migration as early as January, and continue through the summer or even into the fall. In most years, we operated the traps over the coho smolt migration period, early-April through mid-June. Beginning in 1994, and continuing through 1996, we extended trapping longer, as late as mid-July.

5. **Incidence of hatchery produced fish**
Prior to 1994, releases of hatchery-produced 0+ chinook in the Skagit River were unmarked. Consequently, our estimates of wild chinook production for the first four years rely on an assumption for the number of hatchery-produced fingerlings we caught. Estimating both components of the migration relies on assumptions of how many hatchery fish survived to pass the trap during the interval trapped. Beginning with the 1993 brood, all hatchery-produced chinook released into the Skagit River were marked with an adipose clip (ad-mark) and coded-wire tagged.

Study Plan for 1997

The study plan for the 1997 trapping season was directed at improving the estimates of Skagit River chinook production through achieving a better understanding of the sources of variation. In

addition to continuing our analysis of the chinook and coho trapping data collected over the previous seven years, the 1997 work plan included the following five operational elements.

1. **Trapping Season**
   A critical uncertainty in estimating Skagit River wild 0+ chinook production is their emigration timing. With the funding provided by Seattle City Light in 1997, we began trapping in mid-February and continued into September.

2. **Nightly Trap Operation**
   Nightly trapping with both the scoop trap and screw trap was continued throughout the season except when flows and/or debris loads were deemed excessive.

3. **Daytime Trap Operation**
   Daytime trapping occurred at least once each week. We made an effort to enumerate catches shortly after dawn and around dusk to enable separating day and night catches.

4. **Trap Efficiency**
   In addition to the marked wild coho and the two groups of coded-wire tagged hatchery chinook, we proposed releasing one or possibly two groups of tagged 0+ chinook.

5. **Day:Night Trap Efficiency**
   To assess differences in the vertical migration pathway as a function of light, we designed and constructed a fish sampling device, similar to a large plankton net, to capture chinook migrants at discrete depths. Operating this gear at various depths during both day and night intervals while simultaneously fishing the traps would provide insight into the diel migration pathways of 0+ chinook. If successful, results of this analysis should improve our understanding of whether the lower daylight catch rates result from reduced migration rates and/or availability of the fish to the gear. We expect that the issue of trap avoidance as a function of light intensity will remain unresolved.

METHODS

Trapping Gear and Operation

We installed two floating downstream migrant traps in the lower Skagit River (R.M. 17) on February 13. With the permission of Burlington Northern, we attached the four anchor lines to the bridge support structures. The traps were positioned side by side in the zone of highest water velocity, which is just south of the southernmost pier, approximately 70 ft from the south bank. Velocity at this site varies as a function of discharge. At low flows it averages around 5 fps, and increases to around 7 fps at high flows.

Two trap types were used: a floating inclined-plane screen trap (scoop trap), (*Seiler et al.* 1980) and a screw trap (*Busack* 1991). Both traps are contained in steel pontoon barges, outfitted with

two five-ton bow-mounted anchor winches loaded with up to 600 ft of ⅜ inch stainless aircraft cable. Overall, the scoop trap barge measures 13 ft x 38 ft, while the screw trap barge is 15 ft x 30 ft. The inclined-screen of the scoop trap is 6 ft wide, and we fish it only 3.5 ft deep to maintain an oblique angle to the flow. We have found that the angle formed by the 16 ft-long screen, set 3.5 ft deep at the entrance, precludes impinging even such small migrants as pink and chum fry, as there is sufficient sweep across the surface relative to the flow through it. At this depth, the scoop trap screens a rectangular cross-sectional area of 21 sq.ft. The 8 ft-diameter screw trap screens a cross-sectional area of 25 sq.ft, in the shape of a semi-circle.

The traps were fished every night unless flows and associated debris loads were excessive. We also fished the traps on a number of days throughout the season. All captured fish were enumerated by species and age (based on size), and examined for appropriate external marks. Samples of wild chinook were measured (fork length) over the season.

Estimating Migration

Estimating migration for any period, whether a short time interval or an entire season, requires a catch and an estimate of capture rate or trap efficiency. Catch is the product of abundance and capture rate (Equation #1). As our objective is to estimate abundance, and catch is simply a count within a time period, estimating capture rate is the challenge. We directed our analysis of the data we collected at determining appropriate strata, projecting catches and approximating a season average capture rate.

Equation #1: Basic formulas

$$C=Me \qquad M=\frac{C}{e}$$

where: M = migration
C = catch
e = trap efficiency

To assess catch rates of wild coho smolts and wild and hatchery 0+ chinook between light and dark periods we selected sunrise and sunset as the strata breaks. For each trap, we sorted through the trapping interval database to select daytime fishing periods which were preceded and followed by night fishing intervals. Averaging catch rates from the nights before and after accounts for changing migration rates. Catch data were standardized by time fished in each interval and expressed as fish/hour rates. The ratio of day rate-to-night rate was used to indicate relative catch rates as a function of daylight (Equation #2). Daily rates were regressed on flow to assess its effect on day catch rates. For fish categories which showed no correlation with flow we computed season average day:night catch ratios (Equation #3).

Equation #2: Comparing day catch rates to night catch rates:

$$R_i = C_{h_{di}} \div \frac{C_{ni-1} + C_{ni}}{h_{ni-1} + h_{ni}}$$

where:
- i = 24-hour period (from sunrise to sunrise)
- R_i = ratio of day to night catch rates for period i
- $C_{h(di)}$ = catch/hour during daylight for period i
- C_{ni-1} = catch during night before period i
- C_{ni} = catch during night for period i
- h_{ni-1} = hours fished the night before period i
- h_{ni} = hours fished during the night for period i

Equation #3: Season average ratio of day:night catch rates

$$\overline{\chi} R_i = \frac{\Sigma R_i}{n}$$

where: n = total number of comparisons over the season

To standardize catch data, we used catch rates within the strata indicated by the day:night analysis to project catches to the standard of continuous fishing for each date on which trapping was conducted. For the dates missed during high water, we used straight-line interpolation from projected catches before and after the interval missed to approximate daily catches.

An estimate of instantaneous capture rate for both day and night intervals as a function of flow would be optimal but, as discussed above, may not be feasible with chinook. We have two indicators of trap efficiency in 1997: recaptures of the wild coho marked at the tributary traps over the season; and ad-marked hatchery chinook. While the hatchery chinook are the same species and age, because they may behave significantly different than wild fish, their capture rate may not represent that of wild chinook. In addition, because the mortality and residualism of hatchery chinook between release and passing the trap is unknown, but probably significant, the resultant unadjusted estimates of capture rate are biased. The coho have the obvious drawback of being a different species, age, and somewhat larger size, but because they are actively migrating wild smolts which were released over time, their recaptures may represent trap efficiency for wild chinook better than hatchery chinook.

To project recapture rates for both hatchery chinook and the LV-marked wild coho to the standard of continuous trapping, we expanded mark recoveries with the process described above. Recaptures of ad-marked chinook were complicated by the release of two different groups/stocks with the same external mark. Following release of the chinook acclimated at Countyline Pond beginning on June 1, we sacrificed a sample of ad-marked 0+ chinook over a number of days to recover tags and thereby estimate catches of each group.

RESULTS

Trap Operation and Flow

Flow is the dominant factor affecting downstream migrant trapping in the lower Skagit River, and flows during the 1997 season were extraordinary. In mid-March, flow increased from 20,000 cfs to exceed 70,000 cfs. From mid-April through mid-July, five more flow peaks occurred, each one about 10,000 cfs higher than the previous one (Figure 1: USGS data-Mount Vernon). The problem for trapping is not the high volumes of water but rather the quantity and size of wood (large logs and whole trees) that such flows transport. As a result, for the safety of the trapping crew and to avoid losing the gear, we could not operate the traps on a number of days throughout the season.

We began trapping on the night of February 14, and ceased trapping on September 10. Over this 208-day season, we could not operate the scoop and screw traps on 17 and 22 days, respectively. Trapping was also limited by high debris loads on a number of other days. Over the season we fished the scoop trap a total of 2,719 hours (54% of the total time), while the screw trap fished 2,667 hours (53% of total). Both gear fished around 35% of the daylight hours, and 81% of the night hours. Even with the high flows, we fished a higher proportion of the daytime than we have in any previous year. (Table 1).

Catch

Chinook fry were moving downstream when we began trapping on February 14. Catch rates for wild 0+ chinook increased from around 1 fish/hour the first night to 18 fish/hour and 26 fish/hour for the screw and scoop traps, respectively, on March 18, just before the first flow spike. The highest catch rates of the season (46 fish/hour and 41 fish/hour) occurred when trapping resumed on March 23, after the peak flow. Over the remaining season, wild 0+ chinook catch rates fluctuated, finally declining through the summer to less than 1 fish/hour in August for both traps. Catch rates-by-date were similar for each trap (Figure 2). For the season, the scoop trap captured an average of 9.9 wild 0+ chinook/hour fished, while the screw trap caught an average of 7.8 wild chinook/hour.

Chum fry were the most abundant migrant caught (77,417), followed by wild 0+ chinook. Over the season, we captured 47,578 wild 0+ chinook, higher than in any previous year. Comparison of total catch between years can be misleading, however, because of differences in trap efficiency, and fishing time. The catch for the months of April, May, and June in 1997, which is a more comparable season with those of previous years, totaled 31,729 0+ chinook, double the previous high catch (Table 2). Other notable catches included the low number of wild yearling chinook (98), 26 even-year pink fry, 584 coho fry, 15 adult cutthroat, and 7 adult steelhead. We attribute the high catches of coho fry and adult steelhead and cutthroat (higher than in any previous year) to the high flows, and for steelhead and cutthroat, associated high turbidity.

Day:night Catch Ratios

For the season, we compared 0+ chinook catch rates on 35 days, with respective night rates for each trap. Catch rates on any given day or night period may not be directly comparable between the two traps because the intervals fished, are not identical. Day:night catch rate ratios for wild 0+ chinook varied from zero to near nearly three times for both traps. Flows during these comparisons varied five-fold, from less than 10,000 cfs in August, to over 40,000 cfs. No simple correlation with flow was evident, although the zero values only occurred at the lower flows indicating some flow effect (Figure 3). Over the season, these ratios averaged 90% and 75% for the scoop and screw traps, respectively (Tables 3a-b). This outcome indicates that in the 1997 season, wild 0+ chinook catch rates during the daytime averaged slightly lower than respective night intervals. In previous years, although we did not fish through very many days, the data we did collect indicated that catch rates were much lower during the day than at night. Flows in these years, however, were also much lower.

The number of day:night catch rate comparisons for hatchery chinook were limited by release timing and low abundance. Only four comparisons for each trap had catch rates in excess of 1 fish/hour. Consequently, given the wide variation, the average rates of 100% and 38% for the scoop and screw traps, respectively, may have little meaning (Tables 3a-b).

Wild coho smolts were caught during the day at lower rates than respective nights. Flow explained much of the variation in day:night catch rate ratios for both traps (Figure 4). Fewer data points were generated for coho smolts because of their more compressed migration timing relative to wild 0+ chinook (Tables 4a-b). Although flows never got below 20,000 cfs during the coho migration, it appears that from the relationships generated in 1997 at higher flows, relatively few coho would be caught during the daytime at flows <20,000 cfs. This matches our experience in previous years when flows averaged below 20,000 cfs. The day:night catch ratio correlation with flow provided a means to approximate the daytime catch of wild marked coho based on the nightly catches and, thereby project a season total. Relating this estimate to the number of wild coho marked may be our best approximation of capture rate for wild 0+ chinook in 1997.

Coho Smolt Production Evaluation

Over the season, we captured 1.06% (494÷46,406) of the wild LV-marked coho smolts released from the tributary traps. The incidence of marks in the wild coho smolt population is estimated at 4.1% from the ratio of 494 marked smolts in a total wild catch of 12,119. Relating this rate to the 46,406 smolts marked and released from seven tributary traps estimates system production at 1,174,000 wild coho smolts (Table 5).

Trap Efficiency

Wild coho. Projecting night catches of LV-marked wild coho smolts (Table 6) on the basis of day:night catch ratios as a function of flow by trap (Figure 4), estimates we would have caught 420 marks in the scoop trap and 490 marks in the screw trap had we operated both traps continuously. Relating these projected catches to the 46,406 smolts marked at the tributaries, estimates season average scoop and screw trap efficiency at 0.91% and 1.06% (1.96% combined).

Hatchery 0+ chinook. Over the season, we caught 1,847 ad-marked hatchery 0+ chinook, 1,163 smolts in the scoop trap and 684 smolts in the screw trap. These totals include the chinook released from the Skagit Hatchery on May 15 (although we first captured ad-marked chinook on May 14), and from the Countyline acclimation ponds June 1 through June 15 (Table 7). Over 80% of the season total catch was taken before June 1, which we assumed were entirely from the on-station release. From June 1 on, based on recovering 58 coded-wire tags from June 5 through August 8, we estimated that 66% of these chinook were from the on-station release, and the balance (34%) were from the acclimation ponds (Table 8).

Projecting catch rates and assuming the composition indicated from the tag recoveries, we estimate that had we fished continuously, we would have caught 2,994 and 1,965 0+ chinook in the scoop and screw traps, respectively (Tables 9a-b). Recoveries of the on-station release group comprise over 90% of the projected catch totals (4,598÷4,959) (Table 10). Relating the projected catch estimates to the release numbers estimates capture rates for both traps combined at 3.5% and 1.5% for the on-station and acclimation pond groups, respectively. Both of these estimates assume 100% survival and migration past the trap during the trapping season (before September 10).

Trap Efficiency: Day vs Night

Our attempt to sample migrants with a trawl net at greater depths than our surface-oriented traps fish was unsuccessful. The drag of the frame and net in the high flows produced a line angle that was not steep enough to sample at a depth of 6-8 ft. Attaining this depth would have required even more weight and/or a diving plane. This was not an option as the resultant drag would have exceeded the capacity of our davit system.

Wild Chinook Catch Projection

Expansion of daily catch rates and straight line interpolation for the periods missed during the extreme high water events estimates that, had we fished continuously from February 14 through September 10, we would have caught 64,547 and 50,718 wild 0+ chinook in the scoop and screw traps, respectively (Tables 9a-b).

Wild 0+ Chinook Migration Estimate

Expanding season total projected wild 0+ chinook catches by the trap efficiencies indicated from estimated recoveries of marked wild coho smolts and marked hatchery chinook yields total migration estimates that range from 3.6 to 6.0 million migrants for both traps combined. In comparison, expanding actual catches by actual wild coho and hatchery chinook capture rates estimates migration ranged from 4.0 to 4.5 million 0+ chinook (Table 11). These estimates are based on a number of assumptions which will be discussed below.

Migration Timing

The wild 0+ chinook migration in 1997 was under way before we began trapping (February 14), and may have continued after we stopped (September 10), although daily catches were virtually zero by this time. To approximate the migration which occurred before we began trapping we extrapolated initial catch rates (average of the first five days) in mid-February back to zero fish on January 15. With this addition, the highest weekly migration rates (the proportion of the season total migration occurring within a week), was during statistical weeks 12 and 13 (8-9%/week), and weeks 16 and 17 (7-8%/week) (Table 12). The median migration date was April 30 (week 18). Weekly rates declined steadily after early-June (Figure 5). Some migration peaks (as indicated by projected catches) coincided with flow spikes, while others did not (Figure 6).

The ad-marked hatchery 0+ chinook groups released into the Skagit River from the Skagit Hatchery (springs) and Countyline acclimation ponds (summers) had distinctly different emigration patterns. Fifty-percent of the total Skagit Hatchery smolt catches occurred within the first 7 days following release. In comparison, half of the total Countyline catches occurred 14 days after release (Figure 7).

As with the migration estimates, these timing data are based on simple catch projections. The degree to which they reflect migration depends largely on the variability of trap efficiency over the season.

Wild 0+ Chinook Size

Over the season, 0+ chinook captured in the traps increased in size (fork length) from a mean around 40 mm in February to around 80 mm by early September (Table 13, Figure 8). The lower end of the weekly size range did not exceed 40 mm until the end of June, indicating protracted emergence and/or slow growth for a component of the population. No difference in size at time between traps was evident (Figure 9).

ASSUMPTIONS

Every estimate relies on assumptions. Although we know that trap efficiency is not constant, because we presently have no model to indicate its variation, we used a season average rate. Therefore, the overall assumption is that with efficiency held constant, catch is a fraction of abundance. Other assumptions for estimating the numbers of wild 0+ chinook migrating from the Skagit River follows.

Catch Expansion

The expansion of catch has two components:

1. Application of the catch/hour rate for the interval fished each day to 24 hours is an unbiased estimate of the number of fish that we would have caught had the traps fished continuously; and
2. Catch during the intervals missed primarily due to high water were accurately estimated by straight line interpolation from the catch projected for the date preceding and following the period missed.

Trap Efficiency

Estimating trap efficiency also involves the previous two expansions for both the marked wild coho and the marked hatchery chinook:

3. For the coho mark group, the day:night ratio as a function of flow applied to night catches adequately estimated the numbers of wild marked coho we would have caught had the traps fished continuously;
4. For the marked hatchery chinook groups the tag recoveries accurately estimated the recoveries of each group;
5. The numbers of marked fish passing the gear is known; and
6. Marked wild coho and hatchery chinook were captured at the same rate as wild 0+ chinook.

Discussion

Although direct assessment of these assumptions is not possible, we have some intuition as to which direction they are violated. These beliefs and their effects on our estimate of the 0+ chinook production from the Skagit River follows.

Assumption #1:
Catch is probably underestimated, as the periods we fished tended to have more moderate flows and migration rates than the periods we missed. The effect of this bias is to underestimate total production.

Assumption #2:
We probably significantly underestimated catch. Although the dates missed due to high water represent only around 10% of the total season, they occurred during the peak migration period. More importantly, 0+ chinook appeared to increase their migration in response to some of the flow spikes. Consequently, this bias could amount to a significant underestimation of the projected catch and, in turn, the production.

Assumption #3:
We have no reason to believe that the assumption regarding the day:night mark-recapture rate for coho was violated.

Assumption #4:
While the coded-wire tag sample is another source of variation for estimating the recovery rates of each marked hatchery chinook group, it is not an issue when both groups are pooled. We have no evidence that the sample is biased.

Assumption #5:
This assumption is critical as the number of marked fish passing the gear serves as the denominator in the estimate of capture rate. We make no adjustment to the number of wild coho smolts marked at the tributaries because although we do not believe that survival past the gear is 100%, we believe that it is quite high. While we do not have an estimate for the in-river survival of the hatchery chinook, we also do not believe it is near 100%. Based on the difference in recovery patterns, however, it stands to reason that the faster-migrating on-station release group survived to the lower river at higher rates than the group released from the Countyline acclimation ponds. However, the effect of their lower survival on the pooled estimate of capture rate is diminished because the latter group composed a relatively small proportion of the combined group. Overestimating the number of marked hatchery smolts passing the traps underestimates their capture rate. Expanding catches by an underestimate of catch rate over estimates the population.

Assumption #6:
The degree to which the wild coho and/or hatchery chinook represented wild 0+ chinook is unknown. We have more confidence in the season-average estimate of catch rate based on wild coho because they emigrated over a wider interval that was more representative of the main portion of the chinook migration period. Overall, we expect that wild coho were caught at lower rates due to their greater swimming ability, a function of their larger size, than wild chinook. If this is true, using the capture rate estimated with wild coho overestimates the number of wild 0+ chinook produced.

Conclusion

Because these biases have opposite effects on the 0+ chinook production estimate they tend to cancel each other. We believe that the actual wild 0+ chinook production from the Skagit River in 1997 is in the range of 4 to 6 million fish.

DISCUSSION

Despite the high flows which interrupted trapping throughout the 1997 season, this first year of extended operation provided our first measure of the shape of the 0+ chinook migration from the Skagit River. We estimated that two thirds of the migration occurred from April through June, with around 25% of the migration before April, and the remaining 8% after June. The influence of the high flows on migration timing may become evident by comparing results from subsequent seasons which have more normal flow patterns. It is important to remember, however, that these estimates are based on catch projections, and the assumption that trap efficiency was relatively constant over the season. Assessing timing requires quantifying the population over the entire migration interval.

The record high catches of 0+ chinook in 1997 lead us to believe that production in this year was also higher than in any of the previous seven years. Relating an estimate of 4.5 million 0+ chinook to a potential deposition of 27 million eggs yields a survival rate to emigration of 17% (Table 14). This value is very near the rate predicted by the regression of preliminary egg-to-migrant survival estimates on flow over the previous seven years (Figure 10). Conformity with the previous data seems to support the veracity of the present estimate but it is important to realize that the estimates prior to 1997 were generated with different assumptions. The estimates for the 1989-1995 broods are based on trapping primarily at night through the coho emigration period (April-June), expanding these catches to 24-hour estimates, applying a season average trap efficiency (indicated by the wild coho mark-recapture rate), and extrapolating migration rates to assumed starting and ending dates to estimate the migration occurring before and after trapping began. These estimates may be biased high relative to the 1997 estimates because we assumed daytime catch rates were equal to night rates, but we did not increase the trap efficiency estimate by this same assumption. To remove this bias, we recalculated the survival rates for the first seven broods with the following simple methodology; expand season total 0+ chinook catch (scoop trap) by the season average rate by which wild LV-marked coho were captured, and expand this migration by 67%, the proportion of the season migration that we estimate occurred April through June 1997 (Table 15). Relating these estimates to the peak flows during egg incubation produces a fit comparable to that of the original estimates, but survival rates which are two thirds as high (Figure 11). This outcome tends to corroborate the relative value of these migration estimates because it relies primarily on catch and the same indicator of capture rate (wild coho) with a minimum of assumptions.

Improving our estimates of 0+ chinook production from the Skagit River largely depends on calibrating the traps for a range of conditions. Instantaneous trap efficiency is not constant over the season; it varies as a function of flow, velocity, turbidity, light, possibly water temperature, and fish size. Flow is undoubtedly the most important variable because it integrates other physical parameters which affect fish behavior, and trap operation. At the site we have placed the traps, velocity is a positive function of flow as evidenced by the rotational speed of the screw trap (Figure 12). Even for a given discharge, however, velocity and flow vectors can be altered by large woody debris upstream of the railroad bridge and locally at the trap site. Turbidity also appears to be an important parameter that may affect the rate that chinook migrate during the day, their vertical and lateral locations in the channel and their ability to avoid the gear. Using

hatchery fish to represent the responses of wild fish to the complex interactions of these variables with fish size, their physiological status, and the traps may present incalculable biases. Despite these uncertainties, because the numbers of wild fish captured at any one time are inadequate for trap calibration, releasing groups of marked hatchery 0+ chinook offer the only option other than the wild marked coho we release over the entire season.

RECOMMENDATIONS

The following recommendations include measures we may reasonably and cost-effectively implement within the current scope and funding level of our trapping program in the lower Skagit River.

1. Continue the extended season trapping over a sufficient span of years and flow conditions to gain an understanding of the interannual variation in migration timing.

2. Count catches at or near sunrise and sunset to increase the data base for day:night catch comparisons.

3. For a sample of dates, over the season, count catches in two-hour increments over 24-hour periods to determine the variation in diel migration.

4. Investigate the potential of using hydro-acoustics to assess whether downstream migrants alter their vertical pathways as a function of light and/or turbidity. Although such gear cannot discriminate among species, this may be inferred by catches, depending on the extent that shifts occur.

5. Measure turbidity and assess the correlation with flow.

6. Release several paired groups (2,000/group) of marked hatchery 0+ chinook to assess the feasibility of using these fish to calibrate the traps.

7. Engage a biometrician to optimize sampling design and analytical methods, assess assumptions, and compute variance estimates.

Table 1. Record of downstream migrant trap operations, Skagit River, all years.

Year	Gear Type	TRAPPING INTERVAL Date Start	Date End	Season Total Days	Number of Days Fished Nighttime Full	Nighttime Partial	Daytime Full	Daytime Partial	Trap Out	HOURS Total	HOURS Trapped	Percent Fished
1990	Scr/Scp	04/13	06/19	66	50	1	5	10	11	1,602.5	590.5	36.8%
1991	Scoop	04/08	06/20	73	72	1	4	18	0	1,741.5	858.0	49.3%
1992	Scoop	04/10	06/21	72	65		3	5	7	1,717.0	667.0	38.8%
1993	Scoop	04/11	06/07	57	53	2	0	8	2	1,355.5	539.5	39.8%
	Screw	04/22	06/07	46	32	0	4	5	14	1,095.0	366.5	33.5%
1994	Scoop	04/09	06/29	81	78	3	5	4	0	1,931.0	828.0	42.9%
	Screw	04/09	06/29	81	78	1	10	6	2	1,931.0	917.0	47.5%
1995	Scoop	03/25	07/15	112	112	0	5	8	0	2,724.0	1,189.0	43.6%
	Screw	03/25	07/17	114	110	2	8	8	2	2,729.5	1,207.0	44.2%
1996	Scoop	04/12	07/18	97	95	0	6	28	2	2,321.5	1,110.5	47.8%
	Screw	04/12	07/18	97	91	3	7	25	3	2,321.5	1,112.0	47.9%
1997	Scoop	02/14	09/10	208	182	9	58	26	17	4,996.0	2,719.0	54.4%
	Screw	02/14	09/10	208	174	11	56	21	23	4,996.0	2,667.0	53.4%

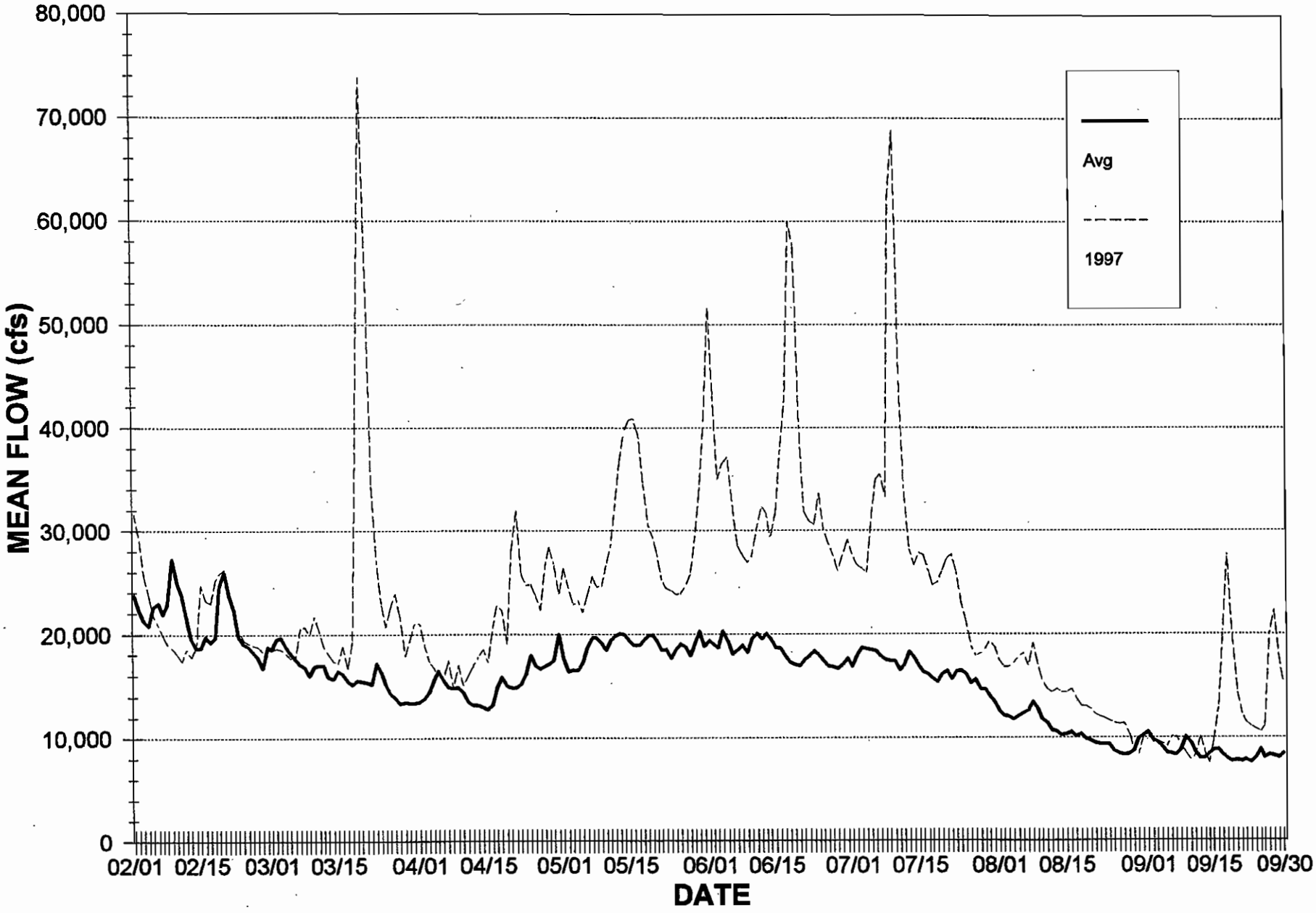
Note: In 1990, we initially started trapping with a screw trap, but because of constant problems, replaced it with a scoop trap on May 7.
Trap time past 0830 hrs is considered a partial day-fish.

Table 2. Downstream migrant salmonids captured in the Skagit River mainstem scoop and screw traps, all years.

Species/age	1990 Scoop	1991 Scoop	1992 Scoop	1993		1994		1995		1996		1997	
				Scoop	Screw	Scoop	Screw	Scoop	Screw	Scoop	Screw	Scoop	Screw
Coho 1+ Wild	10,204	6,904	8,620	3,636	3,690	10,767	10,211	8,861	8,824	11,520	9,134	6,437	5,975
Hatchery	234	382	596	[a]714	[a]723	1,880	1,873	4,800	5,274	973	1,208	334	362
Coho 0+	48	22	64	79	4	57	5	204	57	246	50	364	220
Chinook 1+ Wild	[b]45	[b]1,132	[b]299	[b]3,567	[b]262	308	212	184	112	80	32	46	52
Hatchery								1,754	570	415	117	376	249
Chinook 0+ Wild	[c]8,528	[d]1,706	[e]8,812	[f]7,463	[f]3,415	9,721	4,743	10,536	5,767	2,834	1,731	26,798	20,780
Hatchery						2,320	1,098	6,083	2,022	4,165	2,888	1,163	684
Sockeye 1+	2	21	2	32	16	106	45	31	17	36	56	59	48
Chum 0+	617	48,505	3,081	66,790	13,939	5,113	7,689	66,139	55,824	10,578	5,384	38,243	39,174
Pink 0+	697	0	18,682	0	0	48,532	22,952	0	0	27,482	9,778	9	17
Steelhead 1+ Wild	198	301	332	304	663	601	1,297	532	1,184	364	778	319	531
Hatchery	223	66	124	658	2,381	670	3,107	1,282	4,579	751	1,751	982	2,401
Steelhead adult	0	0	0	0	0	0	0	4	1	1	0	3	4
Cutthroat 1+	117	60	153	45	91	198	437	107	263	165	332	58	89
Cutthroat adult	0	0	0	0	0	0	0	1	0	0	2	2	13
Dolly Varden	130	112	132	76	74	197	255	189	179	142	102	65	77
Trout parr	N/A	N/A	N/A	12	7	47	69	56	47	110	68	40	61

[a] Estimated by proportion of total catch.
[b] Includes both hatchery and wild.
[c] 1989 brood released from Clark Creek = 1,728,100: Fall = 1,170,800 Samish stock + 236,600 Clark Creek stock, released on June 8, 1990; and Summer = 73,800 + 246,900 Clark Creek stock released on June 28, 1990.
[d] Clark Creek stock released on June 18, 1991: 1,144,500 Fall and 111,120 Summer.
[e] Clark Creek stock: 786,100 Fall, released February 25, 1992; 483,280 Summer, released April 20, 1992; and 120,000 released May 21, 1992.
[F] Clark Creek stock: 1,588,800 Fall released in February 1993, and 250,000 Fall released on March 16, 1993; and 160,000 Summer released on May 16, 1993.

Figure 1. **AVG OF DAILY MEAN FLOW FROM 1990-1996 vs. 1997, SKAGIT RIVER MAINSTEM**



D:\Datafile\SKAGIT\FLOW\ALLTRPYR.wb3 (org. 11/18/93)

(rev. 04/24/96)

Figure 2

WILD 0+ CHINOOK CATCH RATES
SKAGIT RIVER SCOOP & SCREW TRAPS, 1997

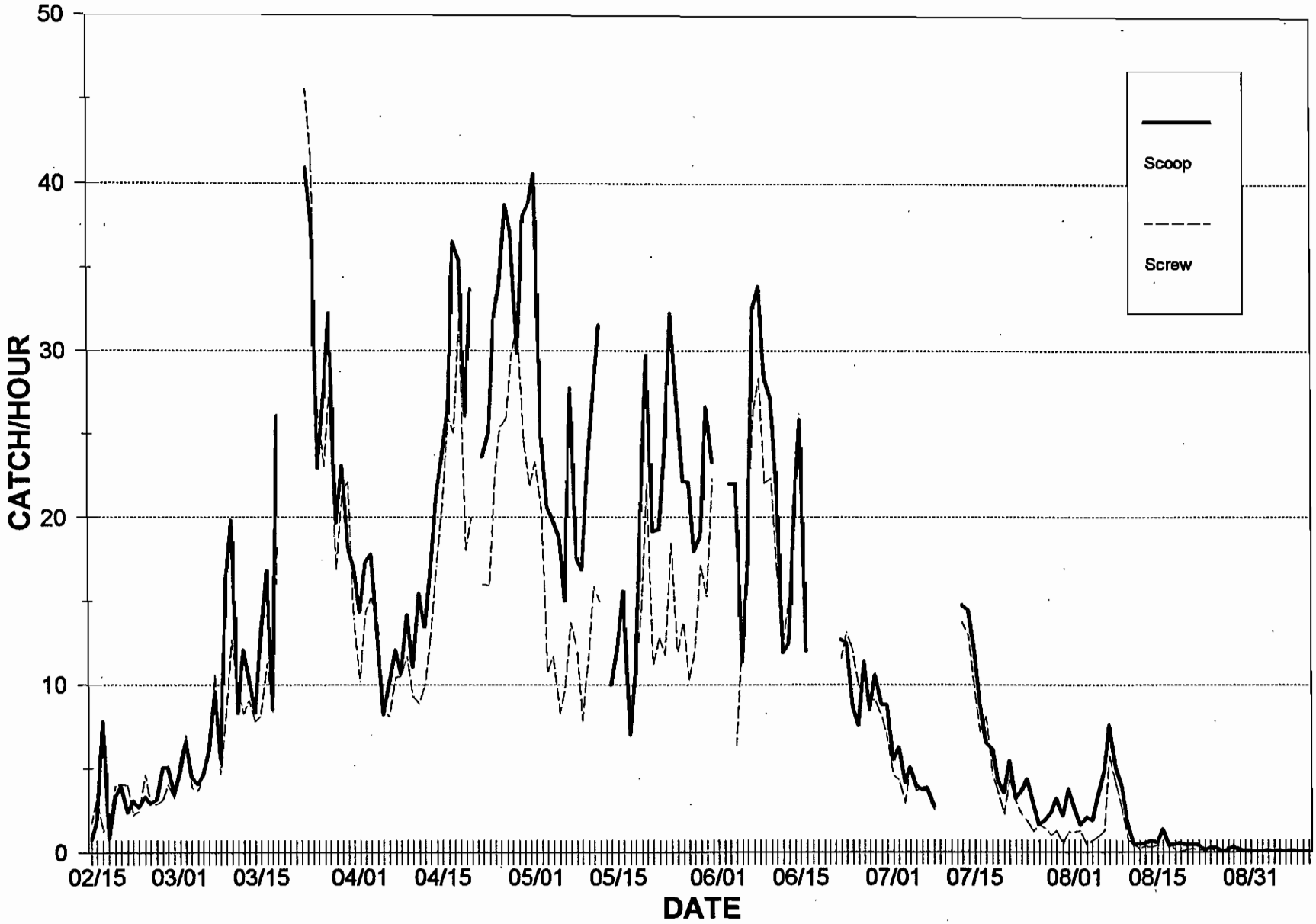


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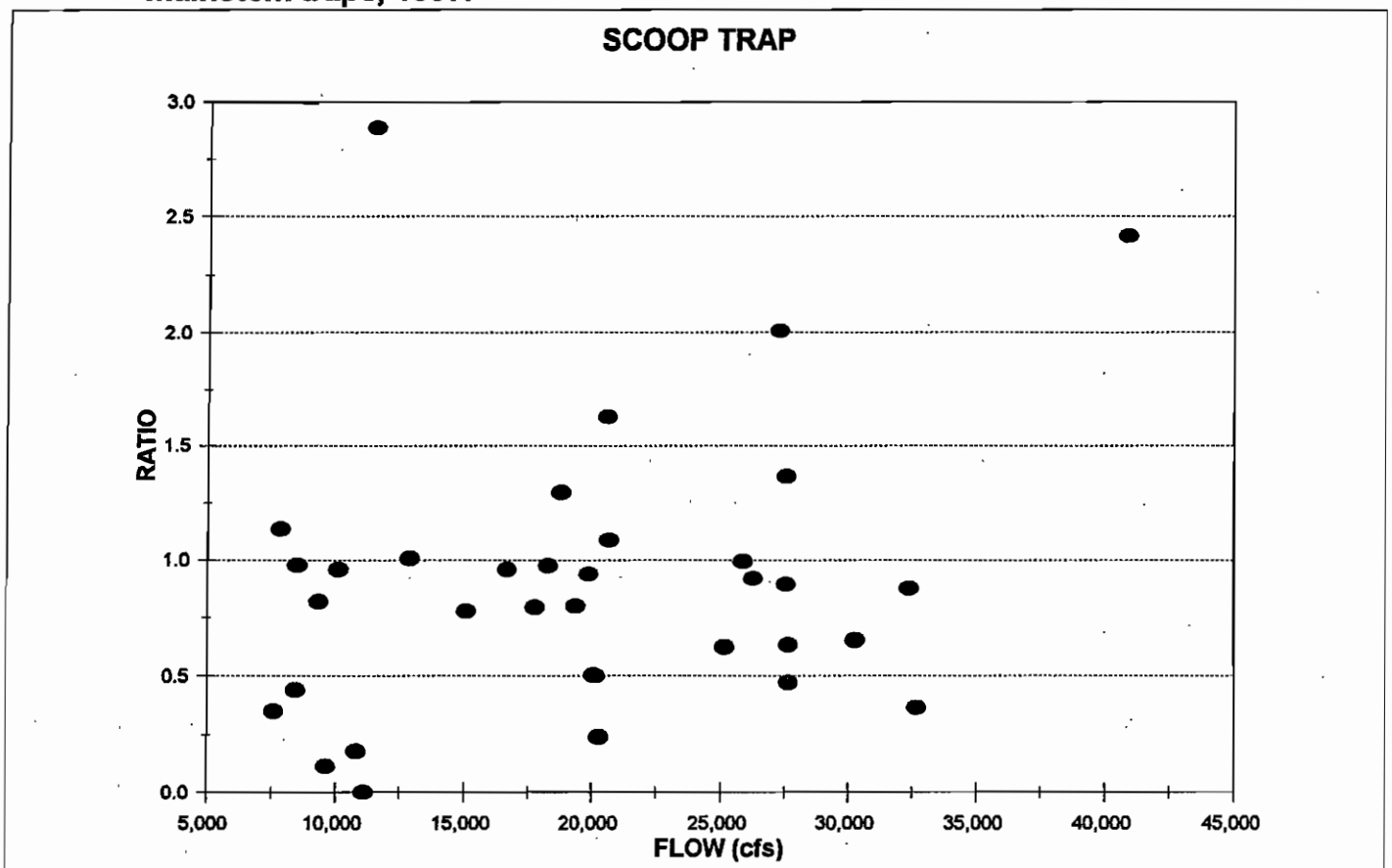
Figure 3. Day:night catch ratios for 0+ chinook and daily mean flow, Skagit River mainstem traps, 1997.



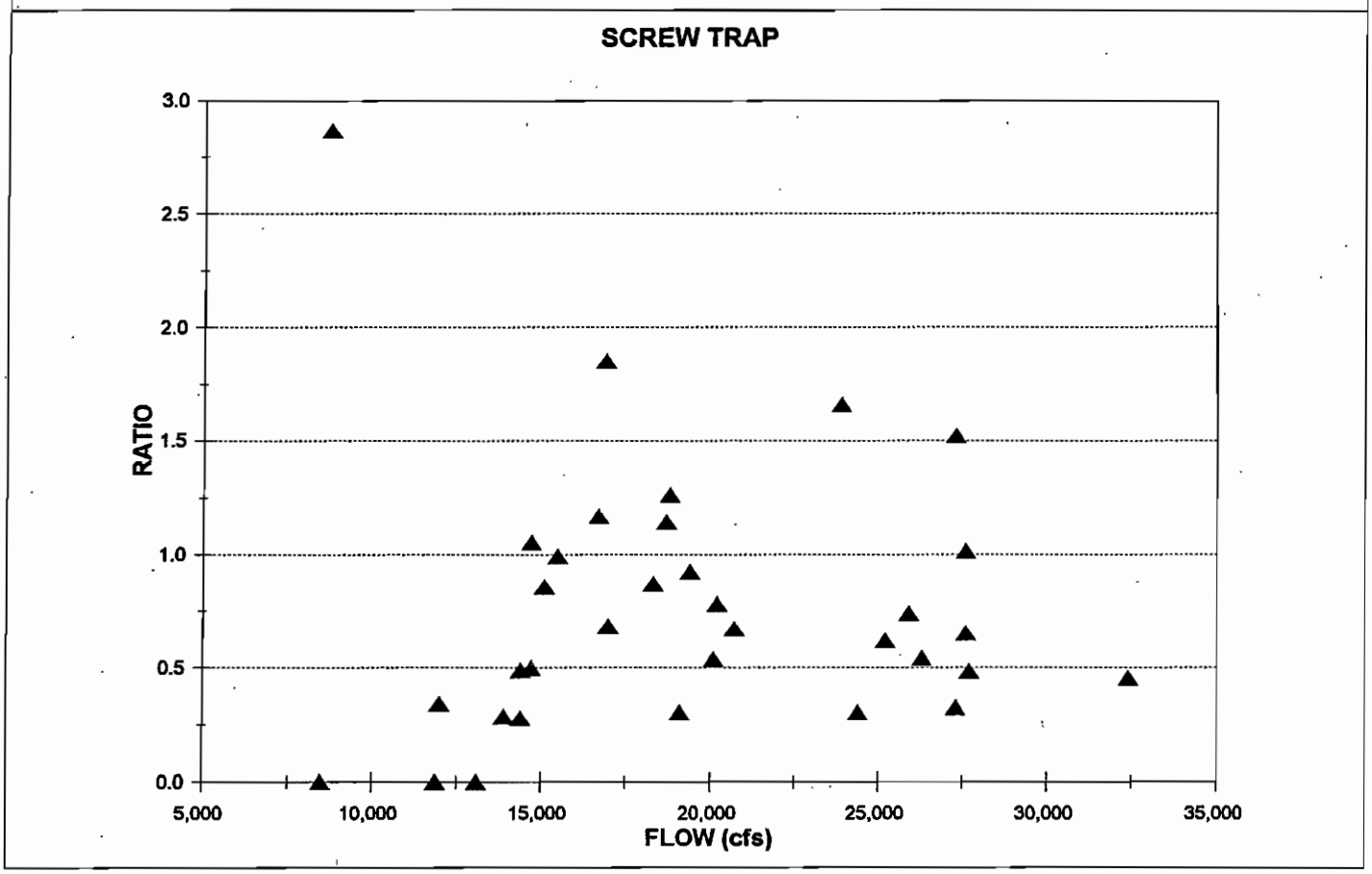


Table 3a. Catch/hour rates of wild and hatchery 0+ CHINOOK during day and night periods, Skagit River SCOOP trap, 1997.

Date	DAYTIME					NIGHTTIME							DAY:NIGHT		
	Start	End	Time Fished	Catch	Catch/ Hour	Start Date	Start Time	End Date	End Time	Time Fished	Catch	Catch/ Hour	Diff (D-N)	Ratio (D/N)	Flow (cfs)
02/24	9.00	15.25	6.25	14	2.24	02/23	18.50	02/24	0.33	5.83	19	3.26			
	15.50	18.25	2.75	0	0.00	02/24	0.33	02/24	8.83	8.50	34	4.00			
						02/24	18.42	02/25	7.33	12.92	42	3.25			
	Total Wild		9.00	14	1.56					27.25	53	1.94	-0.39	79.98%	19,400
02/28	9.00	18.00	9.00	30	3.33	02/27	18.25	02/28	8.83	14.58	65	4.46			
						02/28	18.17	03/01	7.92	13.75	32	2.33			
	Total Wild		9.00	30	3.33					28.33	97	3.42	-0.09	97.37%	18,300
03/06	8.33	17.83	9.50	50	5.26	03/05	18.17	03/06	8.17	14.00	77	5.50			
						03/06	18.00	03/07	7.00	13.00	102	7.85			
	Total Wild		9.50	50	5.26					27.00	179	6.63	-1.37	79.39%	17,800
03/07	7.17	11.00	3.83	49	12.78	03/06	18.00	03/07	7.00	13.00	102	7.85			
	Total Wild		3.83	49	12.78					13.00	102	7.85	4.94	162.92%	20,600
03/11	7.50	12.00	4.50	32	7.11	03/10	18.25	03/11	7.33	13.08	122	9.32			
	12.08	18.17	6.08	26	4.27	03/11	18.33	03/12	8.75	14.42	179	12.42			
	Total Wild		10.58	58	5.48					27.50	301	10.95	-5.47	50.07%	20,200
03/16	7.42	13.33	5.92	144	24.34	03/15	18.25	03/16	7.25	13.00	251	19.31			
	13.50	18.25	4.75	57	12.00	03/16	18.42	03/17	6.83	12.42	119	9.58			
	Total Wild		10.67	201	18.84					25.42	370	14.56	4.29	129.44%	18,800
03/25	6.50	13.00	6.50	166	25.54	03/24	18.92	03/25	2.50	7.58	257	33.89			
						03/25	2.67	03/25	6.33	3.67	84	22.91			
						03/25	18.83	03/26	0.83	6.00	86	14.33			
						03/26	1.00	03/26	6.25	5.25	101	19.24			
	Total Wild		6.50	166	25.54					22.50	528	23.47	2.07	108.83%	20,700
04/01	9.42	19.00	9.58	84	8.77	03/31	19.00	04/01	3.08	8.08	154	19.05			
						04/01	19.17	04/02	6.00	10.83	175	16.15			
	Total Wild		9.58	84	8.77					18.92	329	17.39	-8.63	50.40%	20,100
04/04	8.17	13.17	5.00	61	12.20	04/03	18.58	04/04	8.00	13.42	223	16.62			
	13.33	18.83	5.50	65	11.82	04/04	19.00	04/05	7.17	12.17	97	7.97			
	Total Wild		10.50	126	12.00					25.58	320	12.51	-0.51	95.94%	16,700
04/10	7.33	12.25	4.92	63	12.81	04/09	20.08	04/10	7.17	11.08	156	14.08			
	12.42	20.33	7.92	74	9.35	04/10	20.50	04/11	0.25	3.75	24	6.40			
						04/11	0.42	04/11	6.75	6.33	110	17.37			
	Total Wild		12.83	137	10.68					21.17	290	13.70	-3.03	77.92%	15,100
05/06	7.33	13.25	5.92	44	7.44	05/05	21.08	05/06	1.50	4.42	57	12.91			
	13.42	20.33	6.92	73	10.55	05/06	1.67	05/06	7.17	5.50	133	24.18			
						05/06	20.50	05/06	23.50	3.00	67	22.33			
						05/06	23.67	05/07	6.17	6.50	227	34.92			
	Total Wild		12.83	117	9.12					19.42	484	24.93	-15.81	36.57%	32,700
05/16	5.17	6.25	1.08	19	17.54	05/15	21.22	05/15	22.22	1.00	9	9.00			
	6.42	7.58	1.17	35	30.00	05/16	22.25	05/17	1.00	2.75	22	8.00			
	7.67	8.75	1.08	14	12.92	05/17	1.25	05/18	5.25	4.00	28	7.00			
	8.83	10.17	1.33	18	13.50										
	5.17	**6.25**	**1.08**	**58**	**53.54**	**05/15**	**21.22**	**05/15**	**22.22**	**1.00**	**0**	**0.00**			
	6.42	**7.58**	**1.17**	**52**	**44.57**	**05/16**	**22.25**	**05/17**	**1.00**	**2.75**	**17**	**6.18**			
	7.67	**8.75**	**1.08**	**10**	**9.23**	**05/17**	**1.25**	**05/18**	**5.25**	**4.00**	**63**	**15.75**			
	8.83	**10.17**	**1.33**	**0**	**0.00**										
	Total Wild		4.67	86	18.43					7.75	59	7.61	10.82	242.07%	40,900
	Total Hatchery		**4.67**	**120**	**25.71**					**7.75**	**80**	**10.32**	**15.39**	**249.11%**	40,900
05/21	5.17	9.75	4.58	49	10.69	05/20	21.58	05/21	1.17	3.58	110	30.70			
	9.92	16.33	6.42	112	17.45	05/21	1.33	05/21	5.00	3.67	125	34.09			
						05/21	16.50	05/22	0.17	7.67	127	16.57			
						05/22	0.33	05/22	6.75	6.42	131	20.42			
	5.17	**9.75**	**4.58**	**26**	**5.67**	**05/20**	**21.58**	**05/21**	**1.17**	**3.58**	**26**	**7.26**			
	9.92	**16.33**	**6.42**	**49**	**7.64**	**05/21**	**1.33**	**05/21**	**5.00**	**3.67**	**16**	**4.36**			
						05/21	**16.50**	**05/22**	**0.17**	**7.67**	**76**	**9.91**			
						05/22	**0.33**	**05/22**	**6.75**	**6.42**	**38**	**5.92**			
	Total Wild		11.00	161	14.64					21.33	493	23.11	-8.47	63.34%	27,700
	Total Hatchery		**11.00**	**75**	**6.82**					**21.33**	**166**	**7.31**	**-0.49**	**93.24%**	**27,700**

Table 3a. Catch/hour rates of wild and hatchery 0+ CHINOOK during day and night periods, Skagit River SCOOP trap, 1997.

Date	DAYTIME					NIGHTTIME							DAY:NIGHT		
	Start	End	Time Fished	Catch	Catch/ Hour	Start Date	Start Time	End Date	End Time	Time Fished	Catch	Catch/ Hour	Diff (D-N)	Ratio (D/N)	Flow (cfs)
05/22	6.92	12.00	5.08	68	13.38	05/21	16.50	05/22	0.17	7.67	127	16.57			
						05/22	0.33	05/22	6.75	6.42	131	20.42			
						05/22	21.50	05/23	3.50	6.00	173	28.83			
						05/23	3.67	05/23	6.83	3.17	68	21.47			
	6.92	**12.00**	**5.08**	**17**	**3.34**	**05/21**	**16.50**	**05/22**	**0.17**	**7.67**	**76**	**9.91**			
						05/22	**0.33**	**05/22**	**6.75**	**6.42**	**38**	**5.92**			
						05/22	**21.50**	**05/23**	**3.50**	**6.00**	**42**	**7.00**			
						05/23	**3.67**	**05/23**	**6.83**	**3.17**	**26**	**8.21**			
	Total Wild		5.08	68	13.38					23.25	499	21.46	-8.09	62.33%	25,200
	Total Hatchery		**5.08**	**17**	**3.34**					**23.25**	**182**	**7.83**	**-4.48**	**42.72%**	**25,200**
06/08	5.33	13.17	7.83	198	25.28	06/07	21.83	06/08	5.17	7.33	323	44.05			
	13.75	21.75	8.00	307	38.38	06/08	21.92	06/09	2.17	4.25	101	23.76			
						06/09	2.33	06/10	6.00	3.67	120	32.73			
	5.33	**13.17**	**7.83**	**1**	**0.13**	**06/07**	**21.83**	**06/08**	**5.17**	**7.33**	**9**	**1.23**			
	13.75	**21.75**	**8.00**	**27**	**3.38**	**06/08**	**21.92**	**06/09**	**2.17**	**4.25**	**6**	**1.41**			
						06/09	**2.33**	**06/10**	**6.00**	**3.67**	**5**	**1.36**			
	Total Wild		15.83	505	31.89					15.25	544	35.67	-3.78	89.41%	27,600
	Total Hatchery		**15.83**	**28**	**1.77**					**15.25**	**20**	**1.31**	**0.46**	**134.84%**	**27,600**
06/12	17.00	20.75	3.75	40	10.67	06/11	21.58	06/12	1.75	4.17	65	15.60			
						06/12	1.92	06/12	5.75	3.83	47	12.26			
						06/12	20.92	06/13	5.75	8.83	93	10.53			
	17.00	**20.75**	**3.75**	**0**	**0.00**	**06/11**	**21.58**	**06/12**	**1.75**	**4.17**	**3**	**0.72**			
						06/12	**1.92**	**06/12**	**5.75**	**3.83**	**0**	**0.00**			
						06/12	**20.92**	**06/13**	**5.75**	**8.83**	**3**	**0.34**			
	Total Wild		3.75	40	10.67					16.83	205	12.18	-1.51	87.59%	32,400
	Total Hatchery		**3.75**	**0**	**0.00**					**16.83**	**6**	**0.36**	**-0.36**	**0.00%**	**32,400**
06/25	7.50	21.58	14.08	93	6.60	06/24	21.83	06/25	7.33	9.50	76	8.00			
						06/25	21.75	06/26	6.08	8.33	104	12.48			
	7.50	**21.58**	**14.08**	**1**	**0.07**	**06/24**	**21.83**	**06/25**	**7.33**	**9.50**	**0**	**0.00**			
						06/25	**21.75**	**06/26**	**6.08**	**8.33**	**1**	**0.12**			
	Total Wild		14.08	93	6.60					17.83	180	10.09	-3.49	65.42%	30,300
	Total Hatchery		**14.08**	**1**	**0.07**					**17.83**	**1**	**0.06**	**0.01**	**126.63%**	**30,300**
07/03	7.83	23.00	15.17	63	4.15	07/02	22.17	07/03	7.67	9.50	39	4.11			
						07/03	23.17	07/04	6.50	7.33	37	5.05			
	7.83	**23.00**	**15.17**	**1**	**0.07**	**07/02**	**22.17**	**07/03**	**7.67**	**9.50**	**0**	**0.00**			
						07/03	**23.17**	**07/04**	**6.50**	**7.33**	**1**	**0.14**			
	Total Wild		15.17	63	4.15					16.83	76	4.51	-0.36	92.00%	26,300
	Total Hatchery		**15.17**	**1**	**0.07**					**16.83**	**1**	**0.06**	**0.01**	**110.99%**	**26,300**
07/21	7.75	21.75	14.00	92	6.57	07/20	22.00	07/21	7.58	9.58	40	4.17			
						07/21	21.92	07/22	6.67	8.75	20	2.29			
	7.75	**21.75**	**14.00**	**3**	**0.21**	**07/20**	**22.00**	**07/21**	**7.58**	**9.58**	**0**	**0.00**			
						07/21	**21.92**	**07/22**	**6.67**	**8.75**	**2**	**0.23**			
	Total Wild		14.00	92	6.57					18.33	60	3.27	3.30	200.79%	27,300
	Total Hatchery		**14.00**	**3**	**0.21**					**18.33**	**2**	**0.11**	**0.11**	**196.43%**	**27,300**
07/22	6.75	21.92	15.17	55	3.63	07/21	21.92	07/22	6.67	8.75	20	2.29			
						07/22	22.00	07/23	8.83	10.83	32	2.95			
	6.75	**21.92**	**15.17**	**2**	**0.13**	**07/21**	**21.92**	**07/22**	**6.67**	**8.75**	**2**	**0.23**			
						07/22	**22.00**	**07/23**	**8.83**	**10.83**	**2**	**0.18**			
	Total Wild		15.17	55	3.63					19.58	52	2.66	0.97	136.57%	27,600
	Total Hatchery		**15.17**	**2**	**0.13**					**19.58**	**4**	**0.20**	**-0.07**	**64.56%**	**27,600**
07/23	9.00	21.50	12.50	48	3.84	07/22	22.00	07/23	8.83	10.83	32	2.95			
						07/23	21.67	07/24	7.83	10.17	49	4.82			
	9.00	**21.50**	**12.50**	**2**	**0.16**	**07/22**	**22.00**	**07/23**	**8.83**	**10.83**	**2**	**0.18**			
						07/23	**21.67**	**07/24**	**7.83**	**10.17**	**2**	**0.20**			
	Total Wild		12.50	48	3.84					21.00	81	3.86	-0.02	99.56%	25,900
	Total Hatchery		**12.50**	**2**	**0.16**					**21.00**	**4**	**0.19**	**-0.03**	**84.00%**	**25,900**

Table 3a. Catch/hour rates of wild and hatchery 0+ CHINOOK during day and night periods, Skagit River SCOOP trap, 1997.

Date	DAYTIME					NIGHTTIME						DAY:NIGHT		
	Start	End	Time Fished	Catch	Catch/ Hour	Start Date	Start Time	End Date	End Time	Time Fished	Catch	Catch/ Hour	Diff (D-N)	Ratio (D/N)	Flow (cfs)
08/07	7.33	20.75	13.42	96	7.16	08/06	21.17	08/07	7.17	10.00	93	9.30			
						08/07	20.92	08/08	7.17	10.25	58	5.66			
	7.33	**20.75**	**13.42**	**1**	**0.07**	**08/06**	**21.17**	**08/07**	**7.17**	**10.00**	**0**	**0.00**			
						08/07	**20.92**	**08/08**	**7.17**	**10.25**	**0**	**0.00**			
	Total Wild		13.42	96	7.16					20.25	151	7.46	-0.30	95.96%	10,100
	Total Hatchery		**13.42**	**1**	**0.07**					**20.25**	**0**	**0.00**	**0.07**	**0.00%**	**10,100**
08/08	7.33	20.75	13.42	61	4.55	08/07	20.92	08/08	7.17	10.25	58	5.66			
						08/08	20.92	08/09	7.33	10.42	57	5.47			
	Total Wild		13.42	61	4.55					20.67	115	5.56	-1.02	81.71%	9,320
08/09	7.50	20.75	13.25	48	3.62	08/08	20.92	08/09	7.33	10.42	57	5.47			
						08/09	20.83	08/10	8.00	11.17	23	2.06			
	Total Wild		13.25	48	3.62					21.58	80	3.71	-0.08	97.74%	8,490
08/10	8.17	20.75	12.58	19	1.51	08/09	20.83	08/10	8.00	11.17	23	2.06			
						08/10	20.83	08/11	8.25	11.42	7	0.61			
	Total Wild		12.58	19	1.51					22.58	30	1.33	0.18	113.66%	7,820
08/13	7.83	20.50	12.67	5	0.39	08/12	20.67	08/13	7.67	11.00	6	0.55			
						08/13	20.67	08/14	6.83	10.17	13	1.28			
	Total Wild		12.67	5	0.39					21.17	19	0.90	-0.50	43.98%	8,440
08/14	7.00	20.75	13.75	5	0.36	08/13	20.67	08/14	6.83	10.17	13	1.28			
						08/14	20.92	08/15	7.00	10.08	8	0.79			
	Total Wild		13.75	5	0.36					20.25	21	1.04	-0.67	35.06%	7,600
08/15	7.17	20.50	13.33	2	0.15	08/14	20.92	08/15	7.00	10.08	8	0.79			
						08/15	20.75	08/16	8.50	11.75	21	1.79			
	7.17	**20.50**	**13.33**	**1**	**0.08**	**08/14**	**20.92**	**08/15**	**7.00**	**10.08**	**0**	**0.00**			
						08/15	**20.75**	**08/16**	**8.50**	**11.75**	**1**	**0.09**			
	Total Wild		13.33	2	0.15					21.83	29	1.33	-1.18	11.29%	9,630
	Total Hatchery		**13.33**	**1**	**0.08**					**21.83**	**1**	**0.05**	**0.03**	**0.00%**	**9,630**
08/16	8.67	20.50	11.83	15	1.27	08/15	20.75	08/16	8.50	11.75	21	1.79			
						08/16	20.67	08/17	8.00	11.33	8	0.71			
	8.67	**20.50**	**11.83**	**1**	**0.08**	**08/15**	**20.75**	**08/16**	**8.50**	**11.75**	**1**	**0.09**			
						08/16	**20.67**	**08/17**	**8.00**	**11.33**	**0**	**0.00**			
	Total Wild		11.83	15	1.27					23.08	29	1.26	0.01	100.90%	12,900
	Total Hatchery		**11.83**	**1**	**0.08**					**23.08**	**1**	**0.04**	**0.04**	**0.00%**	**12,900**
08/17	8.17	20.75	12.58	2	0.16	08/16	20.67	08/17	8.00	11.33	8	0.71			
						08/17	20.83	08/18	8.00	11.17	7	0.63			
	Total Wild		12.58	2	0.16					22.50	15	0.67	-0.51	23.84%	20,300
08/18	8.17	20.92	12.75	4	0.31	08/17	20.83	08/18	8.00	11.17	7	0.63			
						08/18	21.00	08/19	8.42	11.42	8	0.70			
	Total Wild		12.75	4	0.31					22.58	15	0.66	-0.35	47.23%	27,700
08/19	8.58	20.42	11.83	6	0.51	08/18	21.00	08/19	8.42	11.42	8	0.70			
						08/19	20.58	08/20	7.37	10.78	4	0.37			
	Total Wild		11.83	6	0.51					22.20	12	0.54	-0.03	93.60%	19,900
08/22	8.50	20.30	11.80	7	0.59	08/21	20.50	08/22	8.33	11.83	3	0.25			
						08/22	20.43	08/23	8.93	12.50	2	0.16			
	Total Wild		11.80	7	0.59					24.33	5	0.21	0.39	288.70%	11,500
08/23	9.00	20.57	11.57	0	0.00	08/22	20.43	08/23	8.93	12.50	2	0.16			
						08/23	20.90	08/24	7.92	11.02	4	0.36			
	Total Wild		11.57	0	0.00					23.52	6	0.26	-0.26	0.00%	11,100
08/24	8.18	20.28	12.10	1	0.08	08/23	20.90	08/24	7.92	11.02	4	0.36			
						08/24	20.58	08/25	9.17	12.58	7	0.56			
	Total Wild		12.10	1	0.08					23.60	11	0.47	-0.38	17.73%	10,800
TOTAL WILD			392.97	2,514	6.40					744.23	5,840	7.85	-1.45	81.53%	19,600
TOTAL HATCHERY			**149.83**	**252**	**1.68**					**243.17**	**458**	**1.88**	**-0.20**	**89.30%**	**27,000**
Average wild					7.08							8.20	-1.12	90.27%	
Average hatchery					**3.21**							**2.32**	**0.97**	**100.23%**	

Table 3b. Catch/hour rates of wild and hatchery 0+ CHINOOK during day and night periods, Skagit River SCREW trap, 1997.

Date	DAYTIME					NIGHTTIME							DAY:NIGHT		
	Start	End	Time Fished	Catch	Catch/ Hour	Start Date	Start Time	End Date	End Time	Time Fished	Catch	Catch/ Hour	Diff (D-N)	Ratio (D/N)	Flow (cfs)
02/24	8.58	15.00	6.42	7	1.09	08/23	18.33	08/24	0.17	5.83	15	2.57			
	15.00	18.08	3.08	9	2.92	08/24	0.17	08/24	8.58	8.42	35	4.16			
						08/24	18.08	08/25	7.25	13.17	42	3.19			
	Total Wild		9.50	16	1.68					27.42	50	1.82	-0.14	92.35%	19,400
02/28	8.33	17.75	9.42	28	2.97	02/27	18.17	02/28	8.33	14.17	53	3.74			
						02/28	17.75	03/01	8.00	14.25	44	3.09			
	Total Wild		9.42	28	2.97					28.42	97	3.41	-0.44	87.11%	18,300
03/11	7.25	12.08	4.83	48	9.93	03/10	18.33	03/11	7.25	12.92	168	13.01			
	12.08	18.17	6.08	42	6.90	03/11	18.17	03/12	8.50	14.33	120	8.37			
	Total Wild		10.92	90	8.24					27.25	288	10.57	-2.32	78.01%	20,200
03/16	7.17	13.25	6.08	99	16.27	03/15	18.17	03/16	7.17	13.00	146	11.23			
	13.25	18.17	4.92	40	8.14	03/16	18.17	03/17	6.75	12.58	110	8.74			
	Total Wild		11.00	139	12.64					25.58	256	10.01	2.63	126.28%	18,800
03/25	6.25	12.83	6.58	127	19.29	03/24	18.83	03/25	2.67	7.83	283	36.13			
						03/25	2.67	03/25	6.25	3.58	160	44.65			
						03/25	18.75	03/26	1.00	6.25	117	18.72			
						03/26	1.00	03/26	6.33	5.33	101	18.94			
	Total Wild		6.58	127	19.29					23.00	661	28.74	-9.45	67.12%	20,700
04/01	8.75	18.75	10.00	67	6.70	03/31	19.00	04/01	2.75	7.75	83	10.71			
						04/01	2.75	04/01	8.75	6.00	80	13.33			
						04/01	18.75	04/02	6.08	11.33	149	13.15			
	Total Wild		10.00	67	6.70					25.08	312	12.44	-5.74	53.86%	20,100
04/04	8.17	13.20	5.03	67	13.31	04/03	18.50	04/04	8.17	13.67	202	14.78			
	13.20	18.75	5.55	89	16.04	04/04	18.75	04/05	7.25	12.50	128	10.24			
	Total Wild		10.58	156	14.74					26.17	330	12.61	2.13	116.88%	16,700
04/10	7.00	12.08	5.08	60	11.80	04/09	20.00	04/10	7.00	11.00	119	10.82			
	12.08	20.60	8.52	59	6.93	04/10	20.60	04/11	0.50	3.90	33	8.46			
						04/11	0.50	04/11	6.50	6.00	52	8.67			
	Total Wild		13.60	119	8.75					14.90	152	10.20	-1.45	85.77%	15,100
05/06	6.50	12.75	6.25	35	5.60	05/05	21.00	05/06	1.00	4.00	21	5.25			
	12.75	20.00	7.25	66	9.10	05/06	1.00	05/06	6.50	5.50	68	12.36			
						05/06	20.00	05/07	23.00	3.00	42	14.00			
						05/07	23.00	05/07	6.25	7.25	120	16.55			
	Total Wild		13.50	101	7.48					19.75	89	4.51	2.98	166.02%	23,900
05/21	9.25	16.00	6.75	54	8.00	05/20	21.50	05/21	0.58	3.08	82	26.59			
						05/21	0.58	05/21	4.50	3.92	55	14.04			
						05/21	23.50	05/22	6.00	6.50	85	13.08			
	9.25	**16.00**	**6.75**	**26**	**3.85**	**05/20**	**21.50**	**05/21**	**0.58**	**3.08**	**17**	**5.51**			
						05/21	**0.58**	**05/21**	**4.50**	**3.92**	**17**	**4.34**			
						05/21	**23.50**	**05/22**	**6.00**	**6.50**	**22**	**3.38**			
	Total Wild		6.75	54	8.00					13.50	222	16.44	-8.44	48.65%	27,700
	Total Hatchery		**6.75**	**26**	**3.85**					**13.50**	**56**	**4.15**	**-0.30**	**92.86%**	**27,700**
05/22	6.00	11.50	5.50	56	10.18	05/21	23.50	05/22	6.00	6.50	85	13.08			
						05/22	21.50	05/23	2.50	5.00	88	17.60			
						05/23	2.50	05/25	6.50	4.00	82	20.50			
	6.00	**11.50**	**5.50**	**8**	**1.45**	**05/21**	**23.50**	**05/22**	**6.00**	**6.50**	**22**	**3.38**			
						05/22	**21.50**	**05/23**	**2.50**	**5.00**	**9**	**1.80**			
						05/23	**2.50**	**05/25**	**6.50**	**4.00**	**13**	**3.25**			
	Total Wild		5.50	56	10.18					15.50	255	16.45	-6.27	61.89%	25,200
	Total Hatchery		**5.50**	**8**	**1.45**					**15.50**	**44**	**2.84**	**-1.38**	**51.24%**	**25,200**
05/23	6.50	17.33	10.83	65	6.00	05/22	21.50	05/23	2.50	5.00	88	17.60			
						05/23	2.50	05/23	6.50	4.00	82	20.50			
						05/23	23.08	05/24	6.50	7.42	154	20.76			
	6.50	**17.33**	**10.83**	**9**	**0.83**	**05/22**	**21.50**	**05/23**	**2.50**	**5.00**	**9**	**1.80**			
						05/23	**2.50**	**05/23**	**6.50**	**4.00**	**13**	**3.25**			
						05/23	**23.08**	**05/24**	**6.50**	**7.42**	**13**	**1.75**			
	Total Wild		10.83	65	6.00					16.42	324	19.74	-13.74	30.40%	24,400
	Total Hatchery		**10.83**	**9**	**0.83**					**16.42**	**35**	**2.13**	**-1.30**	**38.97%**	**24,400**

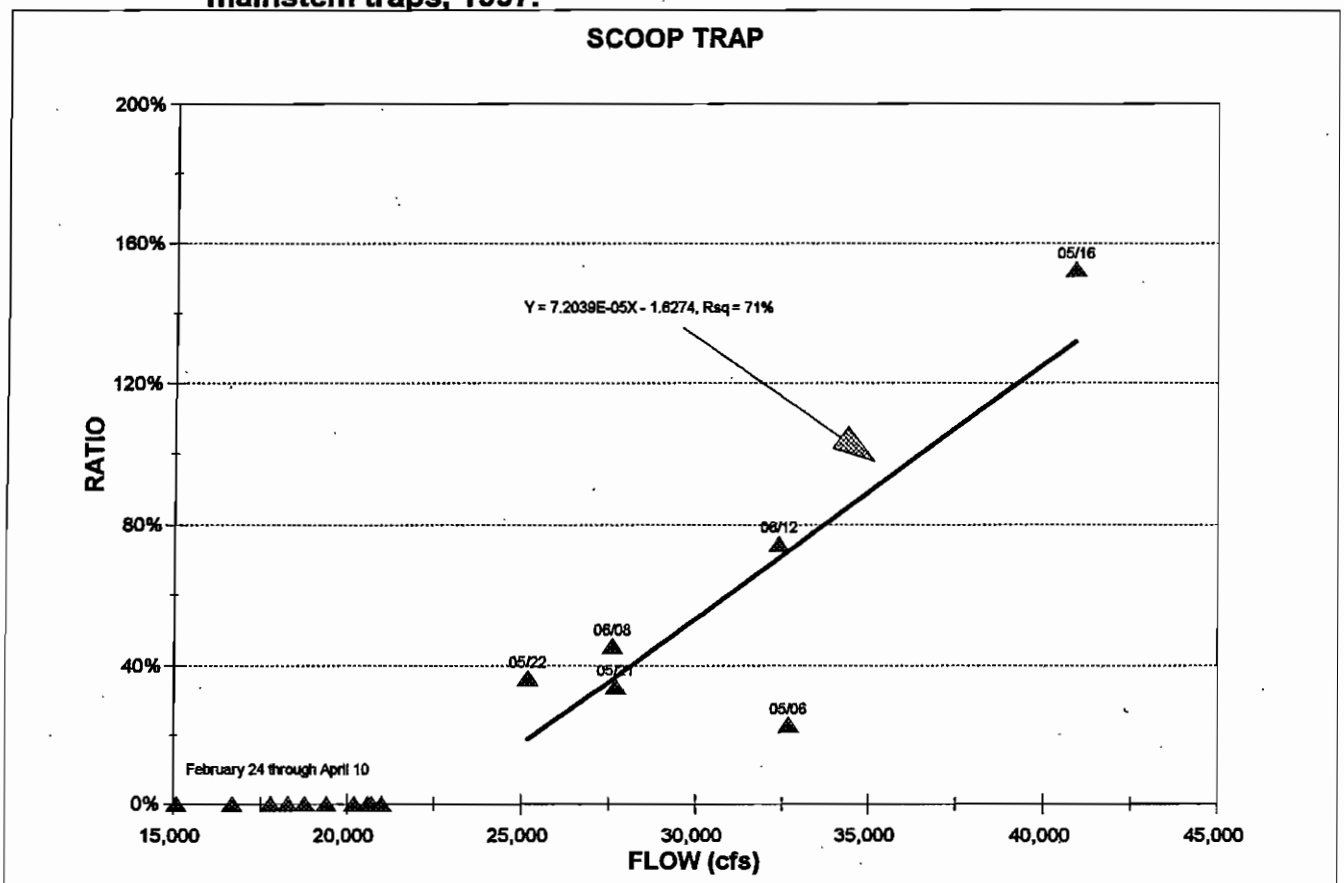
Table 3b. Catch/hour rates of wild and hatchery 0+ CHINOOK during day and night periods, Skagit River SCREW trap, 1997.

Date	DAYTIME					NIGHTTIME						DAY:NIGHT		
	Start	End	Time Fished	Catch	Catch/ Hour	Start Date	Start Time	End Date	End Time	Time Fished	Catch	Catch/ Hour	Diff (D-N)	Ratio (D/N)	Flow (cfs)
06/08	4.75	13.50	8.75	218	24.91	06/07	21.75	06/08	4.75	7.00	216	30.86			
	13.50	21.50	8.00	268	33.50	06/08	21.50	06/09	1.75	4.25	81	19.06			
						06/09	1.75	06/09	6.00	4.25	146	34.35			
	4.75	**13.50**	**8.75**	**4**	**0.46**	**06/07**	**21.75**	**06/08**	**4.75**	**7.00**	**6**	**0.86**			
	13.50	**21.50**	**8.00**	**14**	**1.75**	**06/08**	**21.50**	**06/09**	**1.75**	**4.25**	**7**	**1.65**			
						06/09	**1.75**	**06/09**	**6.00**	**4.25**	**5**	**1.18**			
	Total Wild		16.75	486	29.01					15.50	443	28.58	0.43	101.52%	27,600
	Total Hatchery		16.75	18	1.07					15.50	18	1.16	-0.09	92.64%	27,600
06/12	17.00	20.92	3.92	25	6.38	06/11	21.58	06/12	1.50	3.92	50	12.77			
						06/12	1.50	06/12	5.75	4.25	71	16.71			
						06/12	20.92	06/13	5.42	8.50	112	13.18			
	17.00	**20.92**	**3.92**	**2**	**0.51**	**06/11**	**21.58**	**06/12**	**1.50**	**3.92**	**1**	**0.26**			
						06/12	**1.50**	**06/12**	**5.75**	**4.25**	**0**	**0.00**			
						06/12	**20.92**	**06/13**	**5.42**	**8.50**	**3**	**0.35**			
	Total Wild		3.92	25	6.38					16.67	233	13.98	-7.60	45.66%	32,400
	Total Hatchery		3.92	2	0.51					16.67	4	0.24	0.27	212.77%	32,400
07/03	8.08	22.67	14.58	34	2.33	07/02	22.00	07/03	8.08	10.08	37	3.67			
						07/03	22.67	07/04	6.25	7.58	39	5.14			
	8.08	**22.67**	**14.58**	**0**	**0.00**	**07/02**	**22.00**	**07/03**	**8.08**	**10.08**	**0**	**0.00**			
						07/03	**22.67**	**07/04**	**6.25**	**7.58**	**1**	**0.13**			
	Total Wild		14.58	34	2.33					17.67	76	4.30	-1.97	54.20%	26,300
	Total Hatchery		14.58	0	0.00					17.67	1	0.06	-0.06	0.00%	26,300
07/18	7.83	13.50	5.67	10	1.76	07/17	22.00	07/18	7.83	9.83	66	6.71			
						07/18	22.75	07/19	7.58	8.83	35	3.96			
	7.83	**13.50**	**5.67**	**0**	**0.00**	**07/17**	**22.00**	**07/18**	**7.83**	**9.83**	**4**	**0.41**			
						07/18	**22.75**	**07/19**	**7.58**	**8.83**	**1**	**0.11**			
	Total Wild		5.67	10	1.76					18.67	101	5.41	-3.65	32.62%	27,300
	Total Hatchery		5.67	0	0.00					18.67	5	0.27	-0.27	0.00%	27,300
07/21	7.83	21.50	13.67	73	5.34	07/20	22.00	07/21	7.83	9.83	27	2.75			
						07/21	21.50	07/22	6.50	9.00	39	4.33			
	7.83	**21.50**	**13.67**	**3**	**0.22**	**07/20**	**22.00**	**07/21**	**7.83**	**9.83**	**3**	**0.31**			
						07/21	**21.50**	**07/22**	**6.50**	**9.00**	**2**	**0.22**			
	Total Wild		13.67	73	5.34					18.83	66	3.50	1.84	152.42%	27,300
	Total Hatchery		13.67	3	0.22					18.83	5	0.27	-0.05	0.00%	27,300
07/22	6.50	21.58	15.08	36	2.39	07/21	21.50	07/22	6.50	9.00	39	4.33			
						07/22	21.58	07/23	8.50	10.92	34	3.11			
	6.50	**21.58**	**15.08**	**1**	**0.07**	**07/21**	**21.50**	**07/22**	**6.50**	**9.00**	**2**	**0.22**			
						07/22	**21.58**	**07/23**	**8.50**	**10.92**	**1**	**0.09**			
	Total Wild		15.08	36	2.39					19.92	73	3.67	-1.28	65.12%	27,600
	Total Hatchery		15.08	1	0.07					19.92	3	0.15	-0.08	0.00%	27,600
07/23	8.50	21.33	12.83	24	1.87	07/22	21.58	07/23	8.50	10.92	34	3.11			
						07/23	21.33	07/24	7.75	10.42	20	1.92			
	8.50	**21.33**	**12.83**	**1**	**0.08**	**07/22**	**21.58**	**07/23**	**8.50**	**10.92**	**1**	**0.09**			
						07/23	**21.33**	**07/24**	**7.75**	**10.42**	**1**	**0.10**			
	Total Wild		12.83	24	1.87					21.33	54	2.53	-0.66	73.88%	25,900
	Total Hatchery		12.83	1	0.08					21.33	2	0.09	-0.02	0.00%	25,900
07/31	8.33	20.33	12.00	16	1.33	07/30	20.50	07/31	8.33	11.83	12	1.01			
						07/31	20.33	08/01	8.50	12.17	16	1.32			
	8.33	**20.33**	**12.00**	**1**	**0.08**	**07/30**	**20.50**	**07/31**	**8.33**	**11.83**	**0**	**0.00**			
						07/31	**20.33**	**08/01**	**8.50**	**12.17**	**3**	**0.25**			
	Total Wild		12.00	16	1.33					24.00	28	1.17	0.17	114.29%	18,700
	Total Hatchery		12.00	1	0.08					24.00	3	0.13	-0.04	0.00%	18,700
08/07	8.83	20.75	11.92	99	8.31	08/06	20.75	08/07	8.83	12.08	19	1.57			
						08/07	20.75	08/08	6.75	10.00	80	8.00			
	8.83	**20.75**	**11.92**	**1**	**0.08**	**08/06**	**20.75**	**08/07**	**8.83**	**12.08**	**0**	**0.00**			
						08/07	**20.75**	**08/08**	**6.75**	**10.00**	**1**	**0.10**			
	Total Wild		11.92	99	8.31					22.08	99	4.48	3.82	185.31%	16,900
	Total Hatchery		11.92	1	0.08					22.08	1	0.05	0.04	0.00%	16,900

Table 3b. Catch/hour rates of wild and hatchery 0+ CHINOOK during day and night periods, Skagit River SCREW trap, 1997.

Date	DAYTIME Start	End	Time Fished	Catch	Catch/ Hour	NIGHTTIME Start Date	Start Time	End Date	End Time	Time Fished	Catch	Catch/ Hour	DAY:NIGHT Diff (D-N)	Ratio (D/N)	Flow (cfs)
08/08	6.75	20.50	13.75	27	1.96	08/07	20.75	08/08	6.75	10.00	80	8.00			
						08/08	20.50	08/09	6.83	10.33	51	4.94			
	6.75	**20.50**	**13.75**	**0**	**0.00**	**08/07**	**20.75**	**08/08**	**6.75**	**10.00**	**1**	**0.10**			
						08/08	**20.50**	**08/09**	**6.83**	**10.33**	**0**	**0.00**			
	Total Wild		13.75	27	1.96					20.33	131	6.44	-4.48	30.48%	19,100
	Total Hatchery		**13.75**	**0**	**0.00**					**20.33**	**1**	**0.05**	**-0.05**	**0.00%**	**19,100**
08/09	6.83	20.50	13.67	26	1.90	08/08	20.50	08/09	6.83	10.33	51	4.94			
						08/09	20.50	08/10	7.75	11.25	9	0.80			
	Total Wild		13.67	26	1.90					21.58	60	2.78	-0.88	68.43%	17,000
08/10	7.75	20.58	12.83	9	0.70	08/09	20.50	08/10	7.75	11.25	9	0.80			
						08/10	20.58	08/11	8.00	11.42	7	0.61			
	Total Wild		12.83	9	0.70					22.67	16	0.71	-0.00	99.35%	15,500
08/13	7.50	20.42	12.92	3	0.23	08/12	20.25	08/13	7.50	11.25	5	0.44			
						08/13	20.42	08/14	6.67	10.25	5	0.49			
	Total Wild		12.92	3	0.23					21.50	10	0.47	-0.23	49.94%	14,700
08/14	6.67	20.50	13.83	3	0.22	08/13	20.42	08/14	6.67	10.25	5	0.49			
						08/14	20.50	08/15	6.50	10.00	4	0.40			
	Total Wild		13.83	3	0.22					20.25	9	0.44	-0.23	48.80%	14,400
08/15	6.50	20.25	13.75	3	0.22	08/14	20.50	08/15	6.50	10.00	4	0.40			
						08/15	20.25	08/16	8.00	11.75	13	1.11			
	Total Wild		13.75	3	0.22					21.75	17	0.78	-0.56	27.91%	14,400
08/16	8.00	20.17	12.17	15	1.23	08/15	20.25	08/16	8.00	11.75	13	1.11			
						08/16	20.17	08/17	7.50	11.33	14	1.24			
	Total Wild		12.17	15	1.23					23.08	27	1.17	0.06	105.40%	14,700
08/17	7.50	20.50	13.00	3	0.23	08/16	20.17	08/17	7.50	11.33	14	1.24			
						08/17	20.50	08/18	7.50	11.00	4	0.36			
	Total Wild		13.00	3	0.23					22.33	18	0.81	-0.58	28.63%	13,900
08/18	7.50	21.17	13.67	0	0.00	08/17	20.50	08/18	7.50	11.00	4	0.36			
						08/18	21.17	08/19	8.25	11.08	2	0.18			
	Total Wild		13.67	0	0.00					22.08	6	0.27	-0.27	0.00%	13,100
08/19	8.25	20.37	12.12	0	0.00	08/18	21.17	08/19	8.25	11.08	2	0.18			
						08/19	20.37	08/20	7.25	10.88	1	0.09			
	Total Wild		12.12	0	0.00					21.97	3	0.14	-0.14	0.00%	13,100
08/22	8.25	20.22	11.97	1	0.08	08/21	20.25	08/22	8.25	12.00	2	0.17			
						08/22	20.22	08/23	8.83	12.62	4	0.32			
	Total Wild		11.97	1	0.08					24.62	6	0.24	-0.16	34.29%	12,000
08/23	8.83	20.43	11.60	0	0.00	08/22	20.22	08/23	8.83	12.62	4	0.32			
						08/23	20.43	08/24	7.83	11.40	2	0.18			
	Total Wild		11.60	0	0.00					24.02	6	0.25	-0.25	0.00%	11,900
08/29	8.45	19.83	11.38	4	0.35	08/28	20.28	08/29	8.45	12.17	3	0.25			
						08/29	19.83	08/30	8.17	12.33	0	0.00			
	Total Wild		11.38	4	0.35					24.50	3	0.12	0.23	286.97%	8,730
09/09	7.23	21.42	14.18	0	0.00	09/08	19.75	09/09	7.23	11.48	0	0.00			
						09/09	21.42	09/10	7.60	10.18	0	0.00			
	Total Wild		14.18	0	0.00					21.67	0	0.00	0.00	0.00%	8,490
TOTAL WILD			405.43	1,915	4.72					750.00	4,521	6.03	-1.30	78.36%	19,200
TOTAL HATCHERY			**143.25**	**70**	**0.49**					**240.42**	**178**	**0.74**	**-0.25**	**66.00%**	**25,100**
Average wild					4.93							6.55	-1.62	74.52%	
Average hatchery					**0.63**							**0.89**	**-0.26**	**37.57%**	

Figure 4. Day:night catch ratios for coho smolts and daily mean flow, Skagit River mainstem traps, 1997.



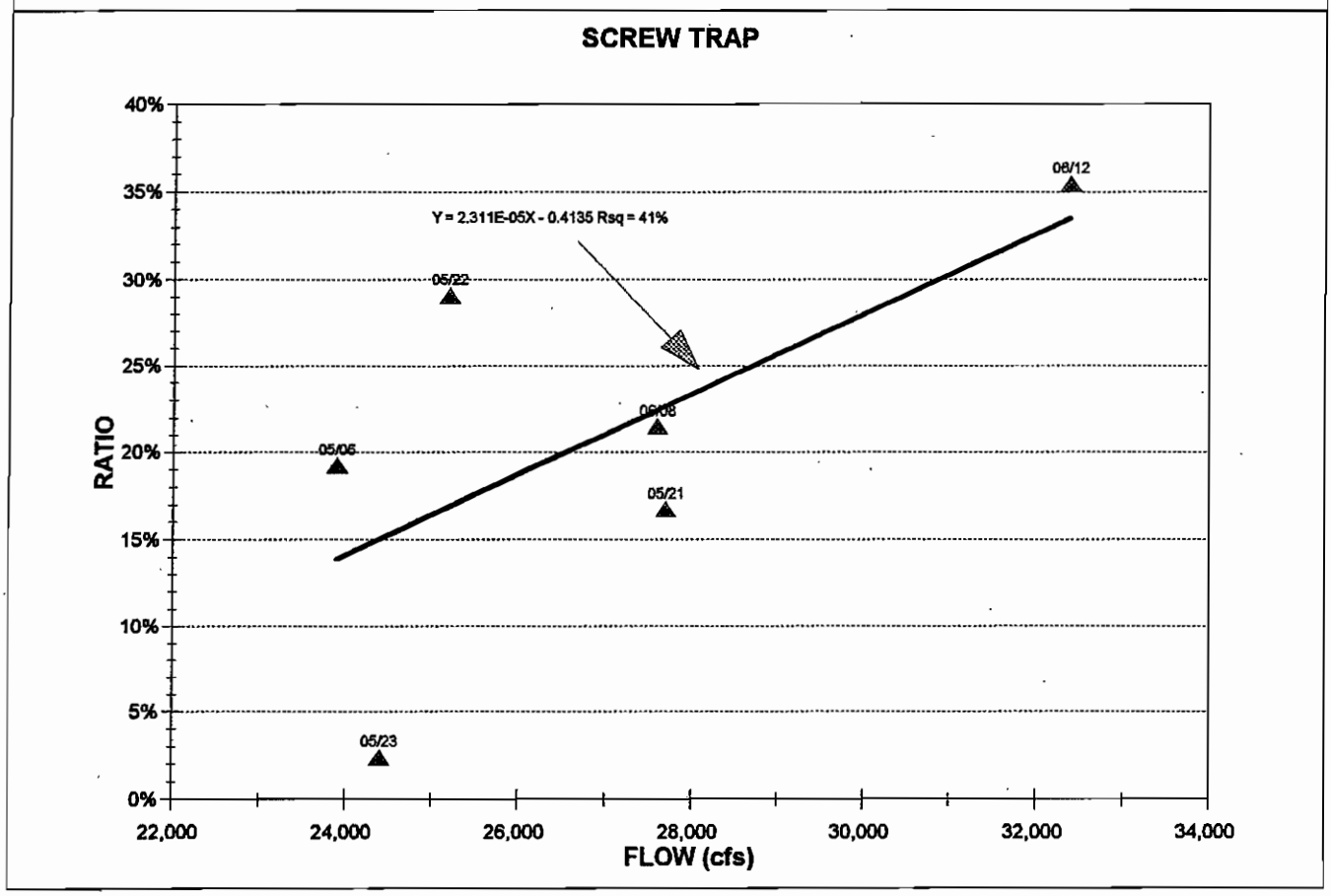


Table 4a. Catch/hour rates of unmarked wild COHO smolts, during day and night periods, Skagit River SCOOP trap, 1997.

Date	DAYTIME					NIGHTTIME						DAY:NIGHT		
	Start	End	Time Fished	Catch	Catch/ Hour	Start Date	Start Time	End Date	End Time	Time Fished	Catch	Catch/ Hour	Diff (D-N)	Ratio (D/N)	Flow (cfs)
02/24	9.00	15.25	6.25	0	0.00	02/23	18.50	02/24	0.33	5.83	0	0.00			
	15.50	18.25	2.75	0		02/24	0.33	02/24	8.83	8.50	0	0.00			
						02/24	18.42	02/25	7.33	12.92	0	0.00			
	Total Wild		9.00	0	0.00					27.25	0	0.00	0.00	0.00%	19,400
02/28	9.00	18.00	9.00	0	0.00	02/27	18.25	02/28	8.83	14.58	1	0.07			
						02/28	18.17	03/01	7.92	13.75	1	0.07			
	Total Wild		9.00	0	0.00					28.33	2	0.07	-0.07	0.00%	18,300
03/06	8.33	17.83	9.50	0	0.00	03/05	18.17	03/06	8.17	14.00	1	0.07			
						03/06	18.00	03/07	7.00	13.00	1	0.08			
	Total Wild		9.50	0	0.00					27.00	2	0.07	-0.07	0.00%	17,800
03/07	7.17	11.00	3.83	0	0.00	03/06	18.00	03/07	7.00	13.00	1	0.08			
	Total Wild		3.83	0	0.00					13.00	1	0.08	-0.08	0.00%	20,600
03/11	7.50	12.00	4.50	0	0.00	03/10	18.25	03/11	7.33	13.08	0	0.00			
	12.08	18.17	6.08	0	0.00	03/11	18.33	03/12	8.75	14.42	0	0.00			
	Total Wild		10.58	0	0.00					27.50	0	0.00	0.00	0.00%	20,200
03/16	7.42	13.33	5.92	0	0.00	03/15	18.25	03/16	7.25	13.00	1	0.08			
	13.50	18.25	4.75	0	0.00	03/16	18.42	03/17	6.83	12.42	1	0.08			
	Total Wild		10.67	0	0.00					25.42	2	0.08	-0.08	0.00%	18,800
03/25	6.50	13.00	6.50	0	0.00	03/24	18.92	03/25	2.50	7.58	0	0.00			
						03/25	2.67	03/25	6.33	3.67	1	0.27			
						03/25	18.83	03/26	0.83	6.00	0	0.00			
						03/26	1.00	03/26	6.25	5.25	0	0.00			
	Total Wild		6.50	0	0.00					22.50	1	0.04	-0.04	0.00%	20,700
04/01	9.42	19.00	9.58	0	0.00	03/31	19.00	04/01	3.08	8.08	1	0.12			
						04/01	19.17	04/02	6.00	10.83	4	0.37			
	Total Wild		9.58	0	0.00					18.92	5	0.26	-0.26	0.00%	21,000
04/04	8.17	13.17	5.00	0	0.00	04/03	18.58	04/04	8.00	13.42	4	0.30			
	13.33	18.83	5.50	0	0.00	04/04	19.00	04/05	7.17	12.17	3	0.25			
	Total Wild		10.50	0	0.00					25.58	7	0.27	-0.27	0.00%	18,700
04/10	7.33	12.25	4.92	0	0.00	04/09	20.08	04/10	7.17	11.08	3	0.27			
	12.42	20.33	7.92	0	0.00	04/10	20.50	04/11	0.25	3.75	0	0.00			
						04/11	0.42	04/11	6.75	6.33	4	0.63			
	Total Wild		12.83	0	0.00					21.17	7	0.33	-0.33	0.00%	15,100
05/06	7.33	13.25	5.92	23	3.89	05/05	21.08	05/06	1.50	4.42	118	26.72			
	13.42	20.33	6.92	52	7.52	05/06	1.67	05/06	7.17	5.50	177	32.18			
						05/06	20.50	05/06	23.50	3.00	87	29.00			
						05/06	23.67	05/07	6.17	6.50	109	16.77			
	Total Wild		12.83	75	5.84					19.42	491	25.29	-19.44	23.11%	32,700
05/16	5.17	6.25	1.08	18	16.62	05/15	21.22	05/15	22.22	1.00	4	4.00			
	6.42	7.58	1.17	23	19.71	05/16	22.25	05/17	1.00	2.75	16	5.82			
	7.67	8.75	1.08	13	12.00	05/17	1.25	05/18	5.25	4.00	42	10.50			
	8.83	10.17	1.33	3	2.25										
	Total Wild		4.67	57	12.21					7.75	62	8.00	4.21	152.68%	40,900
05/21	5.17	9.75	4.58	31	6.76	05/20	21.58	05/21	1.17	3.58	79	22.05			
	9.92	16.33	6.42	30	4.68	05/21	1.33	05/21	5.00	3.67	65	17.73			
						05/21	16.50	05/22	0.17	7.67	78	10.17			
						05/22	0.33	05/22	6.75	6.42	124	19.32			
	Total Wild		11.00	61	5.55					21.33	346	16.22	-10.67	34.19%	27,700
05/22	6.92	12.00	5.08	42	8.26	05/21	16.50	05/22	0.17	7.67	78	10.17			
						05/22	0.33	05/22	6.75	6.42	124	19.32			
						05/22	21.50	05/23	3.50	6.00	238	39.67			
						05/23	3.67	05/23	6.83	3.17	86	27.16			
	Total Wild		5.08	42	8.26					23.25	526	22.62	-14.36	36.52%	25,200
06/08	5.33	13.17	7.83	10	1.28	06/07	21.83	06/08	5.17	7.33	17	2.32			
	13.75	21.75	8.00	9	1.13	06/08	21.92	06/09	2.17	4.25	10	2.35			
						06/09	2.33	06/10	6.00	3.67	13	3.55			
	Total Wild		15.83	19	1.20					15.25	40	2.62	-1.42	45.75%	27,600
06/12	17.00	20.75	3.75	2	0.53	06/11	21.58	06/12	1.75	4.17	2	0.48			
						06/12	1.92	06/12	5.75	3.83	5	1.30			
						06/12	20.92	06/13	5.75	8.83	5	0.57			
	Total Wild		3.75	2	0.53					16.83	12	0.71	-0.18	74.81%	32,400
06/25	7.50	21.58	14.08	0	0.00	06/24	21.83	06/25	7.33	9.50	3	0.32			
						06/25	21.75	06/26	6.08	8.33	0	0.00			
	Total Wild		14.08	0	0.00					17.83	3	0.17	-0.17	0.00%	30,300
07/03	7.83	23.00	15.17	0	0.00	07/02	22.17	07/03	7.67	9.50	1	0.11			
						07/03	23.17	07/04	6.50	7.33	1	0.14			
	Total Wild		15.17	0	0.00					16.83	2	0.12	-0.12	0.00%	26,300
TOTAL WILD			53.17	256	4.82					103.83	1,477	14.22	-9.41	33.85%	10,400

Note: Total Wild only includes the dates when day or night catches >10.

Table 4b. Catch/hour rates of unmarked wild COHO smolts, during day and night periods, Skagit River SCREW trap, 1997.

Date	DAYTIME Start	End	Time Fished	Catch	Catch/ Hour	NIGHTTIME Start Date	Start Time	End Date	End Time	Time Fished	Catch	Catch/ Hour	DAY:NIGHT Diff (D-N)	Ratio (D/N)	Flow (cfs)
05/06	6.50	12.75	6.25	14	2.24	05/05	21.00	05/06	1.00	4.00	75	18.75			
	12.75	20.00	7.25	11	1.52	05/06	1.00	05/06	6.50	5.50	115	20.91			
						05/06	20.00	05/07	23.00	3.00	77	25.67			
						05/07	23.00	05/07	6.25	7.25	177	24.41			
	Total Wild		13.50	25	1.85					19.75	190	9.62	-7.77	19.25%	23,900
05/21	9.25	16.00	6.75	20	2.96	05/20	21.50	05/21	0.58	3.08	69	22.38			
						05/21	0.58	05/21	4.50	3.92	45	11.49			
						05/21	23.50	05/22	6.00	6.50	125	19.23			
	Total Wild		6.75	20	2.96					13.50	239	17.70	-14.74	16.74%	27,700
05/22	6.00	11.50	5.50	35	6.36	05/21	23.50	05/22	6.00	6.50	125	19.23			
						05/22	21.50	05/23	2.50	5.00	153	30.60			
						05/23	2.50	05/25	6.50	4.00	61	15.25			
	Total Wild		5.50	35	6.36					15.50	339	21.87	-15.51	29.10%	25,200
05/23	6.50	17.33	10.83	5	0.46	05/22	21.50	05/23	2.50	5.00	153	30.60			
						05/23	2.50	05/23	6.50	4.00	61	15.25			
						05/23	23.08	05/24	6.50	7.42	102	13.75			
	Total Wild		10.83	5	0.46					16.42	316	19.25	-18.79	2.40%	24,400
06/08	4.75	13.50	8.75	8	0.91	06/07	21.75	06/08	4.75	7.00	18	2.57			
	13.50	21.50	8.00	2	0.25	06/08	21.50	06/09	1.75	4.25	12	2.82			
						06/09	1.75	06/09	6.00	4.25	13	3.06			
	Total Wild		16.75	10	0.60					15.50	43	2.77	-2.18	21.52%	27,600
06/12	17.00	20.92	3.92	1	0.26	06/11	21.58	06/12	1.50	3.92	6	1.53			
						06/12	1.50	06/12	5.75	4.25	2	0.47			
						06/12	20.92	06/13	5.42	8.50	4	0.47			
	Total Wild		3.92	1	0.26					16.67	12	0.72	-0.46	35.46%	32,400
TOTAL WILD			57.25	96	1.68					97.33	1,139	11.70	-10.03	14.33%	26,900
Average					2.08							11.99	-13.28	17.37%	

Table 5. Estimation of wild coho smolt production, Skagit River, 1997.

	Number	Formula
Total mainstem trap catches	**13,108**	
Baker River	[a]-293	
Skagit Hatchery/Lake Shannon	[b]-696	
Subtotal	-989	
Wild coho captured (c)	**12,119**	$N = \frac{(m+1)(c+1)}{(r+1)}$
LVs recaptured (r)	494	
LVs released (m)	46,406	
Total production (N)	**1,136,268**	
Variance (Var)	2.4751e+09	$Var = \frac{(m+1)(c+1)(m-r)(c-r)}{(r+1)^2(r+1)}$
Standard deviation (sd)	49,750	
Coefficient of Var (CV)	4.38%	CV = sd ÷ N
Confidence interval (CI)	±97,510	CI = ± 1.96(sd)
Estimated coho production Skagit River	1,136,268	
Baker River	38,109	
Total Production	1,174,377	
Upper CI (95%)	1,271,887	
Lower CI (95%)	1,076,867	

[a] Estimated Baker recoveries: visually identified ad-marks (166) times the tag expansion factor (1.76) = 293 total tagged and unmarked Baker River smolts in the catch.

[b] Hatchery ad-marked and unmarked smolt total from counts obtained by visual identification at trapping (658 Skagit hatchery + 1 Lake Shannon pen fish + 37 brands from Baker Lake = 696).

Table 6. Projected wild LV-marked COHO smolt catch, based on NIGHT-FISHING ONLY, Skagit River mainstem scoop and screw traps, 1997.

Night of	Flow (cfs)	TOTAL HOURS Night	TOTAL HOURS Day	HOURS FISHED Scoop Actual	HOURS FISHED Scoop N-Only	HOURS FISHED Screw Actual	HOURS FISHED Screw N-Only	CATCH/HOUR Scoop	CATCH/HOUR Screw	PROJECTED NIGH CATCH Scoop	PROJECTED NIGH CATCH Screw	PROJECTED DAY CATCH Scoop	PROJECTED DAY CATCH Screw	Estimated Migration (@1.97%)
04/16	20,600	10.20	13.80	9.92	9.92	10.50	10.20	0	0	0	1	0	0	60
04/17	22,800	10.13	13.87	11.42	9.88	11.17	10.13	0	0	0	0	0	0	5
04/18	22,300	10.08	13.92	12.58	9.77	12.50	9.68	0	0	0	0	0	0	5
04/19	19,100	10.03	13.97	10.50	9.73	10.67	9.82	0	0	0	0	0	0	5
04/20	28,000	9.97	14.03	0.00	0.00	0.00	0.00	0	0	0	0	0	0	26
04/21	31,900	9.92	14.08	0.00	0.00	0.00	0.00	0	0	1	0	0	0	47
04/22	25,800	9.85	14.15	10.42	9.47	10.58	9.55	0	0	1	0	0	0	69
04/23	24,700	9.80	14.20	10.75	9.26	10.92	9.52	0	0	2	2	0	0	252
04/24	24,800	9.75	14.25	10.83	9.42	11.00	9.50	0	1	1	6	0	1	443
04/25	23,700	9.70	14.30	11.25	9.05	11.17	9.13	1	1	6	7	0	1	743
04/26	22,300	9.63	14.37	11.67	9.43	11.58	9.52	0	1	1	6	0	1	409
04/27	26,400	9.58	14.42	10.42	9.32	10.75	9.40	1	1	6	8	3	2	967
04/28	28,400	9.53	14.47	10.75	9.13	11.08	9.38	0	2	4	17	3	6	1,531
04/29	26,700	9.48	14.52	10.75	9.10	11.08	9.35	1	0	5	4	2	1	644
04/30	23,800	9.43	14.57	9.25	9.06	10.17	9.32	0	1	3	5	0	1	468
05/01	26,300	9.38	14.62	9.25	8.80	9.83	9.13	1	1	12	7	5	2	1,329
05/02	24,400	9.33	14.67	9.30	8.93	9.58	9.18	1	1	8	9	2	2	1,065
05/03	22,800	9.27	14.73	9.58	8.81	9.92	9.07	1	1	7	13	0	2	1,147
05/04	23,200	9.23	14.77	9.50	8.71	9.75	8.97	1	1	6	11	0	2	985
05/05	22,100	9.17	14.83	9.92	8.43	9.50	8.68	1	1	8	5	0	1	710
05/06	23,900	9.13	14.87	9.50	8.96	10.25	9.13	1	2	10	17	0	4	1,578
05/07	25,500	9.08	14.92	9.50	8.46	9.67	8.80	0	0	3	4	1	1	474
05/08	24,500	9.03	14.97	9.67	8.78	10.00	8.95	1	1	6	8	1	2	890
05/09	24,600	8.98	15.02	11.42	8.50	5.42	5.42	2	1	15	12	4	3	1,713
05/10	26,600	8.95	15.05	10.25	7.81	4.83	4.83	2	1	15	11	7	4	1,886
05/11	28,400	8.90	15.10	8.58	8.28	8.58	8.37	1	2	11	18	8	7	2,248
05/12	32,500	8.85	15.15	0.00	0.00	0.00	0.00	0	0	10	17	8	8	2,157
05/13	36,600	8.80	15.20	0.00	0.00	0.00	0.00	0	0	8	16	9	8	2,066
05/14	39,500	8.75	15.25	2.50	1.00	0.00	0.00	0	0	7	15	9	8	1,975
05/15	40,700	8.72	15.28	1.00	1.00	0.00	0.00	0	0	5	14	10	8	1,884
05/16	40,900	8.68	15.32	7.75	7.75	0.00	0.00	1	0	4	13	10	8	1,793
05/17	39,300	8.62	15.38	8.25	7.98	0.00	0.00	0	0	2	12	5	8	1,348
05/18	34,500	8.58	15.42	9.25	8.13	9.50	8.30	1	1	9	11	15	8	2,167
05/19	30,600	8.55	15.45	9.08	7.87	9.33	8.12	1	1	9	11	9	6	1,767
05/20	29,400	8.50	15.50	7.25	7.25	7.00	7.00	1	1	5	5	4	2	844
05/21	27,700	8.47	15.53	14.08	8.30	6.50	5.83	1	2	11	19	8	8	2,316
05/22	25,200	8.43	15.57	9.17	7.65	9.00	7.82	1	2	10	15	3	5	1,691
05/23	24,400	8.40	15.60	12.83	8.23	7.42	6.22	1	0	11	4	3	1	961
05/24	24,200	8.37	15.63	8.58	7.37	8.67	7.45	1	1	12	8	3	2	1,267
05/25	23,800	8.33	15.67	9.42	8.01	9.67	8.18	1	1	9	6	0	2	850
05/26	23,900	8.28	15.72	9.00	7.25	9.50	7.58	1	1	7	7	0	2	807
05/27	24,600	8.25	15.75	8.67	7.65	8.83	7.73	1	0	4	3	1	1	466
05/28	25,700	8.22	15.78	8.17	7.80	8.42	7.97	0	0	1	1	0	0	143
05/29	29,200	8.20	15.80	8.92	7.64	9.00	7.97	0	0	2	1	2	1	280
05/30	33,700	8.17	15.83	8.17	7.53	8.50	7.70	0	0	1	1	2	1	226
05/31	40,300	8.13	15.87	0.00	0.00	0.00	0.00	0	0	1	1	2	1	213
06/01	51,700	8.12	15.88	0.00	0.00	0.00	0.00	0	0	1	1	2	0	199
06/02	43,300	8.08	15.92	0.00	0.00	0.00	0.00	0	0	1	0	2	0	186
06/03	35,000	8.07	15.93	8.00	6.98	0.00	0.00	0	0	1	0	2	0	173
06/04	36,500	8.05	15.95	7.08	7.08	7.50	7.50	0	0	0	0	0	0	0
06/05	37,200	8.02	15.98	9.67	6.80	9.75	6.88	0	0	1	1	2	1	281
06/06	32,700	8.00	16.00	9.08	7.21	9.67	7.47	0	0	2	1	3	1	355
06/07	28,600	7.98	16.02	7.33	7.30	7.00	7.00	0	0	0	2	0	1	160
06/08	27,600	7.97	16.03	7.92	7.03	8.50	7.62	0	0	0	0	0	0	0
06/09	26,900	7.95	16.05	9.67	7.79	9.75	7.87	0	0	1	0	1	0	84
06/10	27,500	7.93	16.07	8.92	7.04	0.00		0		0		0		5
06/11	30,300	7.92	16.08	8.00	7.35	0.00		0		1		0		56
Average	28,905													
Projected										267	356	153	134	46,419
Actual										222	244			

Note: One additional LV-mark was caught in the scoop trap on the night of July 2, but was not included in this estimate.

Gear	CATCH Actual	CATCH Proj.	Total LV Release	TRAP EFF Actual	TRAP EFF Proj
Scoop	229	420		0.49%	0.91%
Screw	265	490		0.57%	1.06%
Total	494	910	46,406	1.06%	1.96%

Table 7. Estimated hatchery breakdown of ad-marked 0+ chinook captured in the Skagit River mainstem traps, 1997.

Date	AD-MARKED CATCH Screw	Scoop	Total	ESTIMATED ADMKS By Average Sk-Hatch	Countyline
05/12/97	0	0	0	0	0
05/14/97	0	2	2	2	0
05/15/97	0	0	0	0	0
05/16/97	8	131	139	139	0
05/17/97	0	102	102	102	0
05/18/97	88	91	179	179	0
05/19/97	58	72	130	130	0
05/20/97	60	54	114	114	0
05/21/97	117	173	290	290	0
05/22/97	33	75	108	108	0
05/23/97	43	99	142	142	0
05/24/97	14	42	56	56	0
05/25/97	14	27	41	41	0
05/26/97	15	21	36	36	0
05/27/97	19	23	42	42	0
05/28/97	11	29	40	40	0
05/29/97	10	21	31	31	0
05/30/97	26	13	39	39	0
05/31/97	10	5	15	15	0
06/03/97	0	1	1	1	0
06/04/97	1	6	7	5	2
06/05/97	5	2	7	5	2
06/06/97	6	9	15	10	5
06/07/97	6	12	18	12	6
06/08/97	26	37	63	41	22
06/09/97	9	10	19	12	7
06/10/97	10	8	18	12	6
06/11/97	9	4	13	9	4
06/12/97	3	2	5	3	2
06/13/97	4	3	7	5	2
06/14/97	6	3	9	6	3
06/15/97	7	3	10	7	3
06/16/97	4	2	6	4	2
06/22/97	3	1	4	3	1
06/23/97	3	4	7	5	2
06/24/97	2	1	3	2	1
06/25/97	3	1	4	3	1
06/26/97	0	1	1	1	0
06/27/97	2	2	4	3	1
06/28/97	1	7	8	5	3
06/29/97	1	1	2	1	1
06/30/97	2	1	3	2	1
07/01/97	0	2	2	1	1
07/02/97	0	1	1	1	0
07/03/97	0	0	0	0	0
07/04/97	1	1	2	1	1
07/05/97	0	0	0	0	0
07/06/97	0	0	0	0	0
07/07/97	1	0	1	1	0
07/08/97	0	2	2	1	1
07/13/97	1	2	3	2	1
07/14/97	2	5	7	5	2

Table 7. Estimated hatchery breakdown of ad-marked 0+ chinook captured in the Skagit River mainstem traps, 1997.

Date	AD-MARKED CATCH Screw	Scoop	Total	ESTIMATED ADMKS By Average Sk-Hatch	Countyline
07/15/97	5	4	9	6	3
07/16/97	2	4	6	4	2
07/17/97	2	1	3	2	1
07/18/97	3	3	6	4	2
07/19/97	1	1	2	1	1
07/20/97	2	1	3	2	1
07/21/97	6	3	9	6	3
07/22/97	2	4	6	4	2
07/23/97	2	4	6	4	2
07/24/97	1	2	3	2	1
07/25/97	2	0	2	1	1
07/26/97	0	1	1	1	0
07/27/97	1	2	3	2	1
07/28/97	0	3	3	2	1
07/29/97	2	0	2	1	1
07/30/97	1	3	4	3	1
07/31/97	2	5	7	5	2
08/01/97	3	1	4	3	1
08/02/97	0	0	0	0	0
08/03/97	0	0	0	0	0
08/04/97	0	0	0	0	0
08/05/97	0	1	1	1	0
08/06/97	1	3	4	3	1
08/07/97	1	1	2	1	1
08/08/97	1	0	1	1	0
08/09/97	0	0	0	0	0
08/10/97	0	0	0	0	0
08/11/97	0	0	0	0	0
08/12/97	0	0	0	0	0
08/13/97	0	0	0	0	0
08/14/97	0	0	0	0	0
08/15/97	0	1	1	1	0
08/16/97	0	1	1	1	0
Early	526	980	1,506	1,506	0
Late	158	183	341	230	111
Season	684	1,163	1,847	1,736	111

Note: Ad-mark breakdown uses 66% for Skagit Hatchery smolts, and 34% for chinook from the Countyline Ponds.

Table 8. Breakdown of CWT recoveries from ad-marked chinook sacrificed at the Skagit River mainstem scoop and screw traps, 1997.

Date	Gear Type	NUMBER SAMPLED Heads	No Tags	Tags	63-03/22 #	%	63-43/29 #	%	63-53/23 #	%
06/05	screw	1	0	1	1	100%		0%		0%
06/06	screw	2	0	2	1	50%		0%	1	50%
06/06	scoop	2	0	2	1	50%		0%	1	50%
		4	0	4	2	50%	0	0%	2	50%
06/07	screw	2	0	2		0%		0%	2	100%
06/07	scoop	2	0	2		0%		0%	2	100%
		4	0	4	0	0%	0	0%	4	100%
06/08	screw	4	0	4		0%		0%	4	100%
06/08	scoop	7	0	7	1	14%		0%	6	86%
		11	0	11	1	9%	0	0%	10	91%
06/09	screw	5	0	5	2	40%		0%	3	60%
06/09	scoop	3	0	3		0%		0%	3	100%
		8	0	8	2	25%	0	0%	6	75%
06/10	screw	1	0	1		0%		0%	1	100%
06/11	screw	5	3	2	1	50%	1	50%		0%
06/11	scoop	1	0	1		0%		0%	1	100%
		6	3	3	1	33%	1	33%	1	33%
06/13	screw	1	0	1		0%		0%	1	100%
06/13	scoop	1	0	1		0%		0%	1	100%
		2	0	2	0	0%	0	0%	2	100%
06/14	screw	1	0	1	1	100%		0%		0%
06/15	screw	2	0	2	1	50%		0%	1	50%
06/15	scoop	1	0	1		0%		0%	1	100%
		3	0	3	1	33%	0	0%	2	67%
06/16	screw	1	0	1		0%		0%	1	100%
06/16	scoop	1	0	1		0%	1	100%		0%
		2	0	2	0	0%	1	50%	1	50%
06/23	screw	1	0	1		0%		0%	1	100%
06/25	scoop	1	0	1		0%		0%	1	100%
06/25	screw	1	0	1	1	100%		0%		0%
		2	0	2	1	50%	0	0%	1	50%
06/27	screw	1	0	1		0%		0%	1	100%
06/28	scoop	1	0	1		0%		0%	1	100%
06/29	scoop	1	0	1		0%	1	100%		0%
07/02	scoop	1	0	1		0%		0%	1	100%
07/04	scoop	1	0	1	1	100%		0%		0%
07/16	scoop	2	0	2	1	50%	1	50%		0%
07/21	scoop	1	0	1	1	100%		0%		0%
07/23	screw	1	0	1		0%		0%	1	100%
07/25	screw	2	0	2	2	100%		0%		0%
07/30	scoop	1	0	1	1	100%		0%		0%
08/01	screw	1	0	1		0%		0%	1	100%
08/08	screw	1	0	1		0%		0%	1	100%
08/08	scoop	1	0	1		0%		0%	1	100%
		2	0	2	0	0%	0	0%	2	100%
Total		61	3	58	16	28%	4	7%	38	66%

Note: **Countyline (summer)** 63-03/22
Countyline (summer) 63-43/29
Skagit Hatchery (spring) 63-53/23

Table 9a. Projected wild CHINOOK 0+ outmigrants captured in the Skagit River SCOOP trap, 1997.

Date	Hours Trapped	CHIN 0+ CATCH Total	Unmk	Admk	CATCH RATE Unmk	Admk	PROJ. CATCH Unmk	Admk	CUMM MIGRATION Unmk	Admk
02/14	10.67	8	8	0	0.75	0.00	18	0	0.03%	0.00%
02/15	7.17	13	13	0	1.81	0.00	44	0	0.10%	0.00%
02/16	6.42	50	50	0	7.79	0.00	187	0	0.39%	0.00%
02/17	7.33	6	6	0	0.82	0.00	20	0	0.42%	0.00%
02/18	6.33	21	21	0	3.32	0.00	80	0	0.54%	0.00%
02/19	12.50	49	49	0	3.92	0.00	94	0	0.69%	0.00%
02/20	5.92	14	14	0	2.37	0.00	57	0	0.77%	0.00%
02/21	13.33	41	41	0	3.08	0.00	74	0	0.89%	0.00%
02/22	13.33	36	36	0	2.70	0.00	65	0	0.99%	0.00%
02/23	13.33	44	44	0	3.30	0.00	79	0	1.11%	0.00%
02/24	23.25	67	67	0	2.88	0.00	69	0	1.22%	0.00%
02/25	13.33	42	42	0	3.15	0.00	76	0	1.34%	0.00%
02/26	14.33	72	72	0	5.02	0.00	121	0	1.52%	0.00%
02/27	14.00	71	71	0	5.07	0.00	122	0	1.71%	0.00%
02/28	23.67	83	83	0	3.51	0.00	84	0	1.84%	0.00%
03/01	13.67	66	66	0	4.83	0.00	116	0	2.02%	0.00%
03/02	13.83	92	92	0	6.65	0.00	160	0	2.27%	0.00%
03/03	13.67	61	61	0	4.46	0.00	107	0	2.44%	0.00%
03/04	14.08	57	57	0	4.05	0.00	97	0	2.59%	0.00%
03/05	13.42	62	62	0	4.62	0.00	111	0	2.76%	0.00%
03/06	23.67	142	142	0	6.00	0.00	144	0	2.98%	0.00%
03/07	10.83	104	104	0	9.60	0.00	230	0	3.34%	0.00%
03/08	11.83	66	66	0	5.58	0.00	134	0	3.55%	0.00%
03/09	13.17	215	215	0	16.33	0.00	392	0	4.15%	0.00%
03/10	13.25	263	263	0	19.85	0.00	476	0	4.89%	0.00%
03/11	23.58	196	196	0	8.31	0.00	199	0	5.20%	0.00%
03/12	14.25	172	172	0	12.07	0.00	290	0	5.65%	0.00%
03/13	13.17	137	137	0	10.41	0.00	250	0	6.04%	0.00%
03/14	12.58	105	105	0	8.34	0.00	200	0	6.35%	0.00%
03/15	13.00	163	163	0	12.54	0.00	301	0	6.81%	0.00%
03/16	23.50	395	395	0	16.81	0.00	403	0	7.44%	0.00%
03/17	12.58	108	108	0	8.58	0.00	206	0	7.76%	0.00%
03/18	11.25	293	293	0	26.04	0.00	625	0	8.72%	0.00%
03/19							696		9.80%	0.00%
03/20							767		10.99%	0.00%
03/21							838		12.29%	0.00%
03/22							909		13.70%	0.00%
03/23	5.50	225	225	0	40.91	0.00	982	0	15.22%	0.00%
03/24	11.08	417	417	0	37.62	0.00	903	0	16.62%	0.00%
03/25	17.83	409	409	0	22.93	0.00	550	0	17.47%	0.00%
03/26	11.08	305	305	0	27.52	0.00	660	0	18.49%	0.00%
03/27	10.92	352	352	0	32.24	0.00	774	0	19.69%	0.00%
03/28	11.08	218	218	0	19.67	0.00	472	0	20.42%	0.00%
03/29	11.52	266	266	0	23.10	0.00	554	0	21.26%	0.00%
03/30	13.00	236	236	0	18.15	0.00	436	0	21.96%	0.00%
03/31	11.83	202	202	0	17.07	0.00	410	0	22.59%	0.00%
04/01	23.50	338	338	0	14.38	0.00	345	0	23.13%	0.00%
04/02	11.17	194	194	0	17.37	0.00	417	0	23.77%	0.00%
04/03	12.83	229	229	0	17.84	0.00	428	0	24.43%	0.00%
04/04	23.50	299	299	0	12.72	0.00	305	0	24.91%	0.00%
04/05	12.17	100	100	0	8.22	0.00	197	0	25.21%	0.00%
04/06	13.42	134	134	0	9.99	0.00	240	0	25.58%	0.00%
04/07	13.33	161	161	0	12.08	0.00	290	0	26.03%	0.00%

Table 9a. Projected wild CHINOOK 0+ outmigrants captured in the Skagit River SCOOP trap, 1997.

Date	Hours Trapped	CHIN 0+ CATCH Total	Unmk	Admk	CATCH RATE Unmk	Admk	PROJ. CATCH Unmk	Admk	CUMM MIGRATION Unmk	Admk
04/08	13.33	142	142	0	10.65	0.00	256	0	26.43%	0.00%
04/09	11.92	169	169	0	14.18	0.00	340	0	26.96%	0.00%
04/10	23.50	260	260	0	11.06	0.00	266	0	27.37%	0.00%
04/11	10.33	160	160	0	15.48	0.00	372	0	27.95%	0.00%
04/12	12.33	166	166	0	13.46	0.00	323	0	28.45%	0.00%
04/13	10.92	182	182	0	16.67	0.00	400	0	29.07%	0.00%
04/14	11.50	244	244	0	21.22	0.00	509	0	29.85%	0.00%
04/15	11.67	274	274	0	23.49	0.00	564	0	30.73%	0.00%
04/16	11.92	315	315	0	26.43	0.00	634	0	31.71%	0.00%
04/17	9.67	353	353	0	36.52	0.00	876	0	33.07%	0.00%
04/18	11.33	402	402	0	35.47	0.00	851	0	34.39%	0.00%
04/19	12.58	328	328	0	26.07	0.00	626	0	35.36%	0.00%
04/20	6.92	233	233	0	33.69	0.00	808	0	36.61%	0.00%
04/21							688		37.67%	0.00%
04/22	8.08	191	191	0	23.63	0.00	567	0	38.55%	0.00%
04/23	10.42	261	261	0	25.06	0.00	601	0	39.48%	0.00%
04/24	10.75	344	344	0	32.00	0.00	768	0	40.67%	0.00%
04/25	10.50	355	355	0	33.81	0.00	811	0	41.93%	0.00%
04/26	11.67	452	452	0	38.74	0.00	930	0	43.37%	0.00%
04/27	11.58	430	430	0	37.12	0.00	891	0	44.75%	0.00%
04/28	10.42	311	311	0	29.86	0.00	717	0	45.86%	0.00%
04/29	10.75	409	409	0	38.05	0.00	913	0	47.28%	0.00%
04/30	10.75	417	417	0	38.79	0.00	931	0	48.72%	0.00%
05/01	8.83	358	358	0	40.53	0.00	973	0	50.23%	0.00%
05/02	9.58	238	238	0	24.83	0.00	596	0	51.15%	0.00%
05/03	9.05	187	187	0	20.66	0.00	496	0	51.92%	0.00%
05/04	9.67	192	192	0	19.86	0.00	477	0	52.66%	0.00%
05/05	9.25	174	174	0	18.81	0.00	451	0	53.35%	0.00%
05/06	23.17	348	348	0	15.02	0.00	361	0	53.91%	0.00%
05/07	9.00	250	250	0	27.78	0.00	667	0	54.95%	0.00%
05/08	10.00	175	175	0	17.50	0.00	420	0	55.60%	0.00%
05/09	9.42	159	159	0	16.88	0.00	405	0	56.23%	0.00%
05/10	10.75	250	250	0	23.26	0.00	558	0	57.09%	0.00%
05/11	10.58	288	288	0	27.21	0.00	653	0	58.10%	0.00%
05/12	5.83	184	184	0	31.54	0.00	757	0	59.27%	0.00%
05/13							499		60.05%	0.00%
05/14	2.00	22	20	2	10.00	1.00	240	24	60.42%	0.80%
05/15	3.00	37	37	0	12.33	0.00	296	257	60.88%	9.39%
05/16	6.42	231	100	131	15.58	20.42	374	490	61.46%	25.75%
05/17	11.25	181	79	102	7.02	9.07	169	218	61.72%	33.03%
05/18	12.08	222	131	91	10.84	7.53	260	181	62.12%	39.08%
05/19	9.08	268	196	72	21.58	7.93	518	190	62.92%	45.42%
05/20	8.75	314	260	54	29.71	6.17	713	148	64.03%	50.37%
05/21	23.33	620	447	173	19.16	7.41	460	178	64.74%	56.31%
05/22	14.17	348	273	75	19.27	5.29	462	127	65.46%	60.55%
05/23	16.67	497	398	99	23.88	5.94	573	143	66.35%	65.33%
05/24	8.58	319	277	42	32.27	4.89	775	117	67.55%	69.24%
05/25	9.42	282	255	27	27.08	2.87	650	69	68.55%	71.54%
05/26	8.67	213	192	21	22.15	2.42	532	58	69.38%	73.48%
05/27	9.33	229	206	23	22.07	2.46	530	59	70.20%	75.45%
05/28	8.83	188	159	29	18.00	3.28	432	79	70.87%	78.09%
05/29	8.25	177	156	21	18.91	2.55	454	61	71.57%	80.13%
05/30	8.50	239	226	13	26.59	1.53	638	37	72.56%	81.36%

Table 9a. Projected wild CHINOOK 0+ outmigrants captured in the Skagit River SCOOP trap, 1997.

Date	Hours Trapped	CHIN 0+ CATCH Total	Unmk	Admk	CATCH RATE Unmk	Admk	PROJ. CATCH Unmk	Admk	CUMM MIGRATION Unmk	Admk
05/31	5.67	137	132	5	23.29	0.88	559	21	73.43%	82.06%
06/01							549	18	74.28%	82.67%
06/02							539	15	75.11%	83.17%
06/03	2.00	45	44	1	22.00	0.50	528	12	75.93%	83.57%
06/04	8.50	193	187	6	22.00	0.71	528	17	76.75%	84.13%
06/05	6.25	73	71	2	11.36	0.32	273	8	77.17%	84.40%
06/06	10.25	180	171	9	16.68	0.88	400	21	77.79%	85.10%
06/07	9.00	305	293	12	32.56	1.33	781	32	79.00%	86.17%
06/08	23.08	819	782	37	33.88	1.60	813	38	80.26%	87.44%
06/09	8.58	254	244	10	28.43	1.17	682	28	81.32%	88.38%
06/10	8.92	250	242	8	27.14	0.90	651	22	82.32%	89.11%
06/11	9.33	209	205	4	21.96	0.43	527	10	83.14%	89.45%
06/12	12.42	150	148	2	11.92	0.16	286	4	83.58%	89.58%
06/13	8.08	104	101	3	12.49	0.37	300	9	84.05%	89.88%
06/14	8.00	171	168	3	21.00	0.38	504	9	84.83%	90.18%
06/15	8.08	212	209	3	25.86	0.37	621	9	85.79%	90.48%
06/16	6.50	80	78	2	12.00	0.31	288	7	86.24%	90.71%
06/17							291	6	86.69%	90.92%
06/18							294	5	87.14%	91.08%
06/19							297	4	87.60%	91.22%
06/20							300	3	88.07%	91.32%
06/21							303	2	88.54%	91.38%
06/22	11.17	143	142	1	12.72	0.09	305	2	89.01%	91.45%
06/23	10.00	129	125	4	12.50	0.40	300	10	89.48%	91.78%
06/24	7.33	65	64	1	8.73	0.14	209	3	89.80%	91.88%
06/25	23.67	181	180	1	7.61	0.04	183	1	90.08%	91.92%
06/26	8.17	94	93	1	11.39	0.12	273	3	90.51%	92.02%
06/27	9.50	83	81	2	8.53	0.21	205	5	90.82%	92.18%
06/28	23.42	255	248	7	10.59	0.30	254	7	91.22%	92.42%
06/29	9.83	88	87	1	8.85	0.10	212	2	91.55%	92.48%
06/30	11.00	98	97	1	8.82	0.09	212	2	91.87%	92.55%
07/01	9.92	57	55	2	5.55	0.20	133	5	92.08%	92.72%
07/02	7.50	48	47	1	6.27	0.13	150	3	92.31%	92.82%
07/03	23.67	98	98	0	4.14	0.00	99	4	92.47%	92.95%
07/04	6.50	34	33	1	5.08	0.15	122	4	92.65%	93.09%
07/05	2.00	8	8	0	4.00	0.00	96	4	92.80%	93.22%
07/06	7.00	26	26	0	3.71	0.00	89	4	92.94%	93.35%
07/07	8.50	32	32	0	3.76	0.00	90	4	93.08%	93.49%
07/08	9.17	27	25	2	2.73	0.22	65	5	93.18%	93.65%
07/09							123	8	93.37%	93.92%
07/10							181	11	93.65%	94.29%
07/11							239	14	94.02%	94.76%
07/12							297	17	94.48%	95.32%
07/13	2.17	34	32	2	14.77	0.92	354	22	95.03%	96.06%
07/14	8.00	121	116	5	14.50	0.63	348	15	95.57%	96.56%
07/15	9.00	111	107	4	11.89	0.44	285	11	96.01%	96.93%
07/16	23.67	213	209	4	8.83	0.17	212	4	96.34%	97.06%
07/17	10.25	68	67	1	6.54	0.10	157	2	96.58%	97.13%
07/18	9.42	61	58	3	6.16	0.32	148	8	96.81%	97.39%
07/19	9.00	40	39	1	4.33	0.11	104	3	96.97%	97.49%
07/20	11.00	40	39	1	3.55	0.09	85	2	97.11%	97.56%
07/21	23.67	132	129	3	5.45	0.13	131	3	97.31%	97.66%
07/22	23.83	80	76	4	3.19	0.17	77	4	97.43%	97.80%

Table 9a. Projected wild CHINOOK 0+ outmigrants captured in the Skagit River SCOOP trap, 1997.

Date	Hours Trapped	CHIN 0+ CATCH Total	Unmk	Admk	CATCH RATE Unmk	Admk	PROJ. CATCH Unmk	Admk	CUMM MIGRATION Unmk	Admk
07/23	23.67	90	86	4	3.63	0.17	87	4	97.56%	97.93%
07/24	9.83	45	43	2	4.37	0.20	105	5	97.73%	98.10%
07/25	8.33	24	24	0	2.88	0.00	69	8	97.83%	98.36%
07/26	2.50	5	4	1	1.60	0.40	38	10	97.89%	98.70%
07/27	7.25	16	14	2	1.93	0.28	46	7	97.96%	98.93%
07/28	23.67	59	56	3	2.37	0.13	57	3	98.05%	99.03%
07/29	11.00	35	35	0	3.18	0.00	76	3	98.17%	99.13%
07/30	23.67	54	51	3	2.15	0.13	52	3	98.25%	99.23%
07/31	23.67	94	89	5	3.76	0.21	90	5	98.39%	99.40%
08/01	23.67	62	61	1	2.58	0.04	62	1	98.48%	99.43%
08/02	11.25	18	18	0	1.60	0.00	38	1	98.54%	99.47%
08/03	23.67	49	49	0	2.07	0.00	50	1	98.62%	99.50%
08/04	23.67	45	45	0	1.90	0.00	46	1	98.69%	99.53%
08/05	23.75	81	80	1	3.37	0.04	81	1	98.82%	99.57%
08/06	23.67	117	114	3	4.82	0.13	116	3	99.00%	99.67%
08/07	23.67	181	180	1	7.61	0.04	183	1	99.28%	99.70%
08/08	23.67	119	119	0	5.03	0.00	121	1	99.47%	99.73%
08/09	23.75	95	95	0	4.00	0.00	96	1	99.62%	99.77%
08/10	23.75	37	37	0	1.56	0.00	37	1	99.67%	99.80%
08/11	23.67	12	12	0	0.51	0.00	12	1	99.69%	99.83%
08/12	23.67	11	11	0	0.46	0.00	11	1	99.71%	99.87%
08/13	23.67	13	13	0	0.55	0.00	13	1	99.73%	99.90%
08/14	23.67	16	16	0	0.68	0.00	16	1	99.76%	99.93%
08/15	23.58	14	13	1	0.55	0.04	13	1	99.78%	99.97%
08/16	23.67	33	32	1	1.35	0.04	32	1	99.82%	100.00%
08/17	23.75	10	10	0	0.42	0.00	10	0	99.84%	100.00%
08/18	23.75	11	11	0	0.46	0.00	11	0	99.86%	100.00%
08/19	23.67	13	13	0	0.55	0.00	13	0	99.88%	100.00%
08/20	23.67	10	10	0	0.42	0.00	10	0	99.89%	100.00%
08/21	23.67	11	11	0	0.46	0.00	11	0	99.91%	100.00%
08/22	23.70	10	10	0	0.42	0.00	10	0	99.93%	100.00%
08/23	23.60	2	2	0	0.08	0.00	2	0	99.93%	100.00%
08/24	23.43	6	6	0	0.26	0.00	6	0	99.94%	100.00%
08/25	23.63	6	6	0	0.25	0.00	6	0	99.95%	100.00%
08/26	23.60	0	0	0	0.00	0.00	5		99.96%	100.00%
08/27	23.57	4	4	0	0.17	0.00	4	0	99.96%	100.00%
08/28	23.33	7	7	0	0.30	0.00	7	0	99.97%	100.00%
08/29	23.68	1	1	0	0.04	0.00	1	0	99.97%	100.00%
08/30	23.70	2	2	0	0.08	0.00	2	0	99.98%	100.00%
08/31	23.67	1	1	0	0.04	0.00	1	0	99.98%	100.00%
09/01	23.67	0	0	0	0.00	0.00	1	0	99.98%	100.00%
09/02	23.33	0	0	0	0.00	0.00	1	0	99.98%	100.00%
09/03	23.67	2	2	0	0.08	0.00	2	0	99.98%	100.00%
09/04	23.50	0	0	0	0.00	0.00	2	0	99.99%	100.00%
09/05	23.67	2	2	0	0.08	0.00	2	0	99.99%	100.00%
09/06	8.50	0	0	0	0.00	0.00	2	0	99.99%	100.00%
09/07	11.33	1	1	0	0.09	0.00	2	0	100.00%	100.00%
09/08	23.33	1	1	0	0.04	0.00	1	0	100.00%	100.00%
09/09	23.67	1	1	0	0.04	0.00	1	0	100.00%	100.00%
09/10	16.97	0	0	0	0.00	0.00	0	0	100.00%	100.00%
Total	2,719.37	27,961	26,798	1,163	9.85	0.43	64,547	2,994		
Apr-Jun	904.97	19,361	18,260	1,101	20.18	1.22	44,720	2,771		

Table 9b. Projected wild 0+ CHINOOK outmigrants captured in the Skagit River SCREW trap, 1997.

Date	Hours Trapped	CHIN 0+ CATCH Total	Unmk	Admk	CATCH RATE Unmk	Admk	PROJ. CATCH Unmk	Admk	CUMM MIGRATION Unmk	Admk
02/14	10.75	19	19	0	1.77	0.00	42	0	0.08%	0.00%
02/15	7.17	23	23	0	3.21	0.00	77	0	0.23%	0.00%
02/16	6.42	8	8	0	1.25	0.00	30	0	0.29%	0.00%
02/17	7.50	14	14	0	1.87	0.00	45	0	0.38%	0.00%
02/18	6.50	26	26	0	4.00	0.00	96	0	0.57%	0.00%
02/19	12.33	50	50	0	4.05	0.00	97	0	0.76%	0.00%
02/20	6.00	24	24	0	4.00	0.00	96	0	0.95%	0.00%
02/21	13.42	30	30	0	2.24	0.00	54	0	1.06%	0.00%
02/22	13.25	32	32	0	2.42	0.00	58	0	1.17%	0.00%
02/23	13.83	64	64	0	4.63	0.00	111	0	1.39%	0.00%
02/24	24.00	70	70	0	2.92	0.00	70	0	1.53%	0.00%
02/25	13.33	38	38	0	2.85	0.00	68	0	1.66%	0.00%
02/26	14.50	45	45	0	3.10	0.00	74	0	1.81%	0.00%
02/27	13.92	56	56	0	4.02	0.00	97	0	2.00%	0.00%
02/28	24.00	78	78	0	3.25	0.00	78	0	2.16%	0.00%
03/01	13.83	78	78	0	5.64	0.00	135	0	2.42%	0.00%
03/02	13.92	97	97	0	6.97	0.00	167	0	2.75%	0.00%
03/03	13.75	53	53	0	3.85	0.00	93	0	2.93%	0.00%
03/04	14.08	52	52	0	3.69	0.00	89	0	3.11%	0.00%
03/05	13.50	61	61	0	4.52	0.00	108	0	3.32%	0.00%
03/06	24.00	141	141	0	5.88	0.00	141	0	3.60%	0.00%
03/07	18.17	193	193	0	10.62	0.00	255	0	4.10%	0.00%
03/08	11.50	54	54	0	4.70	0.00	113	0	4.33%	0.00%
03/09	13.00	109	109	0	8.38	0.00	201	0	4.72%	0.00%
03/10	13.17	167	167	0	12.68	0.00	304	0	5.32%	0.00%
03/11	24.00	233	233	0	9.71	0.00	233	0	5.78%	0.00%
03/12	13.92	115	115	0	8.26	0.00	198	0	6.17%	0.00%
03/13	13.25	120	120	0	9.06	0.00	217	0	6.60%	0.00%
03/14	12.42	97	97	0	7.81	0.00	187	0	6.97%	0.00%
03/15	13.17	107	107	0	8.13	0.00	195	0	7.35%	0.00%
03/16	24.00	270	270	0	11.25	0.00	270	0	7.88%	0.00%
03/17	12.58	106	106	0	8.42	0.00	202	0	8.28%	0.00%
03/18	11.58	212	212	0	18.30	0.00	439	0	9.15%	0.00%
03/19							570		10.27%	0.00%
03/20							701		11.65%	0.00%
03/21							832		13.30%	0.00%
03/22							963		15.19%	0.00%
03/23	5.33	243	243	0	45.56	0.00	1,094	0	17.35%	0.00%
03/24	11.33	469	469	0	41.38	0.00	993	0	19.31%	0.00%
03/25	18.08	481	481	0	26.60	0.00	638	0	20.57%	0.00%
03/26	11.42	263	263	0	23.04	0.00	553	0	21.66%	0.00%
03/27	11.25	311	311	0	27.64	0.00	663	0	22.96%	0.00%
03/28	11.25	190	190	0	16.89	0.00	405	0	23.76%	0.00%
03/29	11.92	257	257	0	21.57	0.00	518	0	24.78%	0.00%
03/30	13.00	287	287	0	22.08	0.00	530	0	25.83%	0.00%
03/31	12.00	168	168	0	14.00	0.00	336	0	26.49%	0.00%
04/01	24.00	245	245	0	10.21	0.00	245	0	26.97%	0.00%
04/02	11.33	162	162	0	14.29	0.00	343	0	27.65%	0.00%
04/03	13.00	198	198	0	15.23	0.00	366	0	28.37%	0.00%
04/04	24.00	331	331	0	13.79	0.00	331	0	29.03%	0.00%
04/05	12.25	108	108	0	8.82	0.00	212	0	29.44%	0.00%
04/06	13.58	110	110	0	8.10	0.00	194	0	29.83%	0.00%
04/07	13.50	141	141	0	10.44	0.00	251	0	30.32%	0.00%

Table 9b. Projected wild 0+ CHINOOK outmigrants captured in the Skagit River SCREW trap, 1997.

Date	Hours Trapped	CHIN 0+ CATCH Total	Unmk	Admk	CATCH RATE Unmk	Admk	PROJ. CATCH Unmk	Admk	CUMM MIGRATION Unmk	Admk
04/08	13.50	142	142	0	10.52	0.00	252	0	30.82%	0.00%
04/09	12.17	142	142	0	11.67	0.00	280	0	31.37%	0.00%
04/10	24.00	224	224	0	9.33	0.00	224	0	31.81%	0.00%
04/11	10.33	92	92	0	8.90	0.00	214	0	32.23%	0.00%
04/12	12.42	123	123	0	9.91	0.00	238	0	32.70%	0.00%
04/13	11.08	142	142	0	12.81	0.00	307	0	33.31%	0.00%
04/14	11.67	200	200	0	17.14	0.00	411	0	34.12%	0.00%
04/15	11.83	241	241	0	20.37	0.00	489	0	35.08%	0.00%
04/16	12.08	314	314	0	25.99	0.00	624	0	36.31%	0.00%
04/17	10.42	261	261	0	25.06	0.00	601	0	37.50%	0.00%
04/18	10.75	343	343	0	31.91	0.00	766	0	39.01%	0.00%
04/19	12.67	229	229	0	18.08	0.00	434	0	39.86%	0.00%
04/20	7.00	140	140	0	20.00	0.00	480	0	40.81%	0.00%
04/21							432		41.66%	0.00%
04/22	8.00	128	128	0	16.00	0.00	384	0	42.42%	0.00%
04/23	10.58	169	169	0	15.97	0.00	383	0	43.17%	0.00%
04/24	10.92	241	241	0	22.08	0.00	530	0	44.22%	0.00%
04/25	10.67	270	270	0	25.31	0.00	608	0	45.42%	0.00%
04/26	11.58	300	300	0	25.90	0.00	622	0	46.64%	0.00%
04/27	11.50	340	340	0	29.57	0.00	710	0	48.04%	0.00%
04/28	10.75	339	339	0	31.53	0.00	757	0	49.54%	0.00%
04/29	11.08	273	273	0	24.63	0.00	591	0	50.70%	0.00%
04/30	11.08	242	242	0	21.83	0.00	524	0	51.74%	0.00%
05/01	10.00	233	233	0	23.30	0.00	559	0	52.84%	0.00%
05/02	9.92	203	203	0	20.47	0.00	491	0	53.81%	0.00%
05/03	9.50	102	102	0	10.74	0.00	258	0	54.31%	0.00%
05/04	9.83	115	115	0	11.69	0.00	281	0	54.87%	0.00%
05/05	9.50	79	79	0	8.32	0.00	200	0	55.26%	0.00%
05/06	24.00	233	233	0	9.71	0.00	233	0	55.72%	0.00%
05/07	9.42	129	129	0	13.70	0.00	329	0	56.37%	0.00%
05/08	9.83	120	120	0	12.20	0.00	293	0	56.95%	0.00%
05/09	9.83	77	77	0	7.83	0.00	188	0	57.32%	0.00%
05/10	11.00	127	127	0	11.55	0.00	277	0	57.87%	0.00%
05/11	10.83	172	172	0	15.88	0.00	381	0	58.62%	0.00%
05/12	5.75	86	86	0	14.96	0.00	359	0	59.32%	0.00%
05/13							323		59.96%	0.00%
05/14							287		60.53%	0.00%
05/15							251		61.02%	0.00%
05/16	2.12	27	19	8	8.98	3.78	215	91	61.45%	4.63%
05/17							227	200	61.89%	14.81%
05/18	6.83	156	68	88	9.95	12.88	239	309	62.36%	30.53%
05/19	9.33	195	137	58	14.68	6.21	352	149	63.06%	38.12%
05/20	9.08	260	200	60	22.02	6.61	528	159	64.10%	46.21%
05/21	24.00	385	268	117	11.17	4.88	268	117	64.63%	52.16%
05/22	14.00	212	179	33	12.79	2.36	307	57	65.23%	55.06%
05/23	24.00	327	284	43	11.83	1.79	284	43	65.79%	57.25%
05/24	8.67	175	161	14	18.58	1.62	446	39	66.67%	59.24%
05/25	9.42	126	112	14	11.89	1.49	285	36	67.23%	61.07%
05/26	9.08	140	125	15	13.76	1.65	330	40	67.89%	63.10%
05/27	9.67	119	100	19	10.34	1.97	248	47	68.37%	65.50%
05/28	9.08	118	107	11	11.78	1.21	283	29	68.93%	66.97%
05/29	8.42	155	145	10	17.23	1.19	413	29	69.75%	68.45%
05/30	8.75	160	134	26	15.31	2.97	368	71	70.47%	72.06%

Table 9b. Projected wild 0+ CHINOOK outmigrants captured in the Skagit River SCREW trap, 1997.

Date	Hours Trapped	CHIN 0+ CATCH Total	Unmk	Admk	CATCH RATE Unmk	Admk	PROJ. CATCH Unmk	Admk	CUMM MIGRATION Unmk	Admk
05/31	6.00	144	134	10	22.33	1.67	536	40	71.53%	74.10%
06/01							441	33	72.40%	75.78%
06/02							346	26	73.08%	77.10%
06/03							251	19	73.58%	78.07%
06/04	2.50	17	16	1	6.40	0.40	154	10	73.88%	78.58%
06/05	6.75	92	87	5	12.89	0.74	309	18	74.49%	79.49%
06/06	10.33	195	189	6	18.29	0.58	439	14	75.35%	80.20%
06/07	9.58	258	252	6	26.30	0.63	631	15	76.60%	80.97%
06/08	24.00	707	681	26	28.38	1.08	681	26	77.94%	82.29%
06/09	8.75	202	193	9	22.06	1.03	529	25	78.98%	83.56%
06/10	9.00	211	201	10	22.33	1.11	536	27	80.04%	84.94%
06/11	9.17	165	156	9	17.02	0.98	408	24	80.85%	86.16%
06/12	11.75	150	147	3	12.51	0.26	300	6	81.44%	86.46%
06/13	7.75	120	116	4	14.97	0.52	359	12	82.14%	87.07%
06/14	7.75	156	150	6	19.35	0.77	465	19	83.06%	88.04%
06/15	8.17	221	214	7	26.20	0.86	629	21	84.30%	89.11%
06/16	6.00	77	73	4	12.17	0.67	292	16	84.88%	89.92%
06/17							290	14	85.45%	90.64%
06/18							288	12	86.02%	91.25%
06/19							286	10	86.58%	91.76%
06/20							284	8	87.14%	92.16%
06/21							282	6	87.70%	92.47%
06/22	11.50	136	133	3	11.57	0.26	278	6	88.24%	92.77%
06/23	10.08	136	133	3	13.19	0.30	317	7	88.87%	93.13%
06/24	7.58	94	92	2	12.13	0.26	291	6	89.44%	93.44%
06/25	11.50	118	115	3	10.00	0.26	240	6	89.92%	93.74%
06/26	2.00	19	19	0	9.50	0.00	228	0	90.37%	93.74%
06/27	9.58	89	87	2	9.08	0.21	218	5	90.80%	93.99%
06/28	24.00	219	218	1	9.08	0.04	218	1	91.23%	94.05%
06/29	9.83	81	80	1	8.14	0.10	195	2	91.61%	94.15%
06/30	11.33	80	78	2	6.88	0.18	165	4	91.94%	94.35%
07/01	10.00	46	46	0	4.60	0.00	110	0	92.15%	94.35%
07/02	7.83	34	34	0	4.34	0.00	104	0	92.36%	94.35%
07/03	24.00	71	71	0	2.96	0.00	71	0	92.50%	94.35%
07/04	6.25	33	32	1	5.12	0.16	123	4	92.74%	94.55%
07/05	1.92	7	7	0	3.65	0.00	88	0	92.91%	94.55%
07/06	7.00	27	27	0	3.86	0.00	93	0	93.10%	94.55%
07/07	8.92	36	35	1	3.93	0.11	94	3	93.28%	94.71%
07/08	9.50	24	24	0	2.53	0.00	61	0	93.40%	94.71%
07/09							115	2	93.63%	94.81%
07/10							169	4	93.96%	95.01%
07/11							223	6	94.40%	95.32%
07/12							277	8	94.95%	95.73%
07/13	2.25	32	31	1	13.78	0.44	331	11	95.60%	96.28%
07/14	8.25	109	107	2	12.97	0.24	311	6	96.21%	96.59%
07/15	8.75	89	84	5	9.60	0.57	230	14	96.67%	97.30%
07/16	24.00	175	173	2	7.21	0.08	173	2	97.01%	97.40%
07/17	10.00	83	81	2	8.10	0.20	194	5	97.39%	97.66%
07/18	14.75	71	68	3	4.61	0.20	111	5	97.61%	97.91%
07/19	9.08	34	33	1	3.63	0.11	87	3	97.78%	98.07%
07/20	11.25	28	26	2	2.31	0.18	55	4	97.89%	98.27%
07/21	24.00	111	105	6	4.38	0.25	105	6	98.10%	98.58%
07/22	24.00	75	73	2	3.04	0.08	73	2	98.24%	98.68%

Table 9b. Projected wild 0+ CHINOOK outmigrants captured in the Skagit River SCREW trap, 1997.

Date	Hours Trapped	CHIN 0+ CATCH Total	Unmk	Admk	CATCH RATE Unmk	Admk	PROJ. CATCH Unmk	Admk	CUMM MIGRATION Unmk	Admk
07/23	24.00	57	55	2	2.29	0.08	55	2	98.35%	98.78%
07/24	9.67	19	18	1	1.86	0.10	45	2	98.44%	98.88%
07/25	8.17	12	10	2	1.22	0.24	29	6	98.50%	99.19%
07/26	2.50	4	4	0	1.60	0.00	38	0	98.57%	99.19%
07/27	7.00	11	10	1	1.43	0.14	34	3	98.64%	99.34%
07/28	24.00	24	24	0	1.00	0.00	24	0	98.68%	99.34%
07/29	11.25	16	14	2	1.24	0.18	30	4	98.74%	99.54%
07/30	24.00	14	13	1	0.54	0.04	13	1	98.77%	99.59%
07/31	24.00	31	29	2	1.21	0.08	29	2	98.83%	99.69%
08/01	24.00	32	29	3	1.21	0.13	29	3	98.88%	99.85%
08/02	11.00	14	14	0	1.27	0.00	31	0	98.95%	99.85%
08/03	24.00	10	10	0	0.42	0.00	10	0	98.96%	99.85%
08/04	24.00	16	16	0	0.67	0.00	16	0	99.00%	99.85%
08/05	12.25	11	11	0	0.90	0.00	22	0	99.04%	99.85%
08/06	24.00	31	30	1	1.25	0.04	30	1	99.10%	99.90%
08/07	24.00	140	139	1	5.79	0.04	139	1	99.37%	99.95%
08/08	24.00	99	98	1	4.08	0.04	98	1	99.57%	100.00%
08/09	24.00	63	63	0	2.63	0.00	63	0	99.69%	100.00%
08/10	24.00	17	17	0	0.71	0.00	17	0	99.72%	100.00%
08/11	24.00	11	11	0	0.46	0.00	11	0	99.75%	100.00%
08/12	24.00	5	5	0	0.21	0.00	5	0	99.76%	100.00%
08/13	24.00	8	8	0	0.33	0.00	8	0	99.77%	100.00%
08/14	24.00	7	7	0	0.29	0.00	7	0	99.79%	100.00%
08/15	24.00	10	10	0	0.42	0.00	10	0	99.80%	100.00%
08/16	24.00	29	29	0	1.21	0.00	29	0	99.86%	100.00%
08/17	24.00	13	13	0	0.54	0.00	13	0	99.89%	100.00%
08/18	24.00	4	4	0	0.17	0.00	4	0	99.90%	100.00%
08/19	24.00	1	1	0	0.04	0.00	1	0	99.90%	100.00%
08/20	24.00	4	4	0	0.17	0.00	4	0	99.91%	100.00%
08/21	24.00	5	5	0	0.21	0.00	5	0	99.92%	100.00%
08/22	24.00	3	3	0	0.13	0.00	3	0	99.92%	100.00%
08/23	24.00	4	4	0	0.17	0.00	4	0	99.93%	100.00%
08/24	24.00	5	5	0	0.21	0.00	5	0	99.94%	100.00%
08/25	24.00	1	1	0	0.04	0.00	1	0	99.94%	100.00%
08/26	24.00	5	5	0	0.21	0.00	5	0	99.95%	100.00%
08/27	24.00	7	7	0	0.29	0.00	7	0	99.96%	100.00%
08/28	24.00	7	7	0	0.29	0.00	7	0	99.98%	100.00%
08/29	24.00	6	6	0	0.25	0.00	6	0	99.99%	100.00%
08/30	24.00	0	0	0	0.00	0.00	0	0	99.99%	100.00%
08/31	24.00	0	0	0	0.00	0.00	0	0	99.99%	100.00%
09/01	24.00	0	0	0	0.00	0.00	0	0	99.99%	100.00%
09/02	24.00	0	0	0	0.00	0.00	0	0	99.99%	100.00%
09/03	24.00	2	2	0	0.08	0.00	2	0	99.99%	100.00%
09/04	19.83	2	2	0	0.10	0.00	2	0	100.00%	100.00%
09/05				0			1	0	100.00%	100.00%
09/06				0			0	0	100.00%	100.00%
09/07	3.50	0	0	0	0.00	0.00	0	0	100.00%	100.00%
09/08	24.00	0	0	0	0.00	0.00	0	0	100.00%	100.00%
09/09	24.00	0	0	0	0.00	0.00	0	0	100.00%	100.00%
09/10	17.00	0	0	0	0.00	0.00	0	0	100.00%	100.00%
Total	2,666.78	21,464	20,780	684			50,718	1,965		
Apr-Jun	874.53	14,108	13,469	639			33,192	1,854		

Table 10. Actual and projected catches of two groups of ad-marked 0+ chinook and their catch rates, by trap, Skagit River 1997.

Location	Tag Code	RELEASE Date	RELEASE Number	ACTUAL CATCH Scoop	ACTUAL CATCH Screw	ACTUAL CATCH Total	ACTUAL CATCH RATE Scoop	ACTUAL CATCH RATE Screw	ACTUAL CATCH RATE Total	PROJECTED CATCH Scoop	PROJECTED CATCH Screw	PROJECTED CATCH Total	PROJ. CATCH RATE Scoop	PROJ. CATCH RATE Screw	PROJ. CATCH RATE Total
Skagit Hatchery	63-53/23	05/15	130,500	1,100	630	1,729	0.84%	0.48%	1.33%	2,809	1,789	4,598	2.15%	1.37%	3.52%
Countyline Ponds	63-03/22	06/01-15	20,210												
Countyline Ponds	63-43-29	06/01-15	3,290												
Total Release			23,500	63	54	118	0.27%	0.23%	0.50%	185	176	361	0.79%	0.75%	1.53%
Total Hatchery			154,000	1,163	684	1,847	0.76%	0.44%	1.20%	2,994	1,965	4,959	1.94%	1.28%	3.22%

Table 11. Estimated wild 0+ chinook migration from projected and actual catches, using projected and actual season-average capture rates (for wild coho smolts and hatchery 0+ chinook), Skagit River mainstem traps, 1997.

Gear	PROJECTED			ACTUAL			ESTIMATED MIGRATION (millions)			
	Catch	Catch Rates		Catch	Catch Rates		Projected		Actual	
		Coho	H-Chin		Coho	H-Chin	C-Rate	H-Ch Rate	C-Rate	H-Ch Rate
Scoop	65,597	0.91%	1.94%	26,798	0.49%	0.76%	7.2	3.4	5.4	3.5
Screw	51,588	1.06%	1.28%	20,780	0.57%	0.44%	4.9	4.0	3.6	4.7
Combined	117,185	1.96%	3.22%	47,578	1.06%	1.20%	6.0	3.6	4.5	4.0

Note: Projected catch totals include the estimated number of 0+ chinook we would have caught had we begun trapping on January 15 (Table 12).

Table 12. Estimated migration timing of 0+ wild chinook, Skagit River mainstem traps, 1997.

STATISTICAL WEEK			PROJ. CATCH		EXTRAPOLATED		% of TOTAL		CUMM PERCENT	
No.	Begin	End	Scoop	Screw	Scoop	Screw	Scoop	Screw	Scoop	Screw
3	01/15	01/19			24	20	0.04%	0.04%	0.04%	0.04%
4	01/20	01/26			135	112	0.21%	0.22%	0.24%	0.26%
5	01/27	02/02			253	210	0.39%	0.41%	0.63%	0.66%
6	02/03	02/09			372	308	0.57%	0.60%	1.20%	1.26%
7	02/10	02/16	249	149	266	220	0.78%	0.72%	1.98%	1.98%
8	02/17	02/23	469	557			0.71%	1.08%	2.70%	3.05%
9	02/24	03/02	748	689			1.14%	1.34%	3.84%	4.39%
10	03/03	03/09	1,215	1,000			1.85%	1.94%	5.69%	6.33%
11	03/10	03/16	2,119	1,604			3.23%	3.11%	8.92%	9.44%
12	03/17	03/23	5,023	4,801			7.66%	9.31%	16.58%	18.74%
13	03/24	03/30	4,349	4,300			6.63%	8.34%	23.21%	27.08%
14	03/31	04/06	2,342	2,027			3.57%	3.93%	26.78%	31.01%
15	04/07	04/13	2,247	1,766			3.43%	3.42%	30.20%	34.43%
16	04/14	04/20	4,868	3,805			7.42%	7.38%	37.62%	41.81%
17	04/21	04/27	5,256	3,669			8.01%	7.11%	45.63%	48.92%
18	04/28	05/04	5,103	3,461			7.78%	6.71%	53.41%	55.63%
19	05/05	05/11	3,515	1,901			5.36%	3.68%	58.77%	59.31%
20	05/12	05/18	2,595	1,901			3.96%	3.68%	62.73%	63.00%
21	05/19	05/25	4,151	2,470			6.33%	4.79%	69.06%	67.79%
22	05/26	06/01	3,694	2,619			5.63%	5.08%	74.69%	72.86%
23	06/02	06/08	3,862	2,811			5.89%	5.45%	80.58%	78.31%
24	06/09	06/15	3,571	3,226			5.44%	6.25%	86.02%	84.57%
25	06/16	06/22	2,078	2,000			3.17%	3.88%	89.19%	88.44%
26	06/23	06/29	1,636	1,707			2.49%	3.31%	91.68%	91.75%
27	06/30	07/06	901	754			1.37%	1.46%	93.05%	93.21%
28	07/07	07/13	1,349	1,270			2.06%	2.46%	95.11%	95.68%
29	07/14	07/20	1,339	1,161			2.04%	2.25%	97.15%	97.93%
30	07/21	07/27	553	379			0.84%	0.73%	98.00%	98.66%
31	07/28	08/03	425	166			0.65%	0.32%	98.64%	98.98%
32	08/04	08/10	680	385			1.04%	0.75%	99.68%	99.73%
33	08/11	08/17	107	83			0.16%	0.16%	99.84%	99.89%
34	08/18	08/24	63	26			0.10%	0.05%	99.94%	99.94%
35	08/25	08/31	26	26			0.04%	0.05%	99.98%	99.99%
36	09/01	09/07	12	5			0.02%	0.01%	100.00%	100.00%
37	09/08	09/10	2	0			0.00%	0.00%	100.00%	100.00%
	TOTAL		64,547	50,718	1,050	870				

Figure 5.

PROJECTED 0+ CHINOOK CATCH TIMING
SKAGIT RIVER SCOOP & SCREW TRAPS, 1997

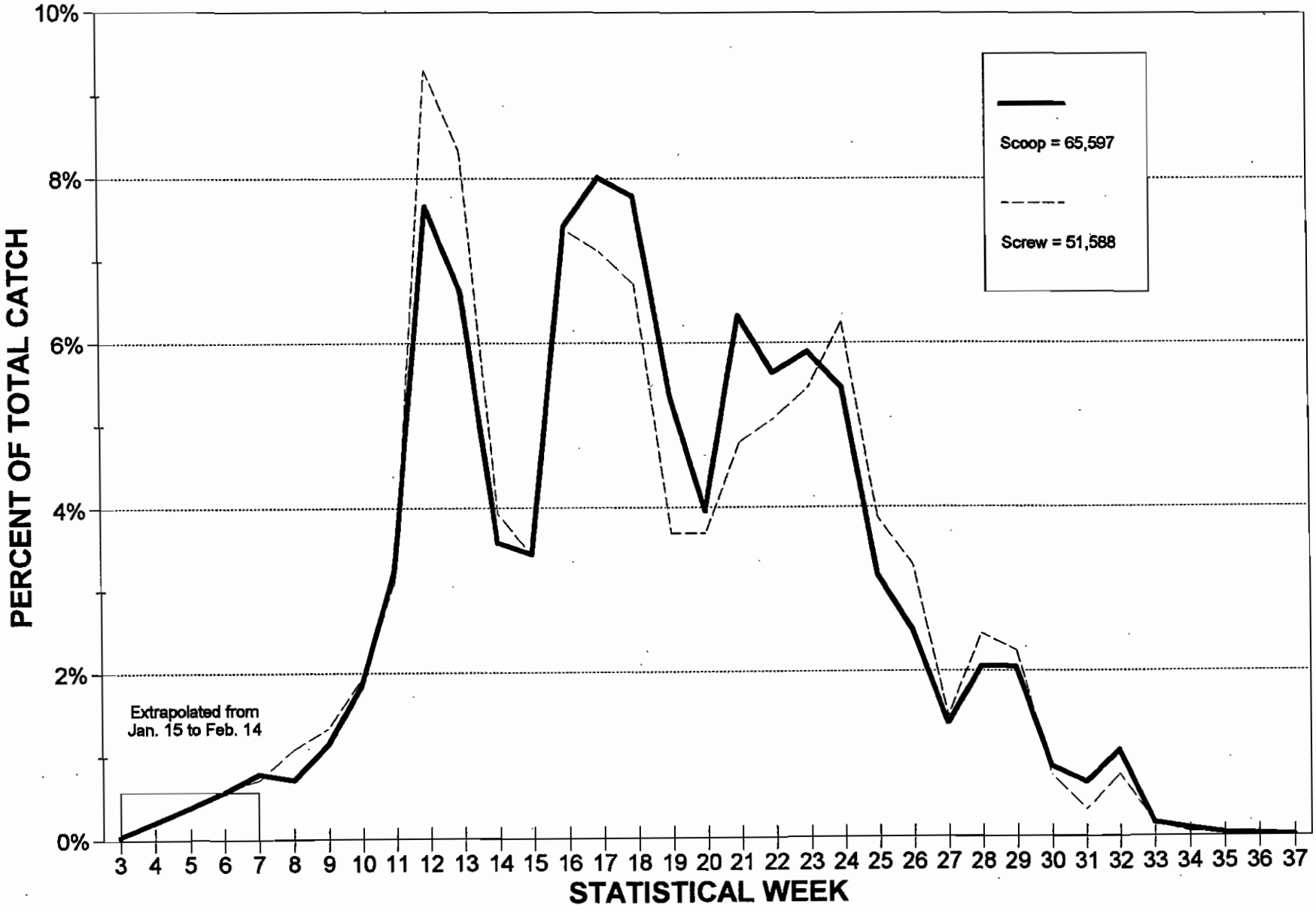


Figure 6.

PROJECTED WILD 0+ CHINOOK CATCHES & FLOW, SKAGIT R. MAINSTEM TRAPS, 1997

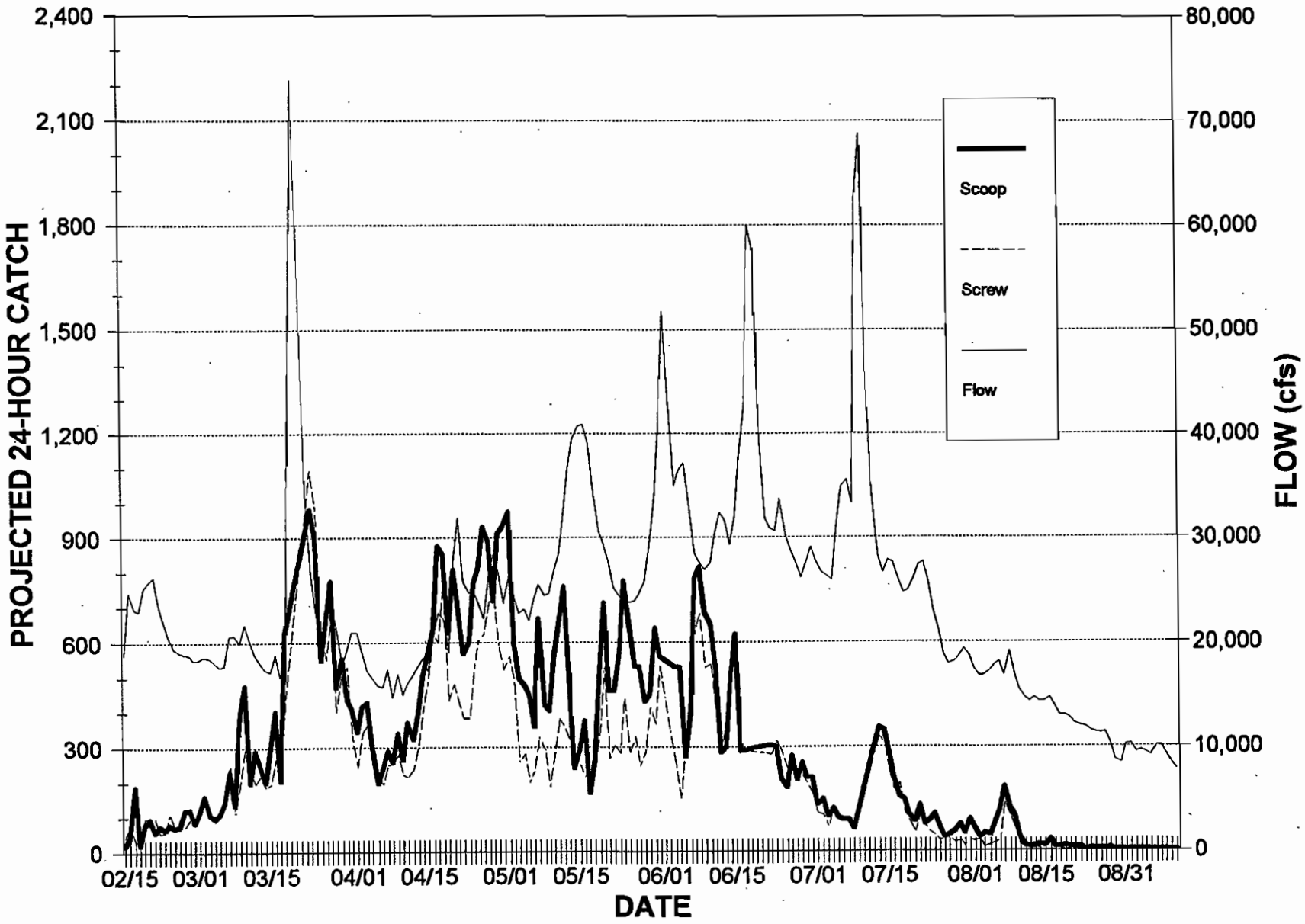
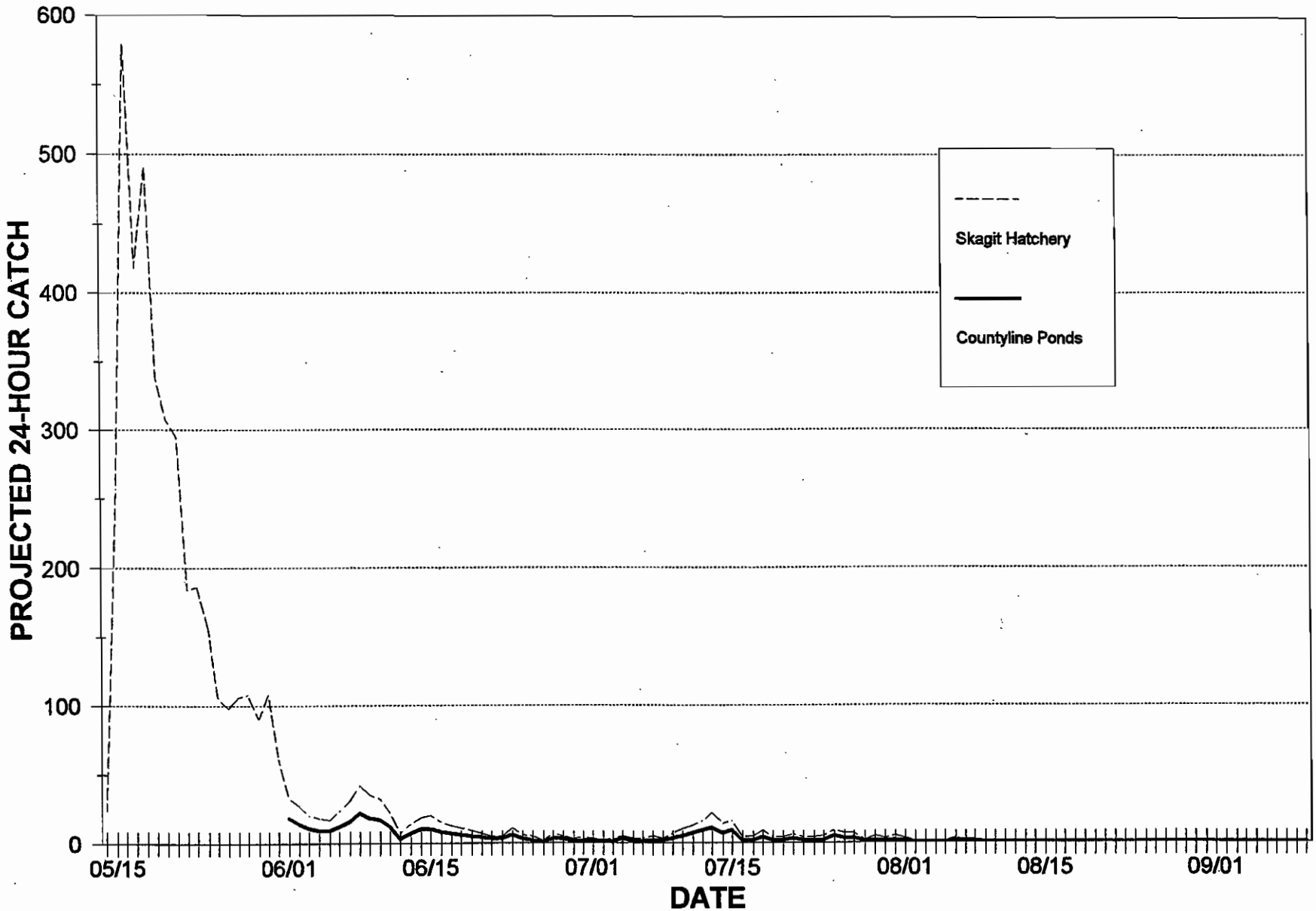


Figure 7.

CATCHES OF TWO HATCHERY GROUPS SKAGIT RIVER 0+ CHINOOK, 1997



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WDFW (rev. 04/28/98)

Table 13. Mean fork length (mm), standard deviation, and range of wild 0+ chinook captured in the mainstem traps, by statistical week, Skagit River 1997.

STAT WEEK			SCOOP					SCREW				
No.	Begin	End	Mean	s.d.	Range Min	Range Max	n	Mean	s.d.	Range Min	Range Max	n
8	02/17	02/23	39.8	1.82	36	43	18	40.0	1.70	37	43	10
9	02/24	03/02	40.4	1.35	39	43	10	39.2	1.23	37	41	10
10	03/03	03/09										
11	03/10	03/16	39.7	2.02	32	45	60	39.5	1.47	36	42	60
12	03/17	03/23	41.2	1.70	39	47	30	40.1	1.70	38	45	30
13	03/24	03/30	40.5	2.71	31	47	30	41.3	1.97	38	47	30
14	03/31	04/06	44.2	5.08	36	66	87	42.9	4.36	37	59	93
15	04/07	04/13	44.8	5.58	36	60	30	43.9	6.19	39	62	30
16	04/14	04/20	45.1	6.83	36	65	50	42.7	4.50	35	57	46
17	04/21	04/27	47.0	7.93	36	65	30	45.9	4.05	40	53	30
18	04/28	05/04	43.8	5.42	37	66	80	45.7	6.77	37	65	80
19	05/05	05/11	46.1	7.66	34	71	80	50.5	9.76	36	80	58
20	05/12	05/18	49.0	9.70	39	60	4					
21	05/19	05/25	51.3	7.29	40	69	30	50.3	8.03	38	70	30
22	05/26	06/01	50.9	7.91	39	70	90	52.7	8.17	39	75	80
23	06/02	06/08	54.1	7.41	39	70	30	52.8	7.11	37	66	30
24	06/09	06/15	50.9	6.49	39	74	84	53.9	6.61	39	71	60
25	06/16	06/22										
26	06/23	06/29	57.4	7.72	38	73	30					
27	06/30	07/06	59.7	9.52	39	85	30	56.4	7.06	46	70	30
28	07/07	07/13										
29	07/14	07/20	64.8	8.70	47	88	103	65.4	9.18	44	85	96
30	07/21	07/27										
31	07/28	08/03	72.7	9.56	53	91	47	69.9	9.56	55	90	15
32	08/04	08/10	75.5	9.43	54	101	53	74.4	8.12	60	89	37
33	08/11	08/17	71.9	10.98	55	91	18	78.3	7.68	69	95	8
34	08/18	08/24	77.1	9.99	60	95	12	75.1	12.59	65	103	9
35	08/25	08/31	83.5	8.22	65	100	13	85.8	14.70	54	102	10
36	09/01	09/07	80.0	13.62	61	93	5	82.8	9.74	69	91	4
37	09/08	09/10	79.5	0.71	79	80	2					
		Total	52.7	13.54	31	101	1,056	51.4	12.88	35	103	886

Figure 8. Min, max, and mean fork length of 0+ chinook, Skagit River mainstem traps, 1997.

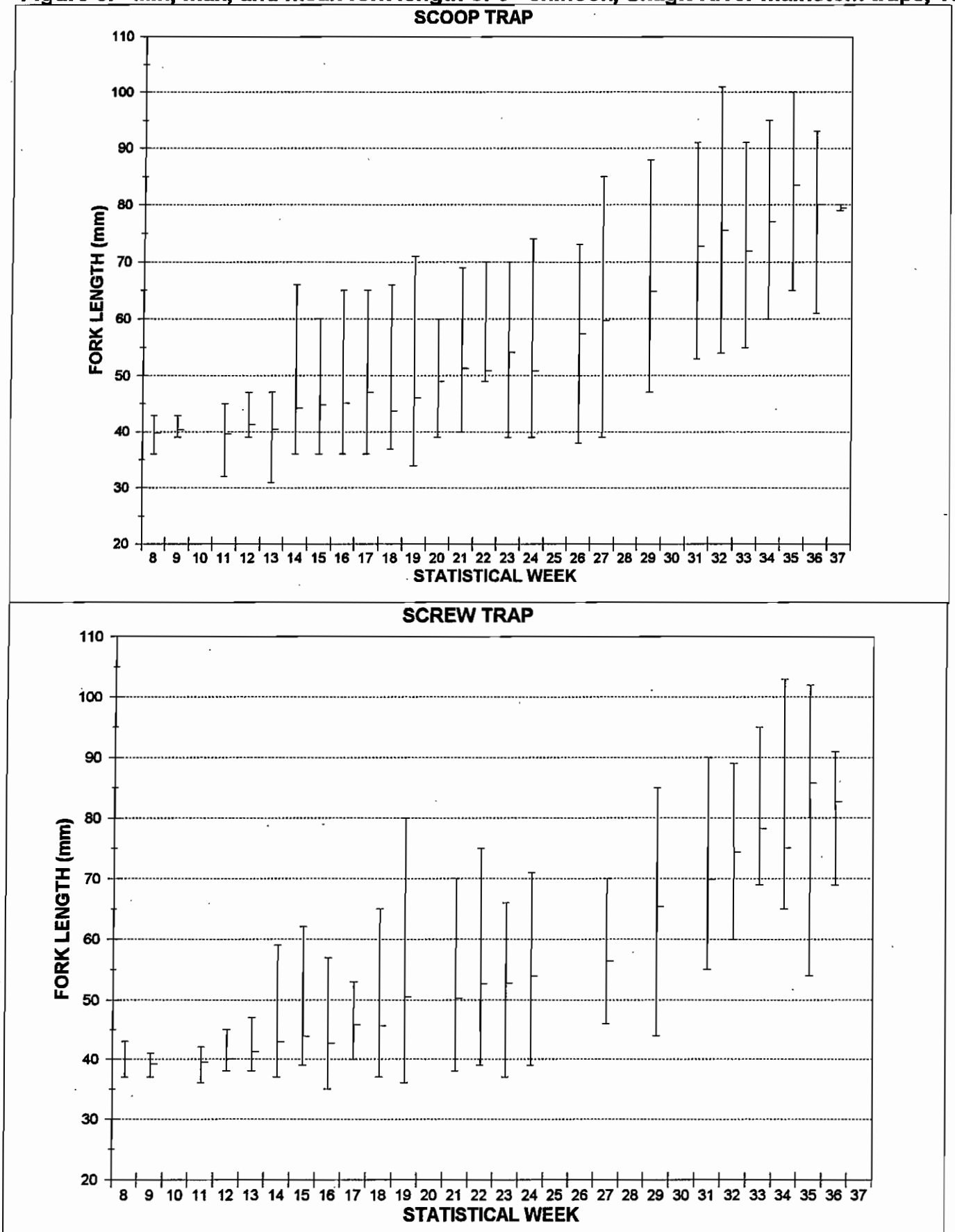

Figure 9. **COMPARISON OF WEEKLY MEAN SIZE BY TRAP, SKAGIT RIVER 0+ CHINOOK, 1997**

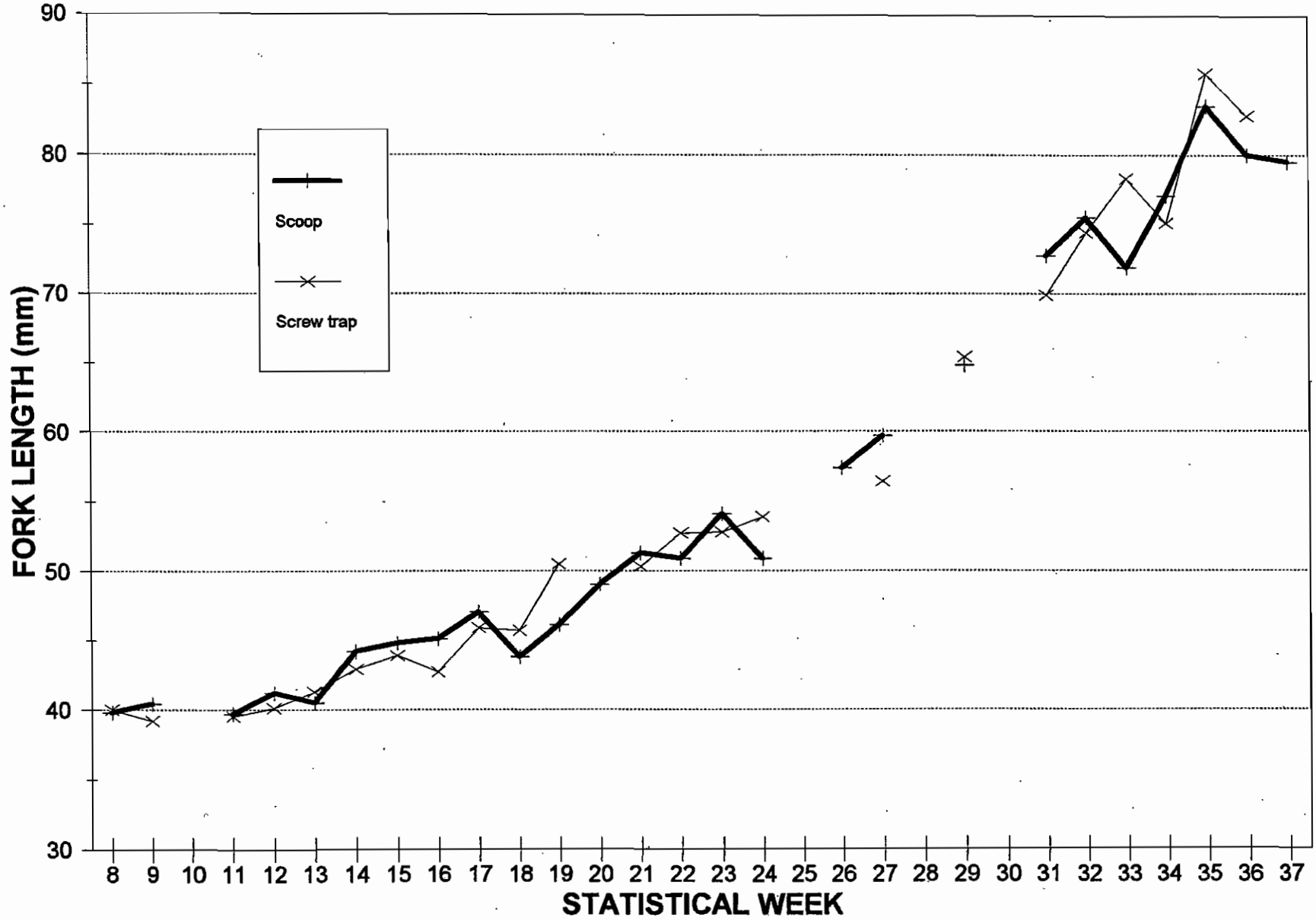

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Table 14. Estimated freshwater survival (egg deposition to migration), Skagit River wild 0+ chinook, by brood year.

A	B	C	D	E	F	G
Brood Year (i)	ESTIMATED ESC. Total	Females 0.5*B	PED @ 4,500 (millions)	Wild Smolts (millions)	Survival to Migr. (E/D)	Winter Hi Flow (cfs)
1989	6,547	3,274	14.7	1.7	12%	88,200
1990	16,935	8,468	38.1	0.5	1%	142,000
1991	5,845	2,923	13.2	2.4	18%	40,100
1992	7,196	3,598	16.2	3.0	18%	27,700
1993	5,585	2,793	12.6	2.7	22%	26,800
1994	5,694	2,847	12.8	1.5	12%	55,700
1995	6,930	3,465	15.6	0.7	5%	126,000
1996	12,025	6,013	27.1	4.5	17%	40,000

Note: Estimated escapement does not include returns to the Baker trap or the spring chinook component.
The 1997 estimate was computed somewhat differently than in previous years. We are presently reviewing our estimatation methodology, which may result in changes to all of these estimates. Until this review is completed, these data are preliminary (as of 01/20/98).

Table 15. Revised estimate of freshwater survival and egg deposition-to-migration, by brood year, Skagit River wild 0+ chinook.

Brood Year	ESTIMATED ESC. Total	Females	PED @ 4,500 (millions)	ACTUAL Catch	LV-recap	MIGRATION Apr-Jun	Total	SURV TO MIGR New	Original	Winter Hi-Flow
1989	6,547	3,274	14.7	8,525	1.32%	645,833	963,930	6.5%	11.9%	88,200
1990	16,935	8,468	38.1	1,706	1.09%	156,514	233,603	0.6%	1.4%	142,000
1991	5,845	2,923	13.2	8,812	0.74%	1,190,811	1,777,330	13.5%	18.3%	40,100
1992	7,196	3,598	16.2	7,463	0.52%	1,435,192	2,142,078	13.2%	18.4%	27,700
1993	5,585	2,793	12.6	9,721	1.01%	962,475	1,436,530	11.4%	21.6%	26,800
1994	5,694	2,847	12.8	10,536	1.20%	878,000	1,310,448	10.2%	11.9%	55,700
1995	6,930	3,465	15.6	2,834	1.02%	277,843	414,691	2.7%	4.8%	126,000

Figure 10.

SURVIVAL OF WILD CHINOOK 0+ SKAGIT RIVER, BY BROOD YEAR

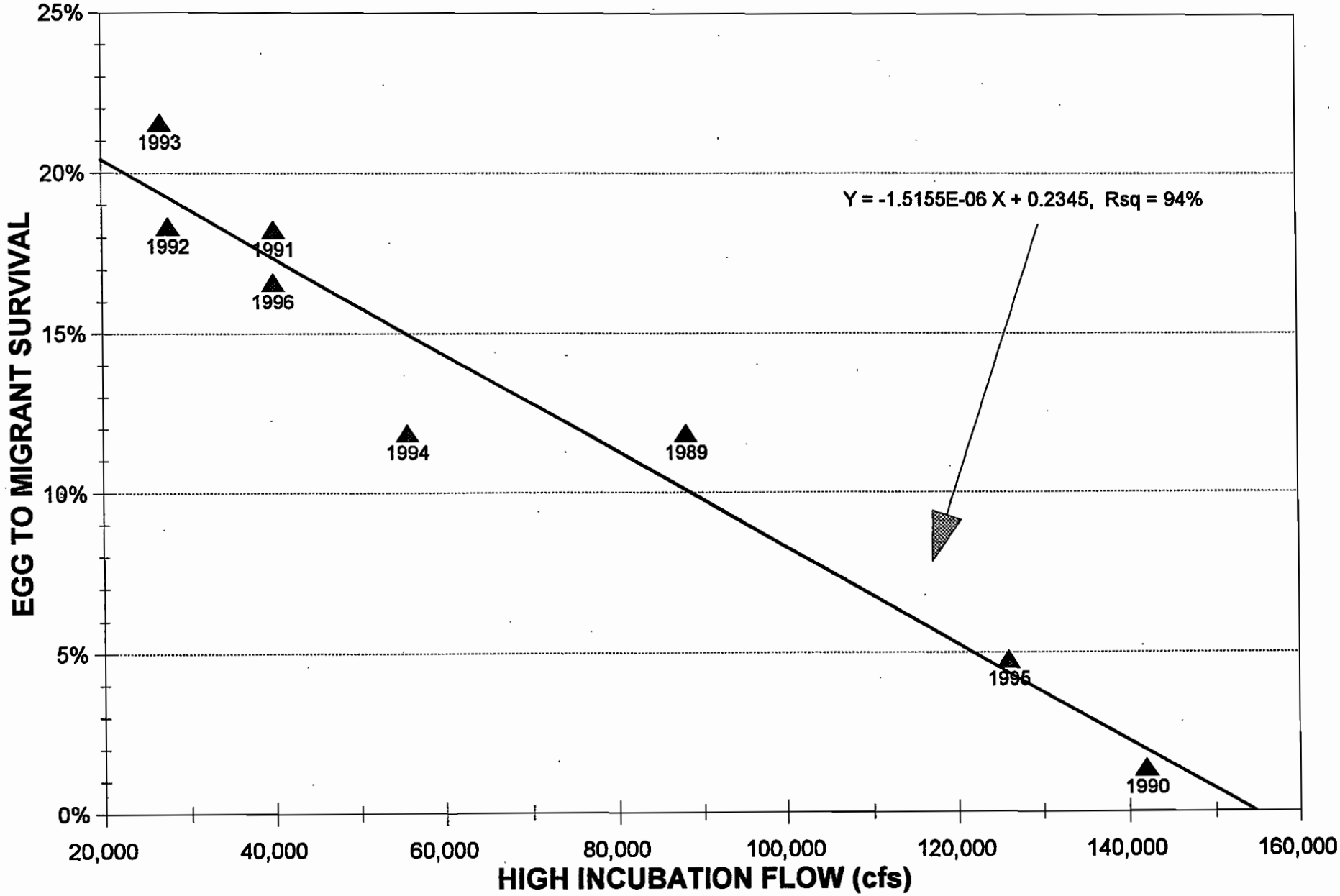

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Figure 11.

REVISED SURVIVAL OF WILD 0+ CHINOOK BY BROOD YEAR, SKAGIT RIVER

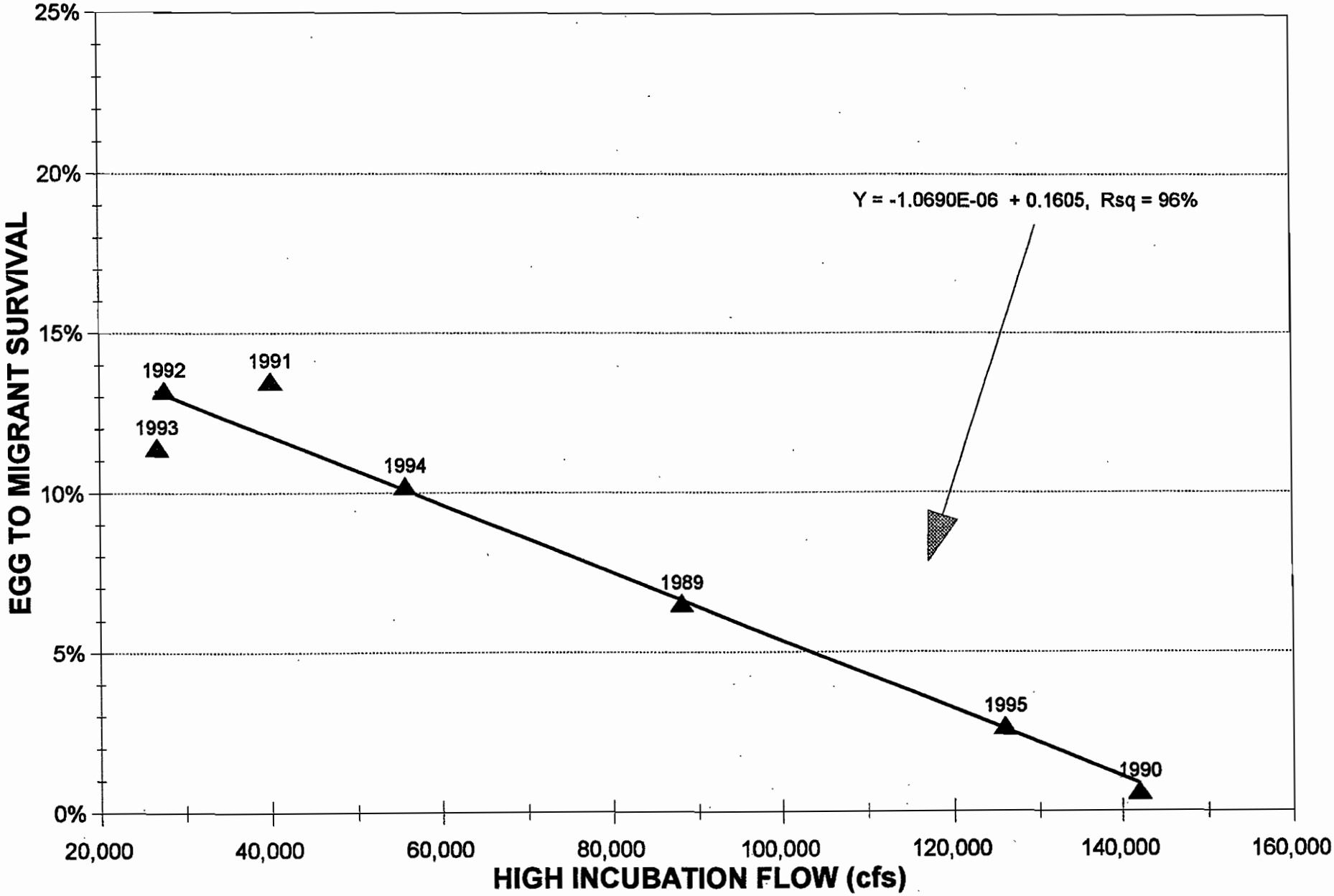

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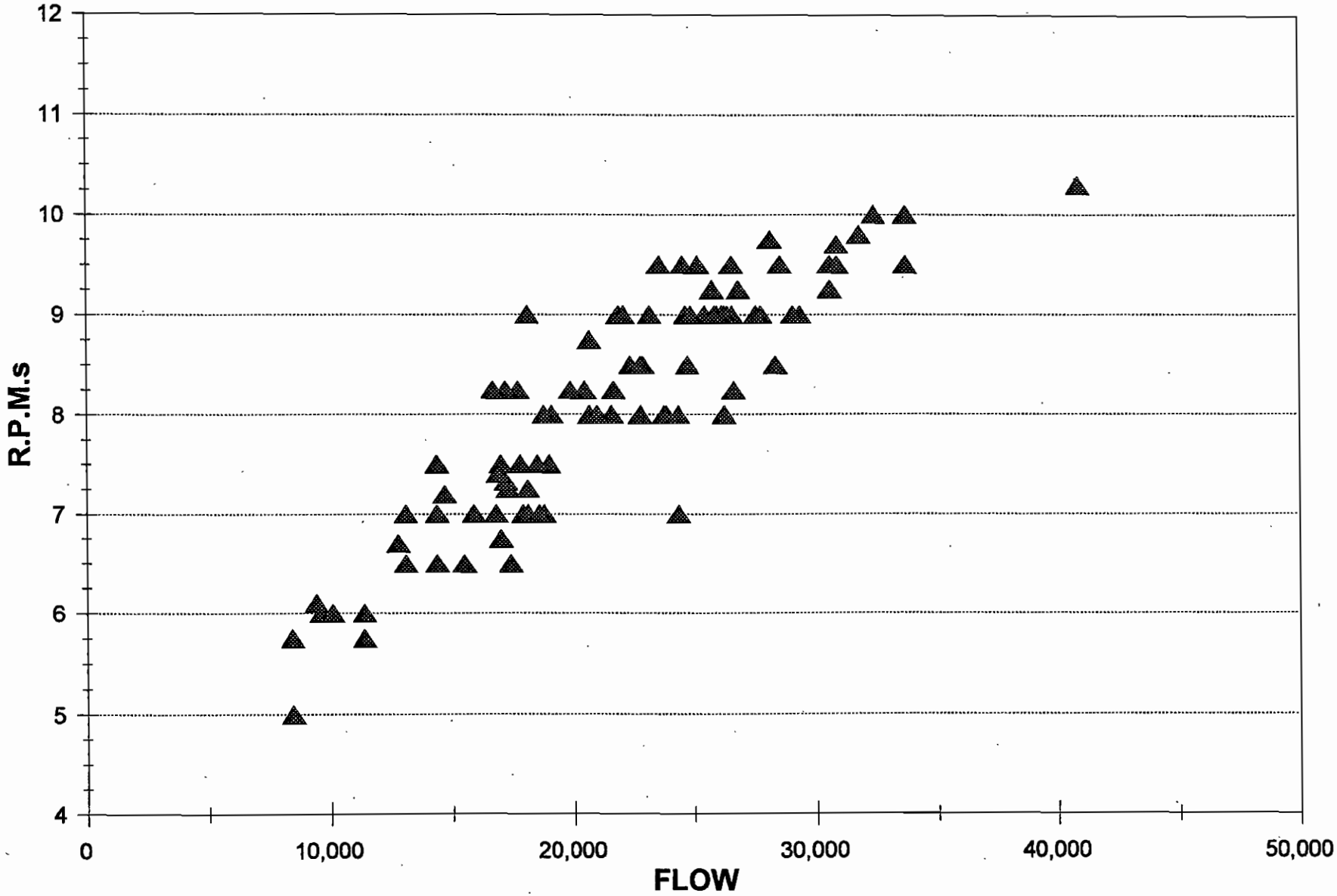
Figure 12.

SCREW TRAP R.P.Ms COMPARED TO FLOW
SKAGIT RIVER 1997



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