ROCK ISLAND DAM SMOLT MONITORING, 1987

Final Report

Prepared By

Charles M. Peven,
Diane H. Sheffield,
and
Paul C. Fielder
Fish and Wildlife Operations
Power Operations Department
Public Utility District No. 1 of Chelan County
Wenatchee, Washington 98801

Prepared For

Dale E. Johnson, Project Manager
U.S. Department of Energy
Bonneville Power Administration
Division of Fish and Wildlife
P.O. Box 3621
Portland, Oregon 97203
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ABSTRACT

Downstream migrating salmon (Oncorhynchus spp.) and steelhead trout (Salmo gairdneri) smolts were monitored at the Rock Island Dam bypass trap from 1 April - 31 Auqust, 1987. Data collected included: 1) number of fish caught by species, 2) number of branded fish caught by species, 3) daily average riverflow, 4) daily average powerhouse #l and #2 flows and daily average spill. These data were transmitted to, and used by, the Fish Passage Center to manage a "water budget" of allocated upstream water storage to augment river flows to improve survival of downstream migrating salmonids. The Rock Island Dam trapping facility collected 84,687 downstream migrating salmonids in 1987. Collected fish included 412 chinook salmon (Oncorhynchus tshawytscha) and 638 steelhead which had been freeze branded (to determine migration rates) and 608 chinook and 16,519 steelhead with clipped adipose fins. The middle 80% of the 1987 spring migration (excluding sub-yearling chinooks) passed Rock Island Dam during a 30 day period, 27 April - 26 May. Passage rates of hatchery released chinook and steelhead smolts and downstream migration timing of all salmonids are presented.

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INTRODUCTION

In 1982, the Northwest Power Planning Council developed a fish and wildlife program to protect, mitigate and enhance fish and wildlife resources affected by construction and operation of Columbia River hydroelectric facilities. Under this program, a "water budget" of allocated upstream water storage was established to be used for instream flow augmentation to improve survival of downstream migrating salmon (Oncorhynchus spp.) and steelhead trout (Salmo gairdneri). The Council's plan also called for studies to monitor juvenile fish migration timing and survival. This information was then applied to the daily management and evaluation of the water budget. The fishery agencies and tribes formed a Water Budget Center (renamed as the Fish Passage Center) to direct the use of the water budget and to conduct and coordinate those studies related to water budget management and evaluation. The Fish Passage Center developed a Smolt Monitoring Program, and selected several sites on the Columbia and Snake rivers as smolt monitoring stations. Rock Island Dam was selected as one of these stations. It is the first dam downstream from all of the major salmon and steelhead producing tributaries of the mid-Columbia River (Fig. 1).

The 1987 Smolt Monitoring Program for the mid-Columbia River was designed to index the daily number of outmigrating salmonids and to report numbers of marked juveniles collected. Data collected under this program allow a comparison and evaluation from year to year migration timing, travel time, and survival rates of different stocks of naturally and hatchery produced smolts.

Funding of the program, as implemented by the Fish Passage Center, was provided by the Bonneville Power Administration. The Public Utility District No. 1 of Chelan County (Chelan PUD) provided the trapping facility, personnel, and equipment to conduct the monitoring.

METHODS

Daily sampling data collected at the Rock Island Dam monitoring station included 1) total number of fish caught by species, 2) total number of branded fish caught by species, 3) daily average riverflow, 4) daily average powerhouse flow through Rock Island #1 (old powerhouse) and Rock Island #2 (new powerhouse) (Fig. 2), and daily average spill. The flow data were recorded so that an expanded index of fish passage through powerhouse #2 could be developed based on the bypass collection count in relation to the proportion of total riverflow passing through powerhouse #2

To provide travel time estimates between hatchery release points and Rock Island Dam, yearling and sub-yearling chinook (Oncorhynchus tshawytscha), and steelhead, in state and federal hatcheries, were freeze branded (using liquid nitrogen) and released. Eleven percent of the released chinook were marked with wire-coded tags and clipped

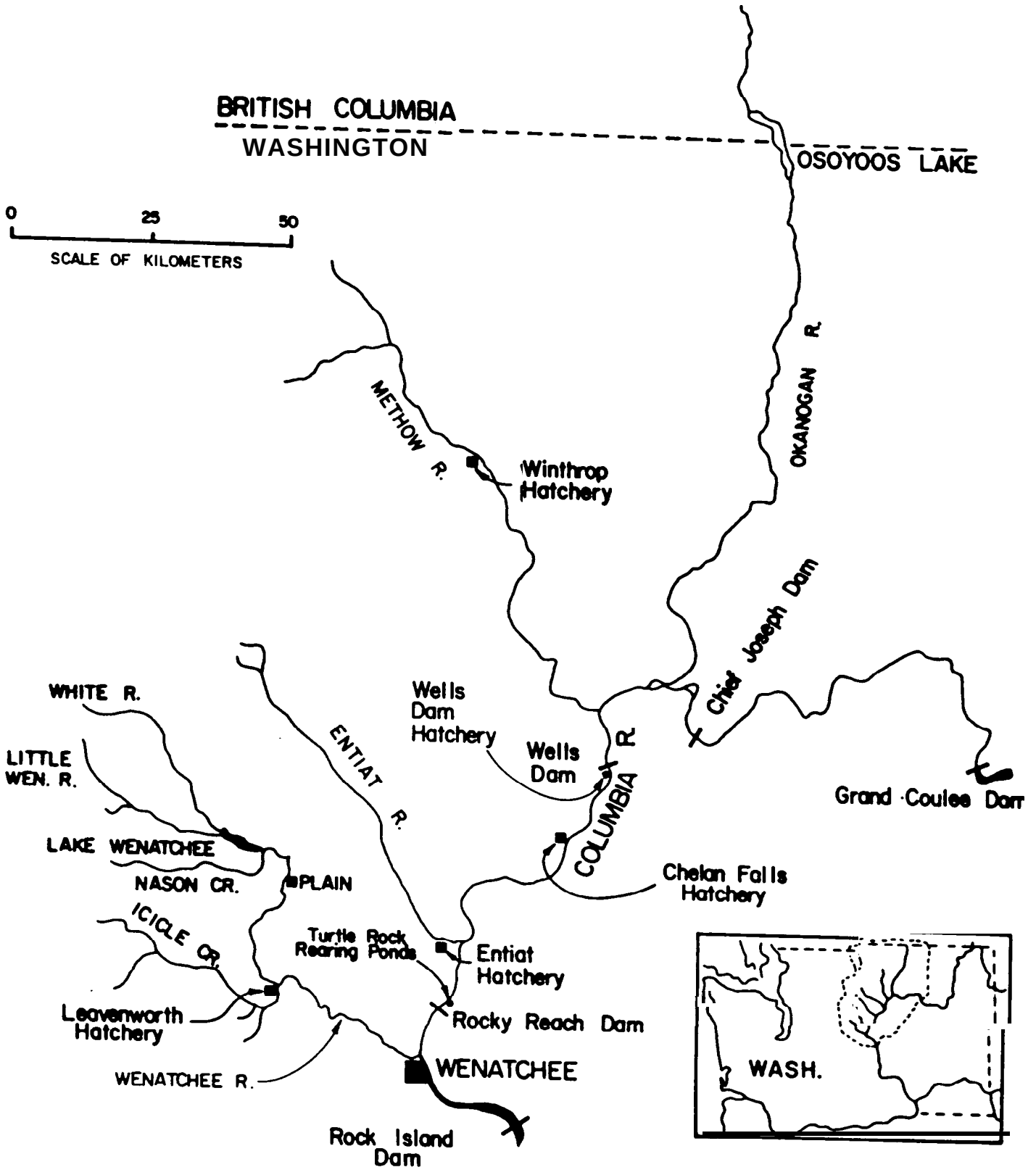

Figure 1. Columbia River between Rock Island and Grand Coulee dams showing major tributaries and hatcheries.

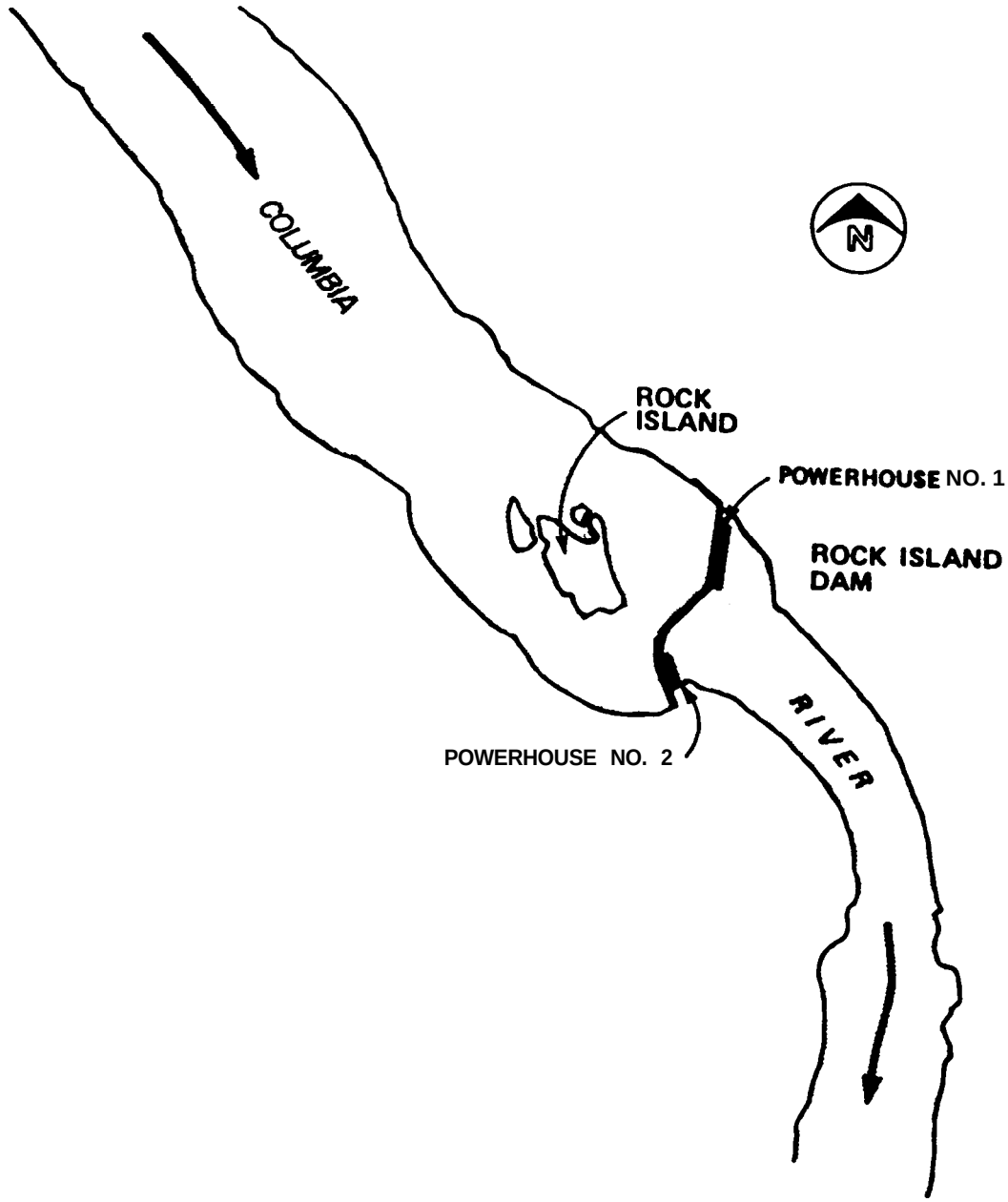

Figure 2. Location of powerhouse #1 and powerhouse #2 of Rock Island hydro-electric project =943-002 (Taken from Olson 1983).

adipose fins (beginning in 1985, all hatchery reared steelhead released in Washington state waters were adipose fin clipped). A comparison of timed releases of marked smolts (according to brand configuration) to daily sample recoveries of these branded smolts at the bypass trap provided travel time estimates between the release points and the dam. Unmarked hatchery and naturally produced salmonids were also monitored to provide an indicator of the peak arrival times for each species at Rock Island Dam.

The bypass trap was monitored by personnel of the Fish and Wildlife Operations Section of the Power Operations Department of Chelan PUD.

Fish collected by the trap during the 24 hour sampling period (0900-0900) were held in the bypass flume before being delivered, via an elevator hopper, to an 8'x8'x3' portable fiberglass holding tank (Figs. 3, 4, 5). The holding tank was supplied with a continuous water flow from the right bank fishladder with a 5 horsepower submersible Pump.

Groups of 30-50 fish were anesthetized with a solution of MS 222 (Tricaine methane sulfonate) before handling. Fish were identified by species and examined for brands and clipped fins in a sampling shed adjacent to the holding tank (Fig. 5). Fork length measurements were taken daily from subsamples of sockeye (Oncorhynchus nerka), steelhead, and sub-yearling chinook, and three times per week from subsamples of yearling chinook. Steelhead were categorized as "hatchery" or "naturally-produced" according to clipped adipose fin, or if an adipose fin was present, a worn appearance of the dorsal and ventral fins (Peven and Hays 1986). The fish were then allowed to recover in an isolated section of the holding tank. Data were recorded on field forms at the dam.

After the examined fish had fully recovered from the effects of the MS 222, they were released through a 4" PVC pipe from the recovery section of the tank (elevation 620' m.s.l.) to the tailrace (elevation 574' m.s.1.) (Fig. 5). The release area of the tailrace was protected from seagull predation with parallel lengths of 80 pound test monofilament fish line tied at approximately 6 foot intervals overhead of the pipe outlet.

Data pertinent to the smolt monitoring program were transferred from Chelan P.U.D. headquarters in Wenatchee, WA to the Fish Passage Center (Portland, OR) daily via the Data Management System (IBM System 36) utilizing an IBM personal computer.

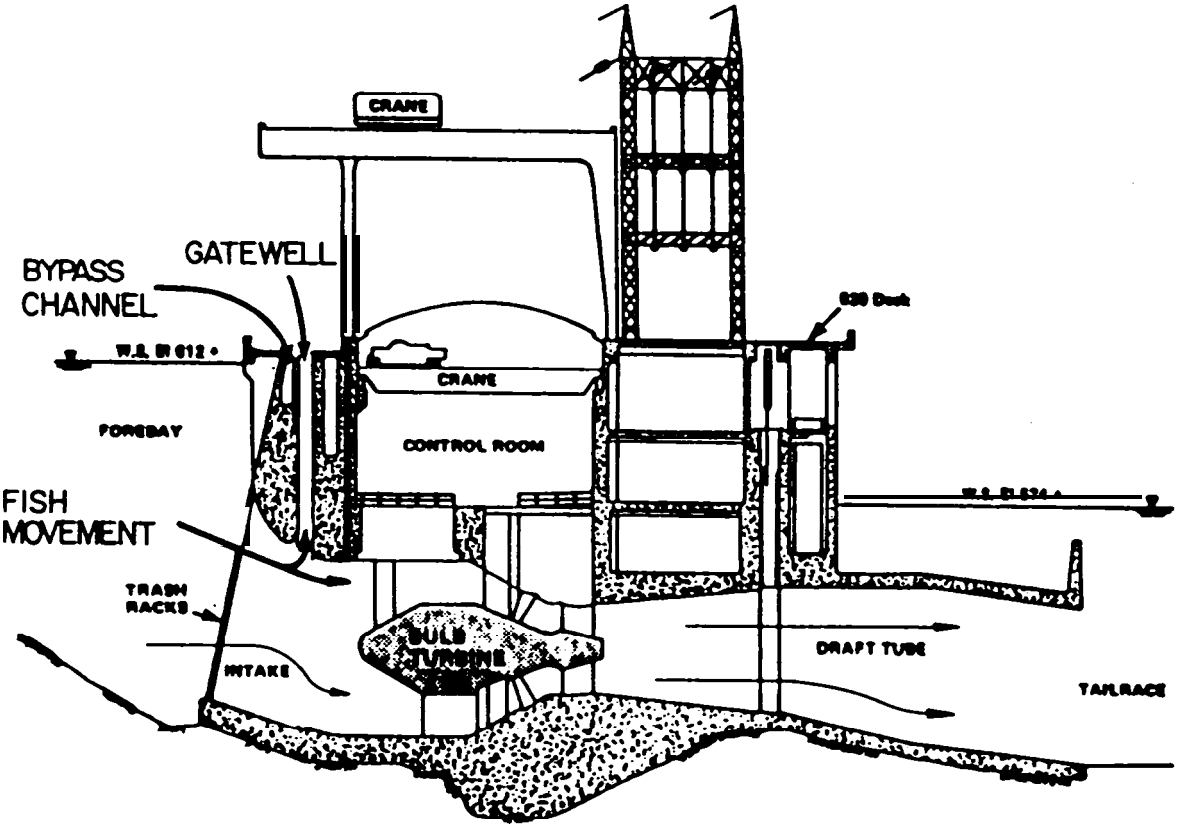

Figure 3 . Section through Rock Island Dam second powerhouse indicating fish movement into gatewell system (Taken from Olson 1983).

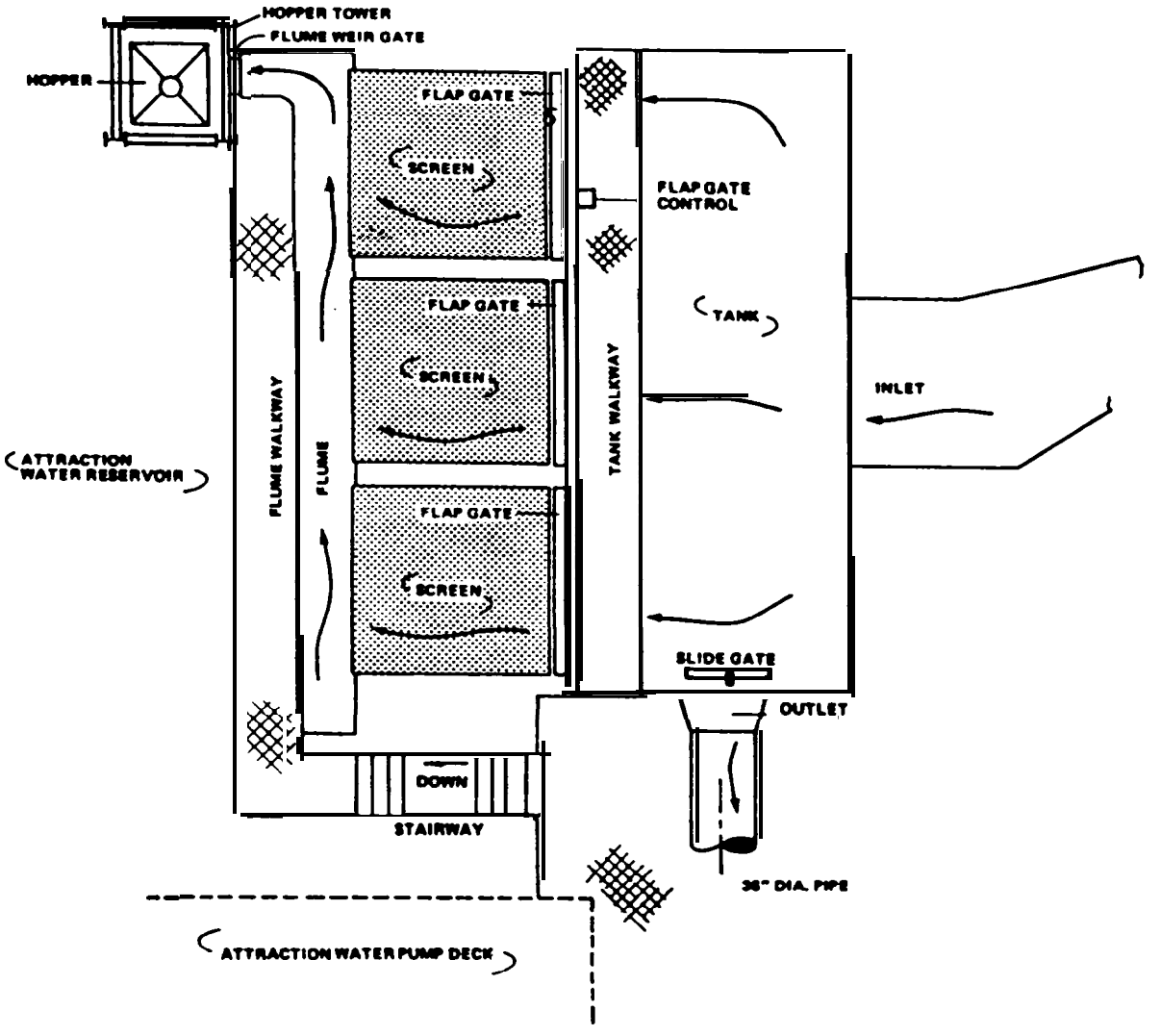

Figure 4. Rock Island Dam fingerling collection trap (Taken from Olson 1983).

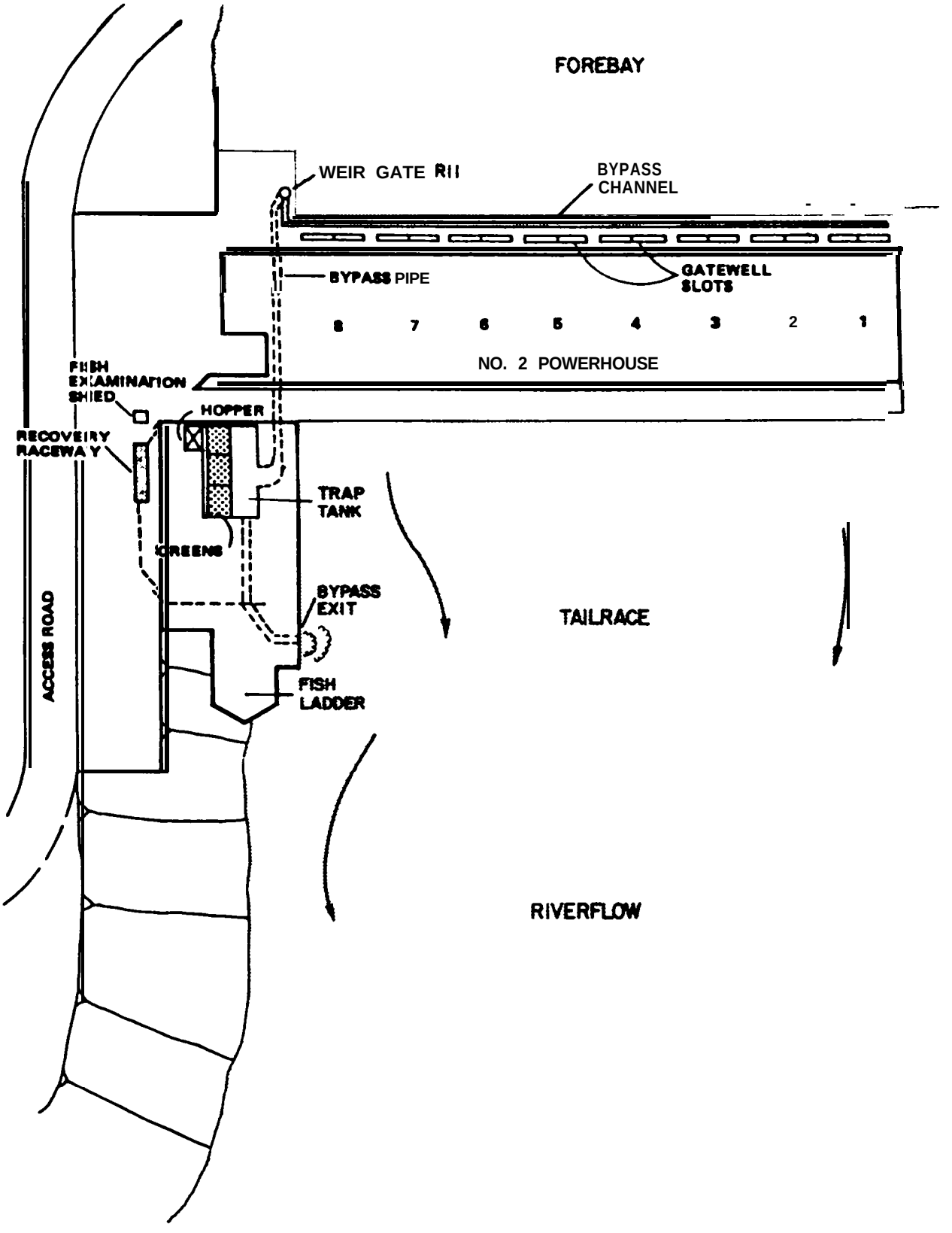

Figure 5. Plan view of fingerling bypass and collection system at Rock Island Dan second powerhouse (Taken fron Olson 1933).

RESULTS AND DISCUSSION

The Rock Island trapping facility collected 84,687 juvenile salmon and steelhead during the 1987 smolt monitoring program (Appendix A-l-A-6). A total of 412 freeze branded chinook salmon and 638 freeze branded steelhead trout representing eight distinct marks and releases, were collected and recorded during 1987 (Table 1). In addition, we collected 608 chinook and 16,519 steelhead with clipped adipose fins (Appendix D-l - D-6).

The bypass trapping facility operated without mechanical failure during the smolt monitoring program and collected fish from all of the 16 gate slots of the second powerhouse.

Between 20 April and 15 May, a hydroacoustic study was conducted at powerhouse # 1 to determine the horizontal and vertical distribution of salmonids approaching the dam. During this time period, less than 50% of the daily flow passed through powerhouse # 2 (Fig. 6) (by comparison, in 1986, the percent flow through powerhouse # 2 ranged from 53.6 - 87.7 for the months of April and May). The bypass trap efficiency is dependent on the amount of flow through powerhouse # 2 and it is probable that fewer salmonids were collected during this time period than would have been if normal flows were present through powerhouse # 2. There were periods (especially during weekends) when there was zero flow through powerhouse # 2.

An examination of daily powerhouse #2 turbine flows in proportion to total river flow showed a variance in powerhouse operations during the period of peak salmonid outmigration. Monthly average powerhouse #2 fiows for the period of 1 April through 30 June ranged from 53.6% to 82.4% of average total riverflow and daily averages ranged from 2.5% to 98.6% (Table 2).

Average daily hydraulic data for Rock Island Dam were supplied to the Fish Passage Center, which used it to develop an expansion of Rock Island trap data (Appendix B-l - B-6). The expansion was derived by taking the actual trap collection count multiplied by the inverse proportion of water passing through powerhouse #2 during the sampling period (i.e., (collection count x 100) / (powerhouse #2 flow / powerhouse #1 flow + powerhouse #2 flow + spill). A comparison of actual trap collection counts to the expanded index (Table 3) indicated differences in the smolt timing estimates. The largest difference in timing estimates observed between the two counts was a 15 day difference in the 90% passage date for total salmonids (Table 3, APP. C-6), a 12 day difference in the 50% passage date for sockeye (Table 3, APP. C-5), and a 13 day difference in the 10% passage date for sub-yearling chinook (Table 3, App. C-2). Table 3 presents actual and expanded count passage data information. Actual count data were used in our analysis and discussion.

Table 1. Summary of brand recovery rates for yearling chinook, sub-yearling chinook, and steelhead, 1 April - 31 August 1987.

Fish	Brand	Release date	Release site		Branded fish released	First recovery date	Last recovery date	10% recovery date	50% recovery date	90% recovery date	# rec.	% rec.
Chinook yearling												
	LA/7S/l	4/20/87	Methow	R	46,667	5/01/87	6/17/87	5/13/87	5/19/87	5/25/87	103	0.22
	LA/7S/3	4/28/87	Methow	R	46,318	5/05/87	6/26/87	5/15/87	5/20/87	6/08/87	165	0.36
	RD/7S/l	4/24/87	Methow	R	44,102	5/02/87	6/11/87	5/08/87	5/19/87	5/24/87	71	0.16
	LD/7T/3	4/22/87	Lvwth	NFH	37,863	4/24/87	5/27/87	4/25/87	5/12/87	5/21/87	31	0.08
Chinook subyrlng												
	LA/T/4	6/01/87	Wells	H	99,611	6/02/87	8/10/87	6/06/87	6/22/87	7/08/87	42	0.04
Steelhead												
	LA/7C/l	4/23/87	Methow	R	29,076	4/28/87	6/08/87	5/01/87	5/04/87	5/12/87	190	0.65
	LA/7C/3	4/27/87	Methow	R	29,884	5/01/87	6/01/87	5/03/87	5/06/87	5/13/87	212	0.71
	RD/7C/l	5/01/87	Methow	R	26,201	5/05/87	6/04/87	5/06/87	5/11/87	5/16/87	236	0.90

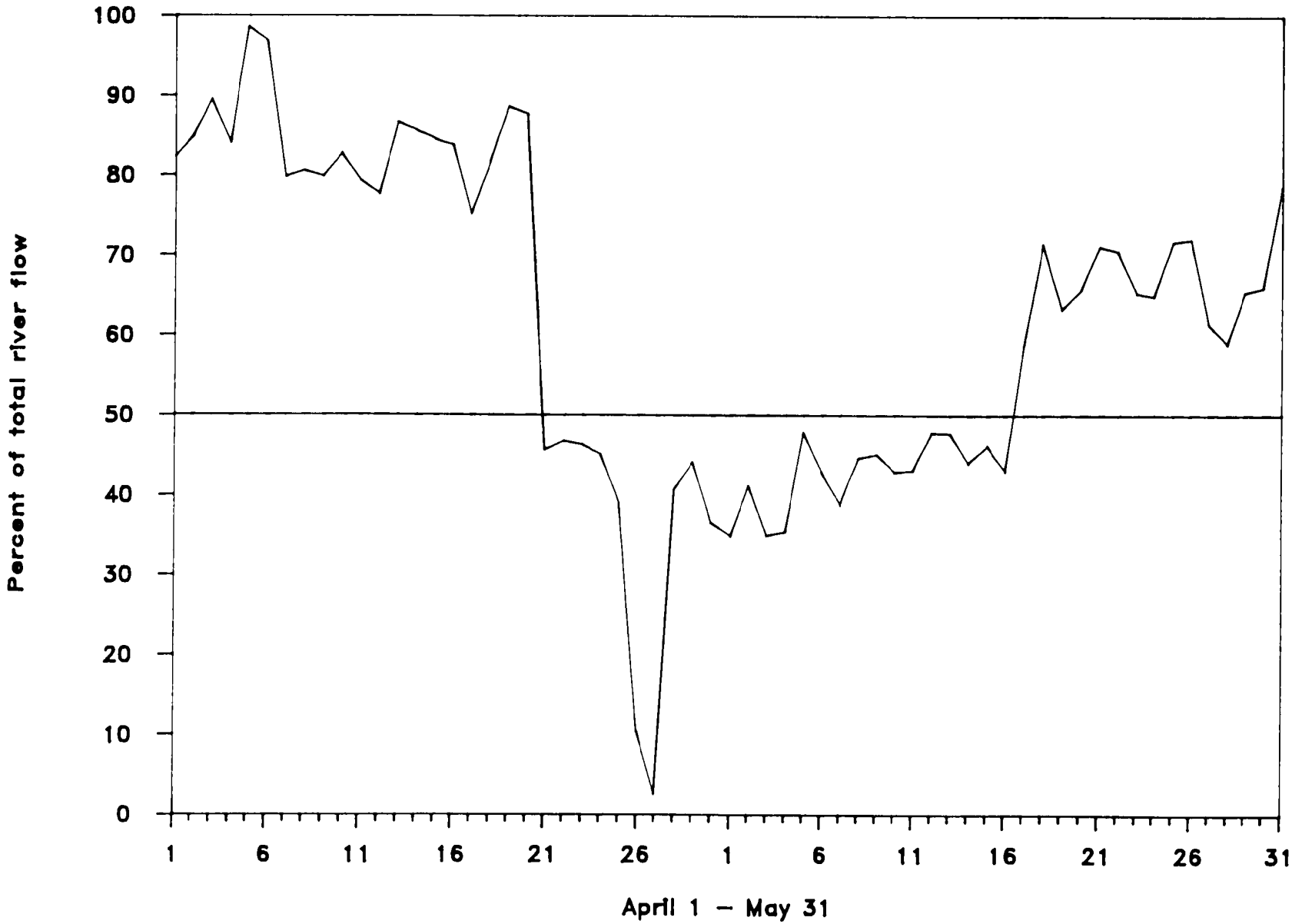

Figure 6. Daily percentage of flow through powerhouse No. 2 at Rock Island Dam, 1 April - 31 August, 1987.

Table 2. Rock Island Dam powerhouse operations expressed in KCFS and % streamflow, 1 April - 31 August,1987.

Average KCFS	April	May	June	July	August
Total river flow (monthly range)	91.5 (43.4-133.3)	148.7 (113.9-180.7)	115.8 (62.8-169.6)	84.4 (49.5-106.6)	84.7 (64.1-110.3)
Powerhouse #1 flow (monthly range)	25.3 (0.0-55.0)	40.2 (4.4-59.3)	22.0 (3.5-58.5)	11.1 (3.7-23.5)	13.6 (3.7-29.4)
Powerhouse #2 flow (monthly range)	62.5 (1.1-91.7)	79.7 (39.7-113.3)	92.9 (58.3-123.0)	72.3 (43.8-89.6)	70.1 (58.4-86.9)
Spill (monthly range)	2.6 (0.0-27.1)	27.5 (0.0-35.5)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Average percent					
Powerhouse #1 flow (monthly range)	27.7 (0.0-69.8)	27.0 (3.8-44.7)	16.7 (5.0-35.3)	12.5 (5.3-22.4)	15.1 (5.4-30.4)
Powerhouse #2 flow (monthly range)	68.2 (2.5-98.6)	53.6 (34.9-78.7)	82.4 (64.0-93.6)	86.2 (76.7-93.3)	83.6 (71.4-92.9)
Spill (monthly range)	3.3 (0.0-24.7)	18.5 (0.0-23.8)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)

Table 3. Comparison of actual and expanded fish counts and passage dates for the Rock Island Dam bypass trap, 1987 (expanded data in parentheses).

	Numbers				Dates		
Species	**Totals**	10%	**50%**	**90%**	10%	**50%**	**90%**
Chinook yearlings	**11080** **(23269)**	**1108** **(2283)**	5540 **(11415)**	9972 **(20547)**	4/23/87 **(4/25/87)**	5/14/87 **(5/11/87)**	5/23/87 **(5/21/87)**
Chinook sub-yearlings	**15136** (18869)	**1514** (1887)	7568 (9435)	13622 (16982)	6/15/87 (6/02/87)	7/11/87 (7/08/87)	8/04/87 (8/04/87)
Steelhead	**20481** (41125)	2048 (4113)	10241 (20563)	18433 (37013)	5/04/87 (5/03/87)	5/14/87 (5/13/87)	5/23/87 (5/22/87)
Coho	**21366** (35175)	2137 (3518)	10683 (17588)	19229 (31658)	5/11/87 (5/10/87)	5/21/87 (5/19/87)	6/07/87 (6/06/87)
Sockeye	**16624** (29856)	**1662** (2986)	**8312** (14928)	14962 (26870)	4/19/87 (4/20/87)	5/22/87 (5/10/87)	5/24/87 (5/23/87)
Total salmonids	84687 **(147855)**	8469 **(14786)**	42344 **(73928)**	76218 **(133070)**	4/30/87 **(4/27/87)**	5/20/87 **(5/18/87)**	7/07/87 **(6/22/87)**

MI6UATION TIMING

Yeadling chinook

Yearling chinook were present the first day of the smolt monitoring program, 1 April, and continued to be present every day until 24 June. The last yearling chinook was collected on 20 July. The 10% and 90% passage dates for yearling chinook were 23 April and 23 May, respectively. Peak passage of 892 yearling chinook occurred on 19 May.

Sub-yearling chinook

The first sub-yearling chinook was collected on 1 April with daily occurrence and continuing until the last day of the smolt monitoring program, 31 August. Peak passage of 763 sub-yearling chinook occurred on 1 August. The 10% and 90% passage dates were 15 June and 4 August, respectively, while the 50% passage date for sub-yearling chinook was 11 July (Table 3, App. C-2). On 26 May, 420,000 sub-yearling chinook were released from the WDF's salmon hatchery at Wells Dam. Starting 1 June, proportions of hatchery and naturally produced zero-age chinook were differentiated from the daily catch at Rock Island Dam using a fork length of 60 mm as a separation criterion (all sub-yearling chinook captured before 1 June were naturally-produced). Figure 7 shows the proportion of each component in the daily catch during the sample period. The separation criterion was eventually increased as both hatchery and naturally-produced fish grew throughout the summer.

Steel head

Daily collection of steelhead smolts began on 3 April and continued until 28 June, after which steelhead were intermittently collected in low numbers (<10) until 13 August. Peak passage of 1,381 steelhead occurred on 13 May just one day prior to the 50% passage date (14 May). The 10% and 90% passage dates were 4 May and 23 May, respectively (Appendix C-3).

Peven (1987a) found that hatchery steelhead comprised 81.1% of the total outmigrants (n = 20,370) collected at Rock Island Dam in 1987.

Sockeye

Sockeye smolts were present at Rock Island Dam on the first day of the monitoring program, 1 April. The last sockeye smolt was trapped on 25 August. Peak passage occurred on 22 May when 6,549 sockeye smolts were collected. The 10% and 90% passaqe dates were 19 April and 24 May, respectively, while 50% of the outmigrating sockeye smolts had passed Rock Island Dam by 22 May (Appendix C-4).

In 1987, the downstream migration of sockeye was bimodal (Appendix C-4). This is due to the difference in run timing of the two stocks of sockeye that migrate past Rock Island Dam. Wenatchee River outmigrants pass Rock Island Dam primarily in April and Okanogan River smolts are more prevalent at Rock Island Dam in May (Peven 1987b).

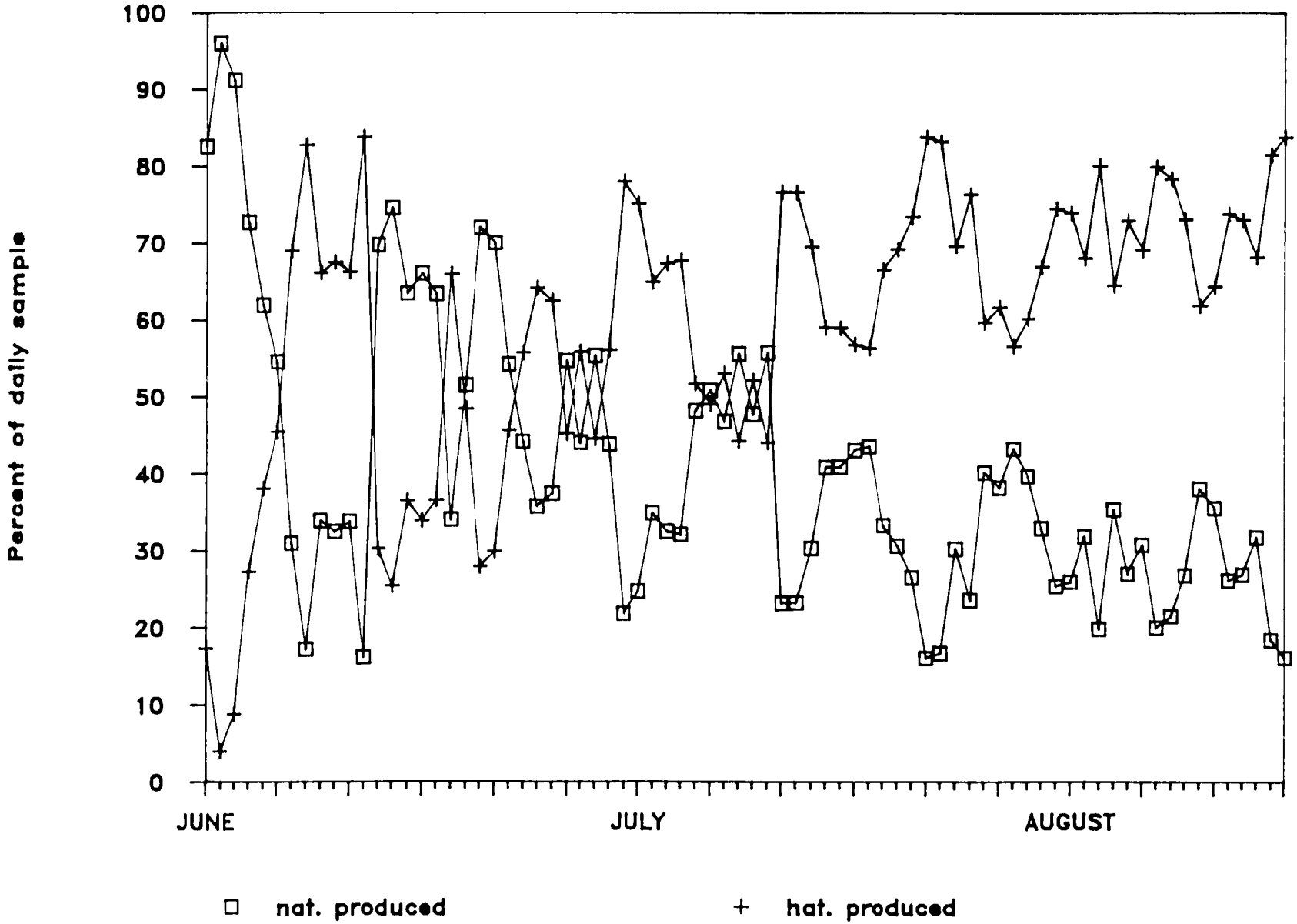

Figure 7. Proportions of hatchery and naturally produced sub-yearling chinook collected at the Rock Island Dam bypass trap, 1 June - 15 August.

Coho

Daily collection of coho (Oncorhynchus kisutch) smolts began on 6 May and continued until 27 June. Sporadic samples of coho were collected after 27 June, with the last coho collected on 24 August. Peak passage of 2,279 coho smolts occurred on 22 May (Appendix A-2, C-5). The 10% 50%, and 90% passage dates for coho were 11 May, 21 May, and 7 June, respectively.

Total salmonid run

The total juvenile salmonid run timing is represented in Appendix C-6. The early peak passage count of 943 on 15 April is largely influenced by the large collection of Wenatchee stock sockeye (n = 624). The 22 May peak count of 9,747 is the combination of coho (n = 2,279) and Osoyoos stock sockeye (n = 6,549) which made up 90.5% of the sample that day.

The effect of sub-yearling chinook was assessed on the 10% 50%, and 90% dates for the total cumulative juvenile salmonid passage. A comparison was made between 1987 and the three year average (1985-1987) between the total juvenile population migrating past Rock Island Dam and the juvenile migration excluding sub-yearling chinook (Figs. 8, 9). The duration of the middle 80% of the total juvenile salmonid passage (10% date to 90% date) was 69 days, 30 April to 7 July with a 50% passage date on 20 May, compared to a 72 day duration for the three year average, with 10% 50%, and 90% passage dates: 23 April, 22 May, and 3 July, respectively (Fig. 8). Excluding sub-yearling chinook from this analysis results in a spring migrant run duration of 30 days, 27 April to 26 May, with a 50% passage date on 18 May, compared to a 40 day duration for the three year average, with 10% 50%, and 90% passage dates: 20 April, 19 May, and 30 May, respectively (Fig. 9).

In summary, sub-yearling chinook extend the juvenile migration 90% passage date 43 days; from 26 May (spring migration) to 7 July (total migration). Run timing was confined to a narrower time frame in 1987 compared to the three year average. The middle 80% of the total juvenile salmonid migration past Rock Island Dam in 1987 was 69 days compared to 72 days for the three year average. Excluding sub-yearlings from this comparison, the spring migration past the dam in 1987 was 30 days, compared to 40 days for the three year average.

MARKED FISH RECOVERIES

The Fish Passage Center released eight groups of freeze branded hatchery fish (totaling 359,722 fish - Table 1) into the Columbia River system upstream from Rock Island Dam in order to evaluate the relationships between Columbia River flow rates and travel time and survival. These releases consisted of 174,950 spring chinook (37,863 released from the Leavenworth National Fish Hatchery into the Wenatchee River and the remainder released into the Methow River) 99,611 sub-yearling chinook released at Wells Dam, and 85,161 steelhead released into the Methow River. Table 1 presents information concerning these releases as well as recovery data, including: first, last, 10% 50%, and 90% recovery dates and number and percent of each release group.

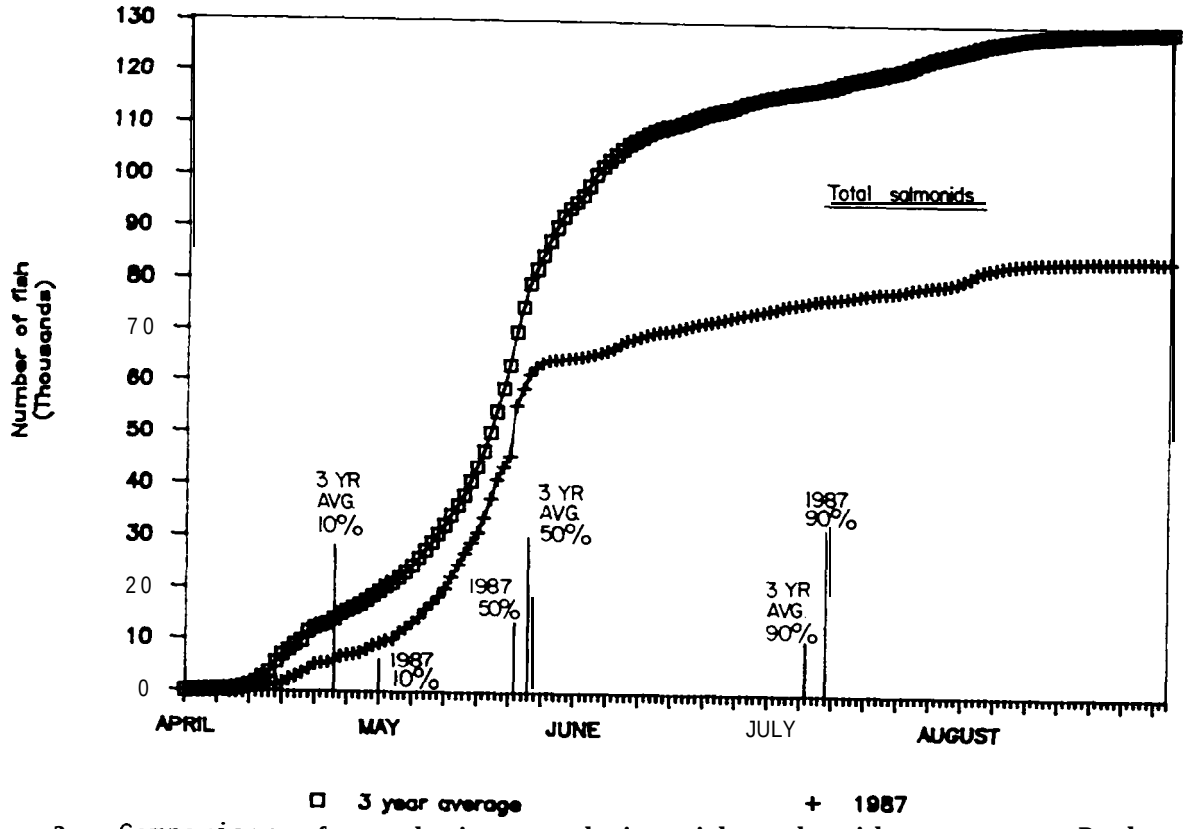

Figure 3. Comparison of cumulative total juvenile salmonid passage at Rock Island Dam between 1937 and the three year average (1985-1987).

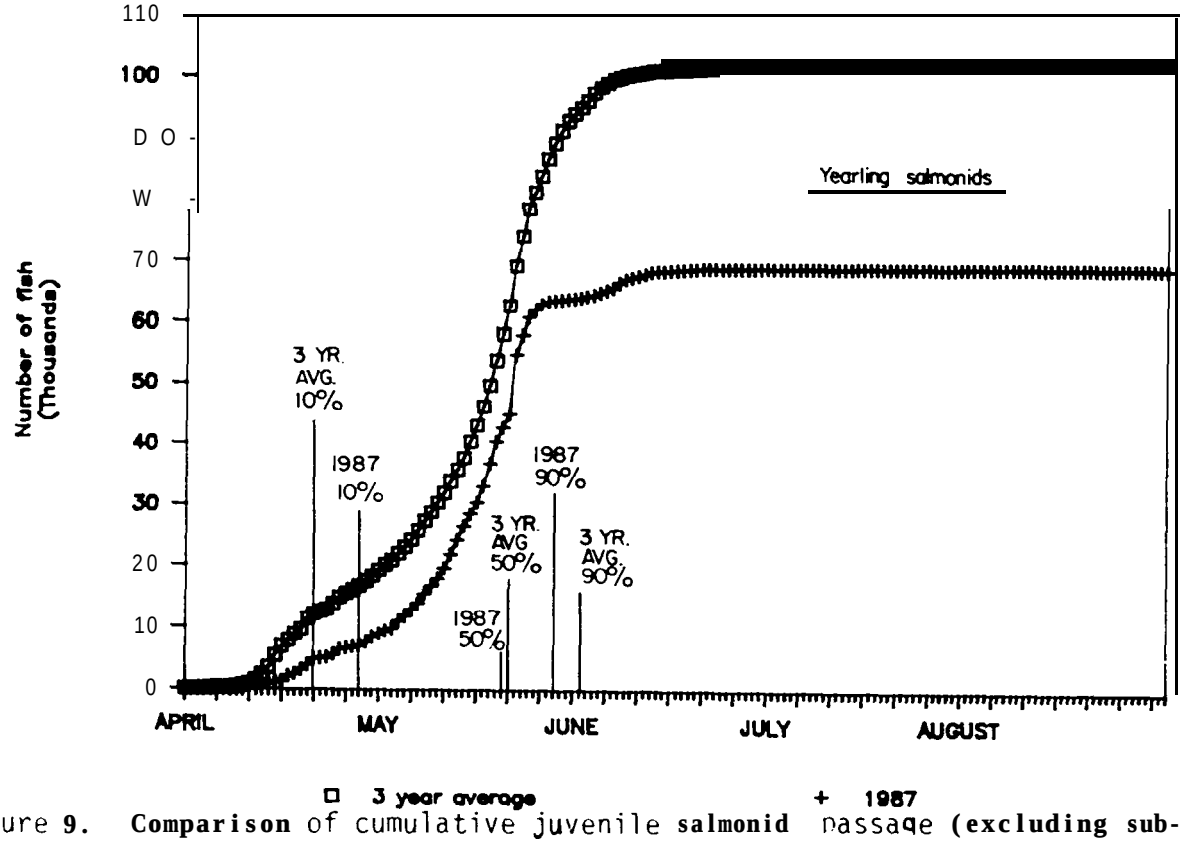

Figure 9. Comparison of cumulative juvenile salmonid passage (excluding sub-yearling chinook) at Rock Island Dam between 1987 and the three year average.

Yearling chinook

Leavenworth National Fish Hatchery - The first brand recovery at Rock Island Dam was on 24 April, consisting of the yearling chinook from Leavenworth National Fish Hatchery that were released on 22 April. The 50% recovery date at Rock Island Dam for the Leavenworth branded yearling spring chinook was 12 May, resultinq in a median travel time of 21 days. Final recovery of Leavenworth branded chinook occurred on 27 May. The Rock Island Dam bypass trap sampled 0.08% of the fish in this release (Table 1). These fish enter the Columbia River only 15 miles above Rock Island Dam and, as a result, Columbia River flows had less influence on travel time to Rock Island Dam for this group compared to fish released into the Methow River or at Wells Dam.

Winthrop National Fish Hatchery - Three groups of yearling chinook were released into the Methow River, each 4 days apart (Table 1). The median passage times for these three groups of fish were 23, 26, and 30 days. The fish released into the Methow River had a longer distance to travel before reaching Rock Island Dam than did the fish released into the Wenatchee River. The Rock Island Dam bypass trap sampled 0.16%-0.36% of these released fish (Table 1).

Sub-yearling chinook

One qroup of branded sub-yearlinq chinook was released from the WDF's hatchery at Wells Dam on 1 June. The median travel time to Rock Island Dam for this group was 22 days and the Rock Island bypass trap collected 0.04% of the marked fish from this release (Table 1). These fish had a shorter travel distance than the yearling chinook released in the Methow River.

Steel head

Three groups of marked steelhead were released on 23 April. 27 April, and 1 May into the Methow River (Table 1). Median travel times of the three groups of fish were 10, 11, and 12 days. Steelhead migrated downstream faster than did chinook yearlings travelinq about the same distance. Of the branded steelhead released, 0.65 - 0.90% were recovered at the Rock Island Dam bypass trap (Table 1).

The Rock Island Dam bypass trap collected a lower percentage of branded fish in 1987 than in 1986 (Fielder and Peven 1986). We believe this to be a direct result of the hydroacoustic study that took place at powerhouse # 1 between 20 April and 15 May, when the majority of branded fish were recovered.

Brands Conditions

Conditions of brands were assessed to determine clarity of the brand and depth of the brand on the fish. Brands were recorded as "O.K." if they were easily detected, "faint" if they were not easily detected, and "ulcerated" if the brand broke throuqh the skin.

Yearling chinook - During peak passage of branded chinook yearlings, 70% (n = 251) were classified as "faint" (Table 4).

Sub-yearling chinook - We did not record brand conditions for sub-yearling chinook because of the low numbers collected, but, brands were

Table 4. Faint Chinook yearling brands observed at the Rock Island Dam bypass trap, 2 May - 26 June 1987.

	Brands							
	LA/7S/l		LA/7S/3		RD/7S/l		LD/7T/3	
Date	Total	No. faint	Total	No. faint	Total	No. faint	Total	No. faint
05/02/87					3	3	1	1
05/03/87					1	1		
05/05/87	1	1	1	1	1	1	1	1
05/07/87	1	1					1	1
05/08/87	1		3	3	2		1	1
05/10/87	3	3	2	2	3	3	1	1
05/11/87	1	1	1	1	2		3	2
05/12/87	2	2	2	1	1	2	3	2
05/13/87	2	2	2	2	4	4		
05/14/87	3	2	2	2			1	
05/15/87	2	2	6	6			3	1
05/16/87	1	1					1	1
05/17/87	1	1	4	3		1	1	
05/18/87	19	13	30	24	1:	9		1
05/19/87	17	8	23	14	14	10	21	1
05/20/87	22	8	28	16	10	9		
05/21/87	9	9	10	7	3	3	1	
05/22/87	1	1	9	7	1	1		
05/23/87	3		a	4	2	2	1	1
05/24/87	2	1	7	2	2	2	i	1
05/25/87	2		4	2	2			
05/26/87			1	1				
05/27/87							1	1
06/02/87			1	1				
06/07/87			1	1				
06/08/87	4	4	4	4	1	1		
06/09/87			2	2				
06/10/87	2	1	7	5	2	2		
06/11/87	1	1			1	1		
06/12/87			4	2				
06/16/87			1	1				
06/17/87	1	1	1	1				
06/26/87			1	1				
Totals:	101	63	165	116	71	56	24	16
Percent of total:		62.3		70.3		78.8		66.6

faint = brands difficult to observe.

clearly visible for the first few we saw, and increasingly became more difficult to detect.

Steelhead - Nineteen percent (n = 187) of the steelhead brands observed were faint, while 12% were ulcerated (Table 5).

Overall, steelhead brands appeared to be in better condition than in 1986 or 1985, but chinook brands were harder to detect.

SUMMARY

Between 1 April and 31 August, 1987, 84,687 downstream migrating salmonids were collected at the Rock Island Dam bypass trap. Freeze branded fish collected consisted of 412 chinook salmon and 638 steelhead trout. In addition, 608 chinook and 16,519 steelhead were collected that had clipped adipose fins.

The middle 80% of the salmonid outmigration passed Rock Island Dam between 30 April and 7 July, 1987, a 69 day period. The dates and duration of the outmigration were extended by sub-yearling chinook. If sub-yearling chinook are excluded from analysis, the middle 80% of the outmigration was 27 April to 26 May, a 30 day period. Sub-yearling chinook comprised 17% of the fish collected at Rock Island Dam.

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Table 5. Faint and ulcerated steelhead brands observed at the Rock Island Dam bypass trap, 30 April - 8 June 1987.

	Brands								
	LA/7C/l			LA/7C/3			RD/7C/l		
Date	Total	No. faint	No. ulc.	Total	No. faint	No. ulc.	Total	No. faint	No. ulc.
04/30/87	8		2						
05/01/87	9		1				3		1
05/02/87	31	2	4				8	1	3
05/03/87	12	2	2	23	10	2			
05/04/87	35	2	7	39	a	2			
05/05/87	20	2	3	19	3	1	2		
05/06/87	13	1	3	27	5	3	24	13	
05/07/87	12		2	13	4	2	21		1
05/08/87	8			14	2	1	23	1:	2
05/09/87	8			12	1		16	4	2
05/10/87	3		1	6	1	1	19	5	2
05/11/87	7	2	2	9	3	4	33	9	6
05/12/87	5	1	1	12	5	2	21	2	1
05/13/87	5	2		9		2	21	4	3
05/14/87	2	1		4			20	1	6
05/15/87	2			3	2		9	1	
05/16/87	1			2			5	1	
05/17/87				2			4		
05/18/87	1			1			4		
05/19/87	1			2			5		3
05/20/87	1		1	1			4		1
05/21/87				1					
05/22/87	1						1	1	
05/23/87							1		1
05/25/87				1			1		
05/31/87	1								
06/01/87				1					
06/04/87							1	1	
06/08/87	1								
Totals:	**187**	**15**	**29**	**201**	**44**	**20**	246	63	32
Percent of total:	8.0		15.5		**21.9**	**10.0**	25.6		13.0

faint = brands difficult to observe: ulcerated = brands broken through the skin.

APPENDICES

A-1 Daily samples from the Rock Island smolt monitoring program, April 1987.
A-2 Daily samples from the Rock Island smolt monitoring program, May 1987.
A-3 Daily samples from the Rock Island smolt monitoring program, June 1987.
A-4 Daily samples from the Rock Island smolt monitoring program, July 1987.
A-5 Daily samples from the Rock Island smolt monitoring program, August 1987.
A-6 Monthly summary of the Rock Island smolt monitoring program, April - August 1987.

B-1 Daily expanded counts from the Rock Island smolt monitoring program, April 1987.
B-2 Daily expanded counts from the Rock Island smolt monitoring program, May 1987.
B-3 Daily expanded counts from the Rock Island smolt monitoring program, June 1987.
B-4 Daily expanded counts from the Rock Island smolt monitoring program, July 1987.
B-5 Daily expanded counts from the Rock Island smolt monitoring Program August 1987.
B-6 Monthly summary of the expanded counts of the Rock Island smolt monitoring program, April - August 1987.

C-1 Chinook yearling run timing, Rock Island Dam, 1 April - 31 August, 1987.
C-2 Chinook sub-yearling run timing, Rock Island Dam, 1 April - 31 August, 1987.
c-3 Steelhead smolt run timing, Rock Island Dam, 1 April - 31 August, 1987.
C-4. Coho smolt run timing, Rock Island Dam, 1 April - 31 August, 1987.
C-5. Sockeye smolt run timing, Rock Island Dam, 1 April - 31 August, 1987.
C-6 Total juvenile salmonid run timing, Rock Island Dam, 1 April - 31 August.

D-1 Daily summary of marked chinook and steelhead sampled from the Rock Island Dam bypass trap, April 1987.
D-2 Daily summary of marked chinook and steelhead sampled from the Rock Island Dam bypass trap, May 1987.
D-3 Daily summary of marked chinook and steelhead sampled from the Rock Island Dam bypass trap, June 1987.
D-4 Daily summary of marked chinook and steelhead sampled from the Rock Island Dam bypass trap, July 1987.
D-5 Daily summary of marked chinook and steelhead sampled from the Rock Island Dam bypass trap, August 1987.
D-6 Monthly summary of marked chinook and steelhead sampled from the Rock Island Dam bypass trap, April - August 1987.

Appendix A-l. Daily salmor;id catch, Rock Island bypass trap, April, 1987.

STOP	DATE/TIME	CHINOOK YEARLING	CHINOOK SUB-YEAR.	STLHD.	COHO	SOCKEYE	TOTAL SALMONIDS
4-01-87/0900		20	2	2	0	4	28
4-02-87/0900		6	10	0	0	0	16
4-03-87/0900		14	5	0	0	1	20
4-04-87/0900		39	26	3	0	4	72
4-05-87/0900		24	9	5	0	5	43
4-06-87/0900		36	15	6	0	17	74
4-07-87/0900		27	4	2	0	17	50
4-08-87/0900		24	21	1	0	8	54
4-09-87/0900		79	24	4	0	14	121
4-10-87/0900		55	4	8	0	7	74
4-11-87/0900		62	11	14	0	37	124
4-12-87/0900		65	16	5	0	37	123
4-13-87/0900		56	5	9	0	70	140
4-14-87/0900		48	1	15	0	156	220
4-15-87/0900		45	5	3	0	122	175
4-16-87/0900		75		20	0	192	294
4-17-87/0900		70	1:	23	0	664	772
4-18-87/0900		74	6	33	0	262	375
4-19-87/0900		94	22	51	0	570	737
4-20-87/0900		121		56	0	596	780
4-21-87/0900		47	1:	53	0	825	938
4-22-87/0900		13	36	23	0	72	144
4-23-87/0900		63	13	25	0	37	138
4-24-87/0900		291	1	20	0	126	438
4-25-87/0900		280	7	32	0	624	943
4-26-87/0900		108	13	21	0	100	242
4-27-87/0900		55	18	26	0	77	176
4-28-87/0900		67	11	32	0	89	199
4-29-87/0900		227	5	50	0	380	662
4-30-87/0900		206	3	124	0	402	735
Monthly totals:		**2391**	335	666	0	5515	8907

Appendix A-Z. Daily salmonid catch, Rock Island bypass trap, May, 1987.

STOP	DATE/TIME	CHINOOK YEARLING	CHINOOK SUB-YEAR.	STLHD.	COHO	SOCKEYE	TOTAL SALMONIDS
5-Ol-87/0900		127	2	229	0	138	496
5-O2-87/0900		133	4	291	0	67	495
5-03-87/0900		66	2	279	0	52	399
5-04-87/0900		214	5	737	0	318	1274
5-05-87/0900		227	5	513	0	23	768
5-06-87/0900		275	9	669	70	49	1072
5-07-87/0900		189	9	591	188	22	999
5-08-87/0900		189	5	663	748	9	1614
5-09-87/0900		207	1	601	367	24	1200
5-10-87/0900		169	1	653	345	44	1212
5-11-87/0900		316	10	916	440	38	1720
5-12-87/0900		458	21	1147	637	53	2316
5-13-87/0900		287	5	1381	662	37	2372
5-14-87/0900		321	10	1113	722	18	2184
5-15-87/0900		307	8	978	703	15	2011
5-16-87/0900		339	12	1043	605	5	2004
5-17-87/0900		536	15	1020	1214	8	2793
5-18-87/0900		833	23	1202	1511	16	3585
5-19-87/0900		892	22	1311	1479	5	3709
5-2O-87/0900		815	2	834	789	22	2462
5-21-87/0900		399		695	634	437	2167
5-22-87/0900		233	1:	675	2279	6549	9747
5-23-87/0900		178	4	445	1205	1391	3223
5-24-87/0900		133	9	287	1689	785	2903
5-25-87/0900		77	8	164	813	268	1330
5-26-87/0900		64	6	103	492	159	824
5-27-87/0900		41	12	70	217	122	462
5-28-87/0900		15	38	80	55	20	208
5-29-87/0900		15	9	105	25	22	176
5-30-87/0900		21	37	61	23	21	163
5-31-87/0900		8	41	46	17	16	128
Monthly totals:		8084	348	18902	17929	10753	56016

Appendix A-3. Daily salmonid catch, Rock Island bypass trap, June, 1987.

STOP DATE/TIME	CHINOOK YEARLING	CHINOOK SUB-YEAR.	STLHD.	COHO	SOCKEYE	TOTAL SALMONIDS
6-01-87/0900	9	24	62	44	22	**161**
6-02-87/0900	10	51	59	55	35	**210**
6-03-87/0900	22	39	85	112	31	**289**
6-04-87/0900	27	11	85	270	17	**410**
6-05-87/0900	13	21	76	248	10	368
6-06-87/0900	38	37	88	390	14	567
6-07-87/0900	20	43	119	652	22	856
6-08-87/0900	67	65	69	379	22	602
6-09-87/0900	62	64	33	138	20	317
6-10-87/0900	75	80	33	209	21	418
6-11-87/0900	69	80	27	215	12	403
6-12-87/0900	54	62	23	213	7	359
6-13-87/0900	26	86	13	89	2	216
6-14-87/0900	18	118	22	44	2	204
6-15-87/0900	16	115	18	34	4	187
6-16-87/0900	17	228	8	54	1	308
6-17-87/0900	17	259	12	39	1	328
6-18-87/0900	12	232	9	64	2	**319**
6-19-87/0900	3	194	1	42	1	**241**
6-20-87/0900	14	236	4	17	0	**271**
6-21-87/0900	7	164	2	20	1	**194**
6-22-87/0900	1	223	3	7	2	236
6-23-87/0900	4	346	8	13	3	374
6-24-87/0900	0	294	1	11	0	306
6-25-87/0900	1	256	2	5	4	268
6-26-87/0900	1	200	1	4	0	206
6-27-87/0900	0	245	4	0	1	250
6-28-87/0900	0	222	0	0	1	223
6-29-87/0900	1	235	0	0	3	239
6-30-87/0900	0	247	1	1	4	253
Monthly totals:	604	4477	868	3369	265	9583

Appendix A-4. Daily salmonid catch, Rock Island bypass trap, July, 1987.

STOP DATE/TIME	CHINOOK YEARLING	CHINOOK SUB-YEAR.	STLHD.	COHO	SOCKEYE	TOTAL SALMONID
7-01-87/0900	0	375	3	3	6	387
7-02-87/0900	0	446	3	0	4	453
7-03-87/0900	0	212	6	1	1	220
7-04-87/0900	0	174	2	0	2	178
7-05-87/0900	0	172	0	0	1	173
7-06-87/0900	0	216	2	0	1	219
7-07-87/0900	0	288	1	0	0	289
7-08-87/0900	0	158	1	0	2	161
7-09-87/0900	0	159	1	0	3	163
7-10-87/0900	0	163	2	0	3	168
7-11-87/0900	0	130	2	0	1	133
7-12-87/0900	0	148	1	0	1	150
7-13-87/0900	0	148	2	0	2	152
7-14-87/0900	0	203	2	0	5	210
7-15-87/0900	0	161	2	1	2	166
7-16-87/0900	0	165	0	0	3	168
7-17-87/0900	0	175	1	0	2	178
7-18-87/0900	0	132	2	0	4	138
7-19-87/0900	0	101	2	0	1	104
7-20-87/0900	1	98	1	0	0	100
7-21-87/0900	0	267	0	0	3	270
7-22-87/0900	0	317	0	2	2	321
7-23-87/0900	0	185	0	1	4	190
7-24-87/0900	0	177	1	2	3	183
7-25-87/0900	0	174	0	0	0	174
7-26-87/0900	0	183	1	0	0	184
7-27-87/0900	0	135	0	2	0	137
7-28-87/0900	0	165	1	1	0	167
7-29-87/0900	0	289	1	0	4	294
7-30-87/0900	0	512	0	3	7	522
7-31-87/0900	0	547	0	10	2	559
Monthly totals:	1	6775	40	26	69	6911

Appendix A-5. Daily salmonid catch, Rock Island bypass trap, August, 1987.

STOP	DATE/TIME	CHINOOK YEARLING	CHINOOK SUB-YEAR.	STLHD.	COHO	SOCKEYE	TOTAL SALMONID
8-01-87/0900		0	763	0 2205	63	434	789
8-02-87/0900		0	424				
8-03-87/0900		0	263	1	3	2	269
8-04-87/0900		0	341	0	3	0	344
8-05-87/0900		0	240	0	4	2	246
8-06-87/0900		0	160	0	0	1	161
8-07-87/0900		0	144	0	0	1	145
8-08-87/0900		0	138	1	3	1	140
8-09-87/0900		0	105	0	0	1	109
8-10-87/0900		0	61	0			62
8-11-87/0900		0	89	0	0		90
8-12-87/0900		0	52		0	1	53
8-13-87/0900			63	0	0	1	65
8-14-87/0900		0	39	0	0	0	39
8-15-87/0900		0	31	0	0	0	31
8-16-87/0900		0	19	0	0	0	19
8-17-87/0900		0	21	0	0	0	21
8-18-87/0900		0	34	0	0	0	34
8-19-87/0900		0	19	0	0	0	19
8-20-87/0900		0	46	0	1	0	47
8-21-87/0900		0	22	0		0	
8-22-87/0900		0	21	0	0	0	2321
8-23-87/0900		0	11	0	0	0	11
8-24-87/0900		0	4				6
8-25-87/0900		0	17	0	0	1	18
8-26-87/0900		0	24	0	0		
8-27-87/0900		0	13	0	0	00	2413
8-28-87/0900		0	9	0	0	0	9
8-29-87/0900		0	9			0	9
8-30-87/0900		0	12	0	0	0	12
8-31-87/0900		0	7	0	0	0	7
Monthly totals:		**0**	**3201**	5	42	22	3270

Appendix A-6. Monthly summary of salmonid catch at Rock Island Dam, 1 **April - 31 August** 1987.

MONTH	CHINOOK YEARLING	CHINOOK SUB-YR.	STLHD.	COHO	SOCKEYE	TOTAL SALMONIDS
April	2391	335	666	0	5515	8907
May	8084	348	18902	17929	10753	56016
June	604	4477	868	3369	265	9583
July	1	6775	40	26	69	6911
August	0	3201	5	42	22	3270
Yearly totals:	11080	15136	20481	21366	16624	84687

Appendix B-l. Expanded Rock Island salmonid catches, Aprll, 1987.

STOP	DATE/TIME	CHINOOK YEARLING	CHINOOK SUB-YEAR.	STLHD.	COHO	SOCKEYE	TOTAL SALMONIDS
4-01-87/0900		24	2	2	0	5	34
4-02-87/0900		7	12	0	0	0	19
4-03-87/0900		15	6	0	0	1	22
4-04-87/0900		46	31	4	0	5	85
4-05-87/0900		24	9	5	0		43
4-06-87/0900		37	15	6	0	1:	75
4-07-87/0900		33	5	2	0	21	62
4-08-87/0900		29	26	1	0	10	66
4-09-87/0900		98	30	5	0	17	150
4-10-87/0900		66	5	10	0	8	88
4-11-87/0900		76	14	17	0	46	153
4-12-87/0900		83	21	6	0	47	158
4-13-87/0900		64	6	10	0	80	159
4-14-87/0900		55	1	17	0	180	254
4-15-87/0900		53	6	4	0	143	205
4-16-87/0900		89	8	24	0	227	348
4-17-87/0900		92	20	30	0	875	1017
4-18-87/0900		90	7	40	0	318	455
4-19-87/0900		105	24	57	0	634	820
4-20-87/0900		138	8	64	0	679	889
4-21-87/0900		102	28	115	0	1793	2038
4-22-87/0900		28	76	49	0	152	305
4-23-87/0900		135	28	53	0	79	295
4-24-87/0900		639	2	44	0	277	962
4-25-87/0900		709	18	81	0	1580	2388
4-26-87/0900		719	87	140	0	666	1612
4-27-87/0900		2105	689	995	0	2947	6736
4-28-87/0900		163	27	78	0	216	483
4-29-87/0900		509	11	112	0	852	1485
4-30-87/0900		558	8	336	0	1089	1990
Monthly totals:		6890	1229	2307	0	12968	23394

Appendix B-2. Expanded Rock Island salmonid catches, May, 1987.

STOP	DATE/TIME	CHINOOK YEARLING	CHINOOK SUB-YEAR.	STLHD.	COHO	SOCKEYE	TOTAL SALMONIDS
5-01-87/0900		361	6	650	0	392	1408
5-02-87/0900		319	10	699	0	161	1188
5-03-87/0900		187	6	790	0	147	1130
5-04-87/0900		597	14	2055	0	887	3553
5-05-87/0900		470	10	1062	0	48	1590
5-06-87/0900		636	21	1548	162	113	2480
5-07-87/0900		482	23	1508	480	56	2549
5-08-87/0900		420	11	1472	1661	20	3584
5-09-87/0900		453	2	1315	803	53	2626
5-10-87/0900		391	2	1510	798	102	2802
5-11-87/0900		726	23	2105	1011	87	3952
5-12-87/0900		949	44	2378	1320	110	4801
5-13-87/0900		597	10	2874	1378	77	4936
5-14-87/0900		723	23	2508	1627	41	4921
5-15-87/0900		659	17	2098	1508	32	4314
5-16-87/0900		783	28	2409	1398	12	4629
5-17-87/0900		903	25	1717	2044	13	4703
5-18-87/0900		1153	32	1663	2091	22	4961
5-19-87/0900		1398	34	2055	2318	8	5814
5-20-87/0900		1227	3	1256	1188	33	3707
5-21-87/0900		555	3	967	882	608	3016
5-22-87/0900		327	15	948	3201	9198	13690
5-23-87/0900		270	6	675	1829	2111	4891
5-24-87/0900		203	14	438	2576	1197	4427
5-25-87/0900		106	11	226	1120	369	1832
5-26-87/0900		88	8	141	675	218	1130
5-27-87/0900		66	19	112	347	195	739
5-28-87/0900		25	64	135	93	34	350
5-29-87/0900		23	14	159	38	33	267
5-30-87/0900		32	56	92	35	32	245
5-31-87/0900		10	52	58	21	20	161
Monthly totals:		15139	606	37623	30604	16429	100401

Appendix B-3. Expanded Rock Island salmonid catches, June, 1987.

STOP	DATE/TIME	CHINOOK YEARLING	CHINOOK SUB-YEAR.	STLHD.	COHO	SOCKEYE	TOTAL SALMONIDS
6-01-87/0900		11	30	77	54	27	199
6-02-87/0900		13	66	76	71	45	271
6-03-87/0900		31	54	119	156	43	403
6-04-87/0900		34	14	108	344	22	522
6-05-87/0900		16	26	96	313	13	464
6-06-87/0900		54	52	124	549	20	799
6-07-87/0900		29	62	172	940	32	1234
6-08-87/0900		82	80	85	466	27	739
6-09-87/0900		93	96	50	207	30	476
6-10-87/0900		116	123	51	323	32	645
6-11-87/0900		107	124	42	333	19	625
6-12-87/0900		62	71	26	243	8	410
6-13-87/0900		29	97	15	100	2	243
6-14-87/0900		20	131	24	49	2	227
6-15-87/0900		17	121	19	36	4	197
6-16-87/0900		19	250	9	59	1	338
6-17-87/0900		20	297	14	45	1	376
6-18-87/0900		13	251	10	69	2	345
6-19-87/0900			212	1	46	1	263
6-20-87/0900		1:	252	4	18	0	290
6-21-87/0900		7	173	2	21	1	204
6-22-87/0900		1	236	3	7	2	250
6-23-87/0900		5	429	10	16	4	464
6-24-87/0900		0	340	1	13	0	354
6-25-87/0900		1	294	2	6	5	308
6-26-87/0900		1	234	1	5	0	241
6-27-87/0900		0	286	5	0	1	292
6-28-87/0900		0	236	0	0	1	237
6-29-87/0900		1	251	0	0	3	255
6-30-87/0900		0	350	1	1	6	359
Monthly totals:		800	5238	1147	4490	354	12029

Appendix B-4. Expanded Rock Island salmonid catches, July, 1987.

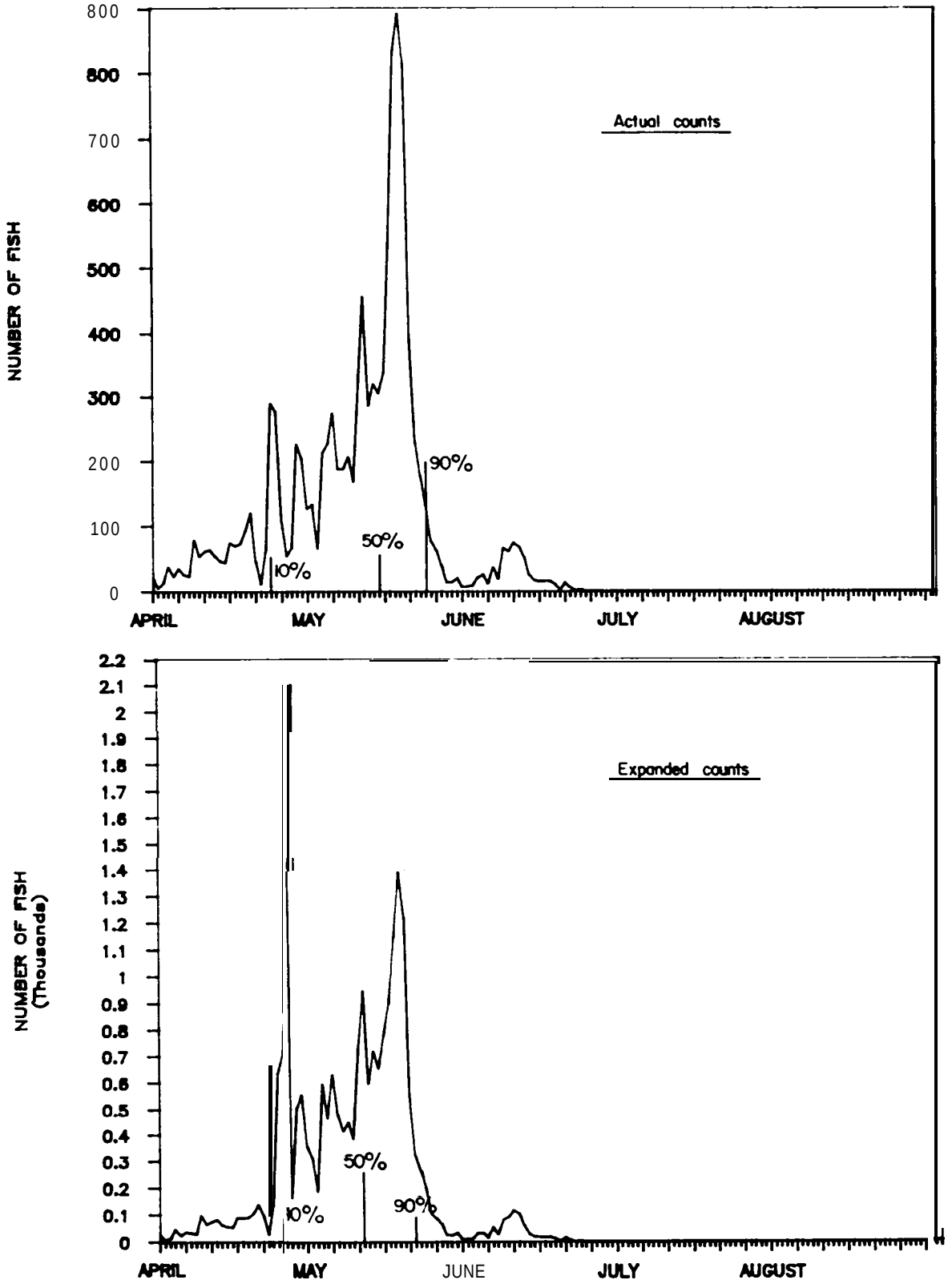
STOP	DATE/TIME	CHINOOK YEARLING	CHINOOK SUB-YEAR.	STLHD.	COHO	SOCKEYE	TOTAL SALMONIDS
7-01-87/0900		0	484	4	4	8	500
7-02-87/0900		0	522	4	0	5	530
7-03-87/0900		0	230	7	1	1	239
7-04-87/0900		0	191	2	0	2	195
7-05-87/0900		0	193	0	0	1	194
7-06-87/0900		0	235	2	0	1	239
7-07-87/0900		0	340	1	0	0	341
7-08-87/0900		0	189	1	0	2	193
7-09-87/0900		0	190	1	0	4	195
7-10-87/0900		0	185	2	0	3	190
7-11-87/0900		0	144	2	0	1	147
7-12-87/0900		0	156	1	0	1	158
7-13-87/0900		0	158	2	0	2	162
7-14-87/0900		0	239	2	0	6	247
7-15-87/0900		0	198	2	1	2	204
7-16-87/0900		0	197	0	0	4	201
7-17-87/0900		0	214	1	0	2	218
7-18-87/0900		0	158	2	0	5	166
7-19-87/0900		0	117	2	0	1	121
7-20-87/0900		1	107	1	0	0	110
7-21-87/0900		0	324	0	0	4	328
7-22-87/0900		0	355	0	2	2	359
7-23-87/0900		0	209	0	1	5	215
7-24-87/0900		0	195	1	2	3	202
7-25-87/0900		0	186	0	0	0	186
7-26-87/0900		0	198	1	0	0	199
7-27-87/0900		0	149	0	2	0	152
7-28-87/0900		0	199	1	1	0	201
7-29-87/0900		0	340	1	0	5	346
7-30-87/0900		0	593	0	3	8	604
7-31-87/0900		0	632	0	12	2	646
Monthly totals:		1	7827	43	29	80	7980

Appendix B-5. Expanded Rock Island salmonid catches, August, 1987.

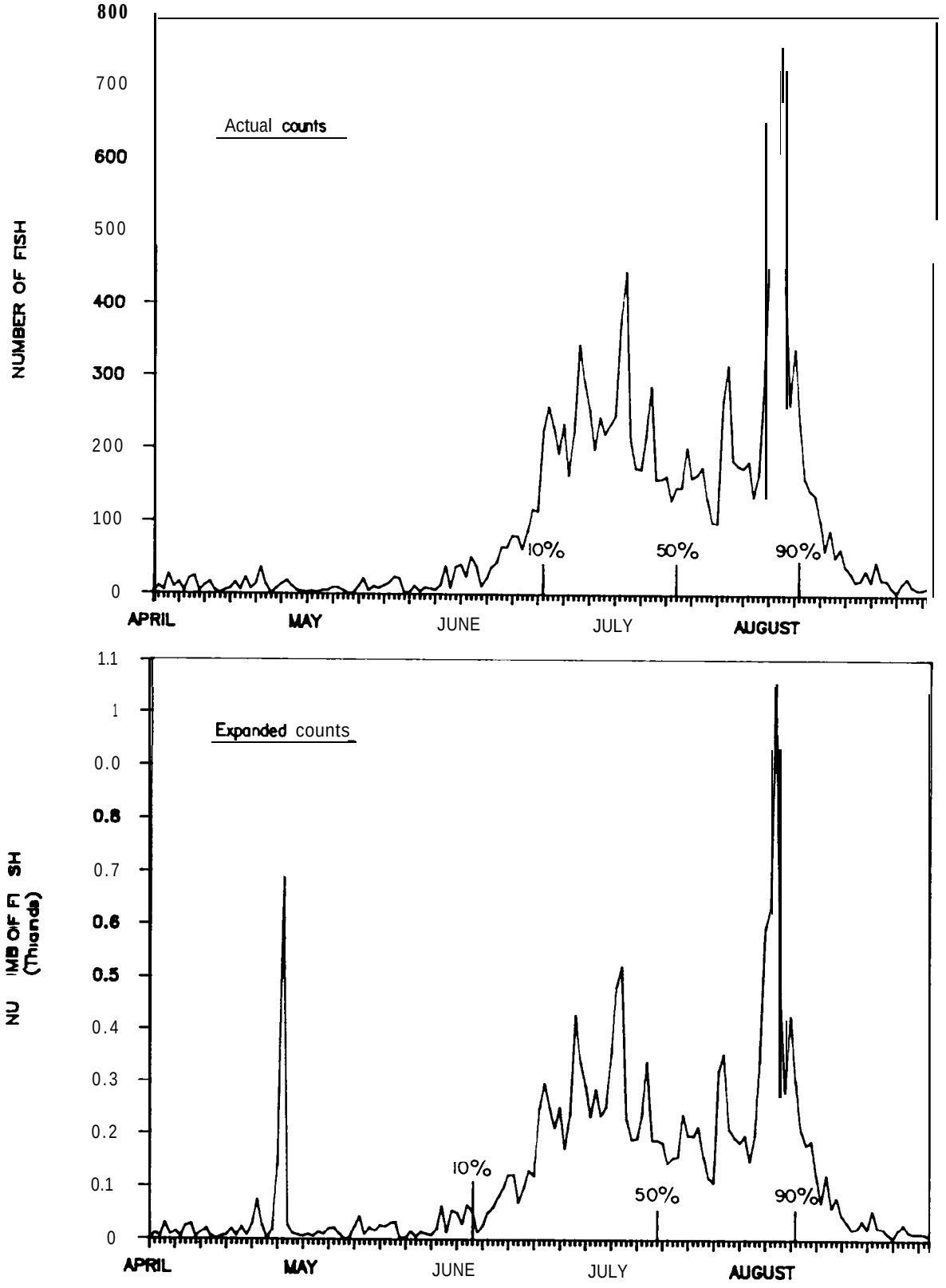
STOP	DATE/TIME	CHINOOK YEARLING	CHINOOK SUB-YEAR.	STLHD.	COHO	SOCKEYE	TOTAL SALMONIDS
8-01-87/0900		0	1057	0	28	8	1093
8-02-87/0900		0	453	2	5	3	464
8-03-87/0900		0	280	1	3	2	286
8-04-87/0900		0	427	0	4	0	431
8-05-87/0900		0	305	0	5	3	313
8-06-87/0900		0	208	0	0	1	210
8-07-87/0900		0	181	0	0	1	182
8-08-87/0900		0	188	1	1	0	191
8-09-87/0900		0	122	0	3	1	127
8-10-87/0900		0	72	0	0	0	72
8-11-87/0900		0	123	0	0	1	124
8-12-87/0900		0	62	0	0	1	64
8-13-87/0900		0	80	1	0	1	83
8-14-87/0900		0	47	0	0	0	47
8-15-87/0900		0	34	0	0	0	34
8-16-87/0900		0	20	0	0	0	20
8-17-87/0900		0	22	0	0	0	22
8-18-87/0900		0	37	0	0	0	37
8-19-87/0900		0	21	0	0	0	21
8-20-87/0900		0	57	0	1	0	58
8-21-87/0900		0	24	0	1	0	25
8-22-87/0900		0	22	0	0	0	22
8-23-87/0900		0	12	0	0	0	12
8-24-87/0900		0	4	0	1	1	6
8-25-87/0900		0	19	0	0	1	21
8-26-87/0900		0	30	0	0	0	30
8-27-87/0900		0	16	0	0	0	16
8-28-87/0900		0	12	0	0	0	12
8-29-87/0900		0	13	0	0	0	13
8-30-87/0900		0	13	0	0	0	13
8-31-87/0900		0	8	0	0	0	8
Monthly totals:		0	3969	5	52	25	4051

Appendix B-6. Monthly summary of expanded catch data at Rock Island Dam, 1 April - 31 August 1987.

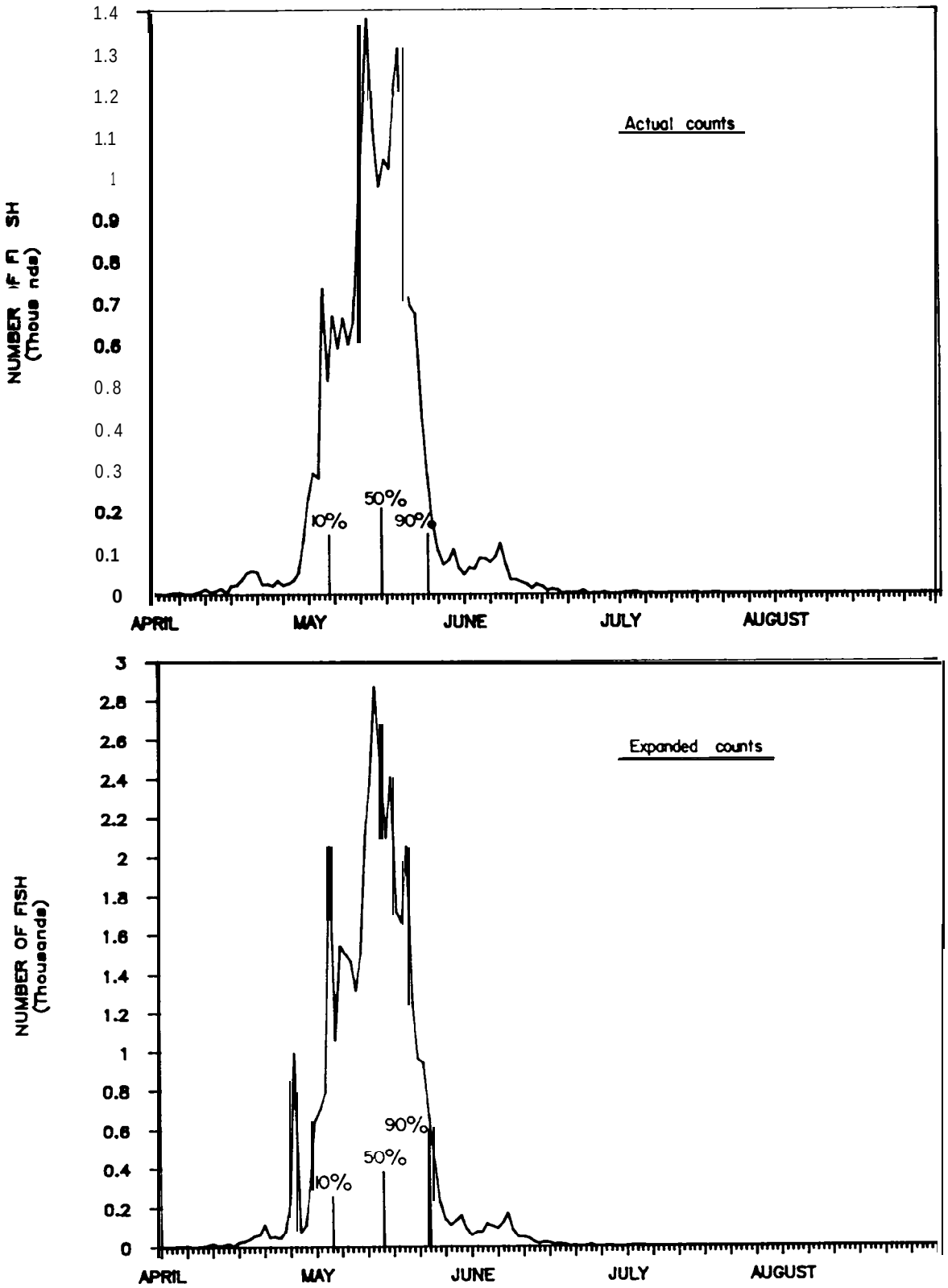
MONTH	CHINOOK YEARLING	CHINOOK SUB-YR.	STLHD.	COHO	SOCKEYE	TOTAL SALMONIDS
April	6890	1229	2307	0	12968	23394
May	15139	606	37623	30604	16429	100401
June	800	5238	1147	4490	354	12029
July	1	7827	43	29	80	7980
August	0	3969	5	52	25	4051
Yearly totals:	22830	18869	41125	35175	29856	147855



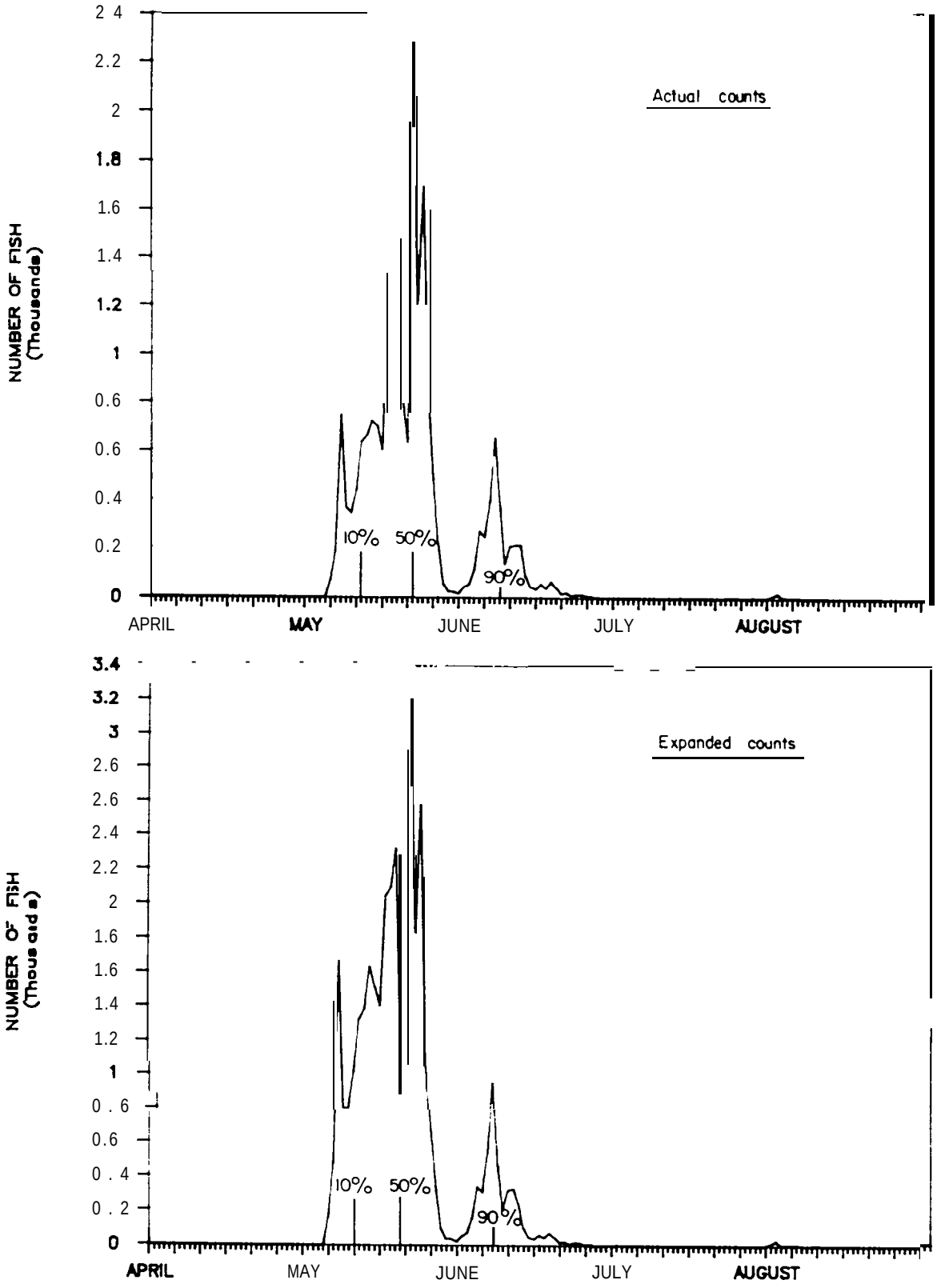
Appendix C-l. **Chinook yearling run timing,** Rock Island Dam 1 **April - 31 August 1987.**



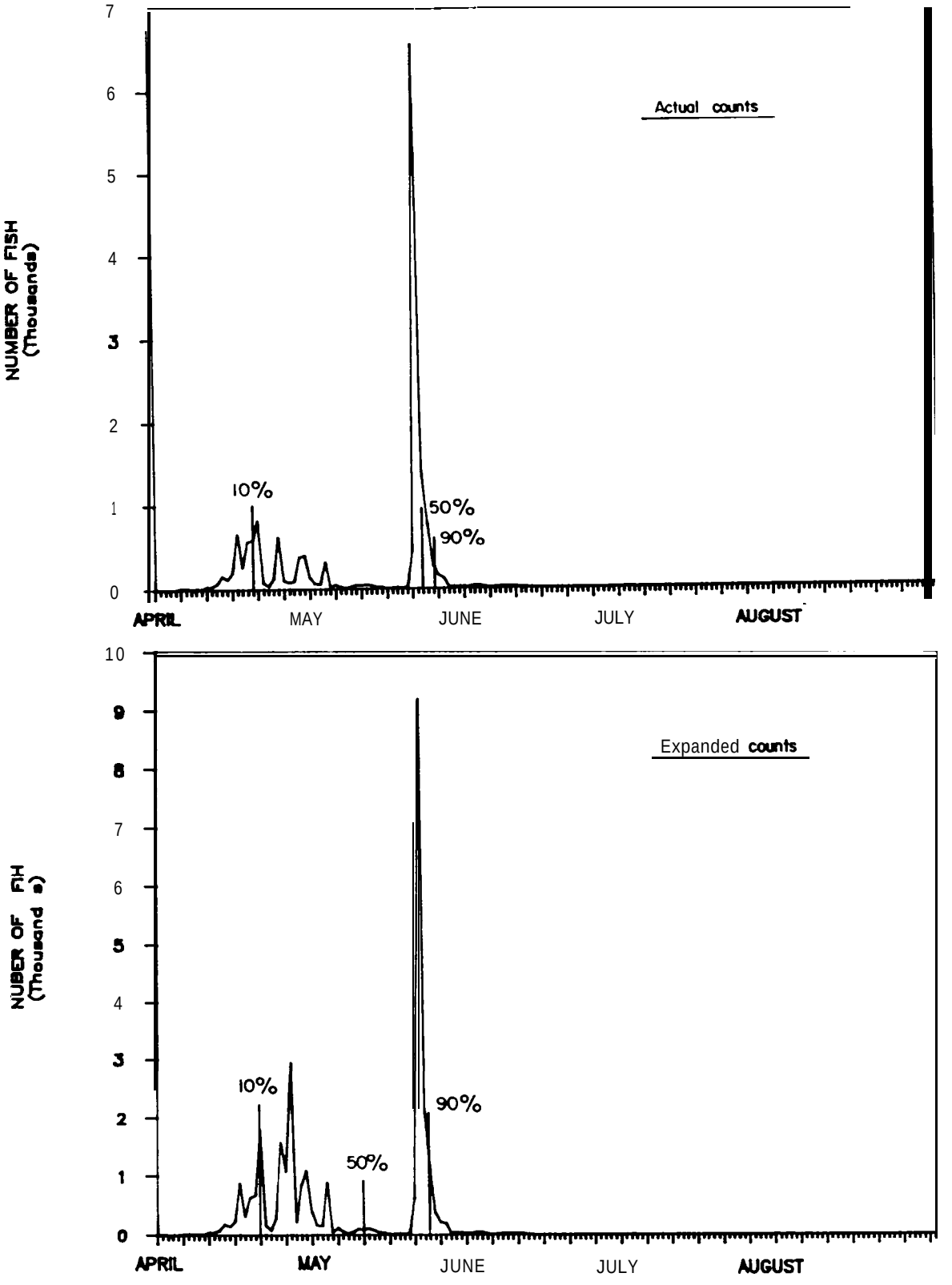
Appendix C-2 Chinook sub-yearling **run timing,** Rock **Island Dam,** 1 **April - 31 August, 1987.**



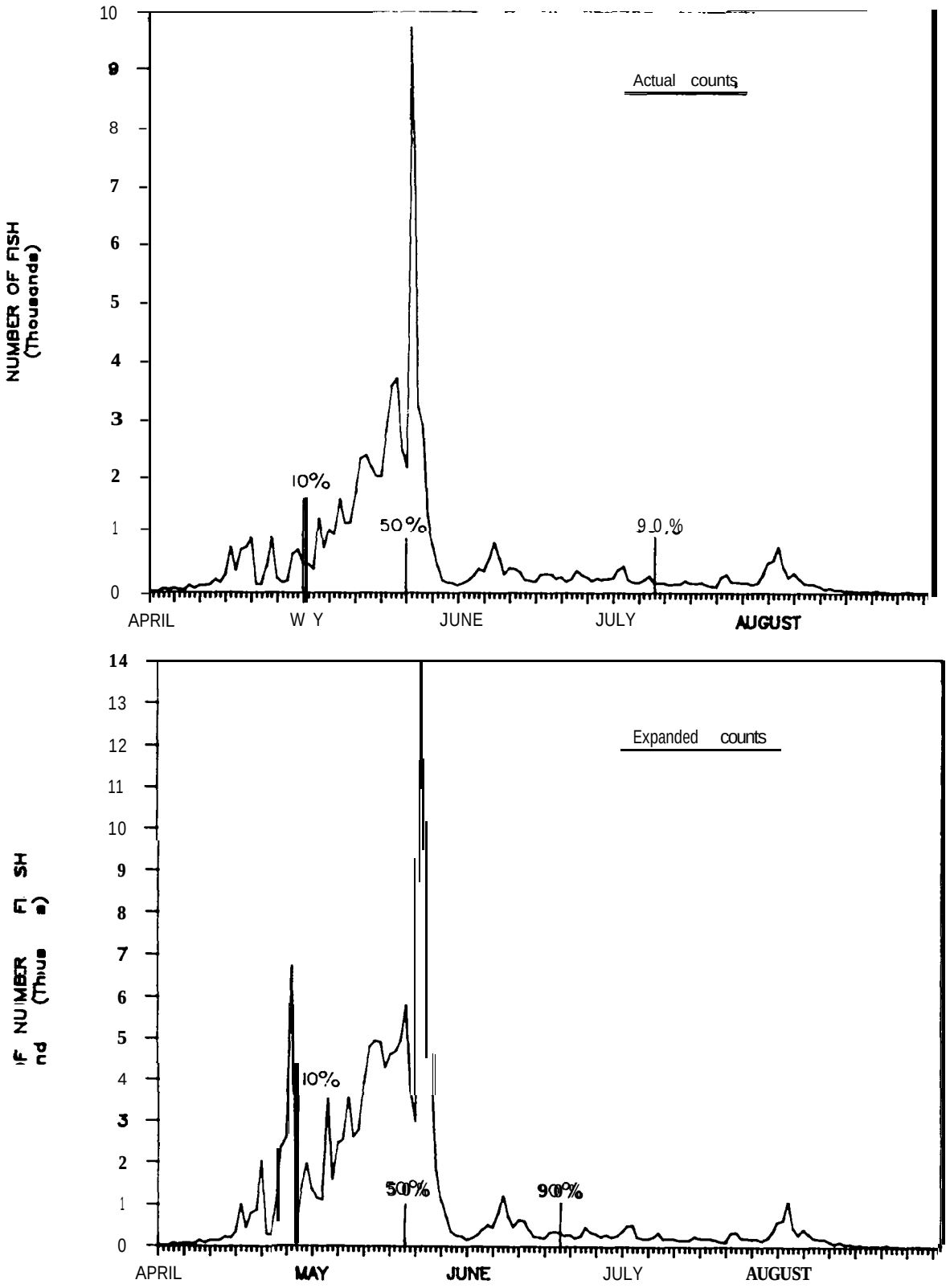
Apoendix C-3. Steelhead smolt run timing, Rock Island Dam, 1 April - 31 August, 1987.



Appendix C-4. Coho smolt **run timing Rock Island Dam, 1 April - 31** August, 1987.



Appendix C-5. Sockeye smolt run timing Rock Island Dam, 1 April - 31 August, 1987.



Appendix C-6. Total juvenile salmonid run timing Rock Island Dam, 1 April - 31 August 1087.

Appendix D-1. Daily summary of branded chinook and steelhead sampled from the Rock s and Dam bypass trap, April, 1987.

	Chinook Brands					Ad Clips		Steelhead Brands			
Date	7S/LA/1	7S/LA/3	7S/RD/1	7T/LD/3	T/LA/4	Subyr	Yrlng	7C/LA/1	7C/LA/3	7C/RD/1	Ad Clips
04/01/87											
04/02/87											
04/03/87											
04/04/87											
04/05/87											
04/06/87											1
04/07/87											
04/08/87											
04/09/87											
04/10/87											
04/11/87											1
04/12/87											
04/13/87											
04/14/87											
04/15/87											
04/16/87											2
04/17/87											7
04/18/87											14
04/19/87											26
04/20/87											32
04/21/87											17
04/22/87											12
04/23/87											9
04/24/87				3							4
04/25/87				2							12
04/26/87											11
04/27/87											9
04/28/87								2			20
04/29/87				2				1			20
04/30/87								8			66
Totals:	0	0	0	7	0	0	0	11	0	0	263

Appendix D-2. Daily summary of branded chinook and steelhead sampled from the Rock Island Dam bypass trap, May, 1987.

	Chinook Brands					Ad Clips		Steelhead Brands			
Date	7S/LA/l	7S/LA/3	7S/RD/l	7T/LD/3	T/LA/4	Subyr	Yrlng	7C/LA/l	7C/LA/3	7C/RD/l	Ad Clips
05/01/87	1						1	9	3		143
05/02/87				3	1		2	31	a		192
05/03/87				1			1	12	23		189
05/04/87							6	35	39		493
05/05/87	1	1		1	1		5	20	19	2	347
05/06/87							12	13	27	24	518
05/07/87	1				1		49	12	13	21	486
05/08/87	1	3		2	1		40	8	14	23	563
05/09/87							35	a	12	16	509
05/10/87	3	2		3	1		28	3	6	19	475
05/11/87	1	1		2	3		32	7	9	33	807
05/12/87	2	2		1	3		28	5	12	21	1019
05/13/87	2	2		4			16	5	9	21	1117
05/14/87	3	2			1		9	2	4	20	861
05/15/87	2	6			3		15	2	3	9	725
05/16/87	1				1		7	1	2	5	1004
05/17/87	1	4		1	1		19		2	4	936
05/18/87	19	30		15	2		a	1	1	4	1098
05/19/87	17	23		14	1		9	1	2	5	1203
05/20/87	22	28		10			11	1	1	4	745
05/21/87	9	10		3	1		12		1		625
05/22/87	1	9		1			7	1		1	572
05/23/87	3	8		2	1		6			1	358
05/24/87	2	7		2	1		5			1	216
05/25/87	2	4		2			5		1	1	114
05/26/87		1					7				76
05/27/87					1		3				52
05/28/87							3				55
05/29/87	1										a7
05/30/87											56
05/31/87								1			42
Totals:	95	143		67	24	0	0	381	178	211	235	15683

Appendix D-3. Daily summary of branded chinook and steelhead sampled from the Rock Island Dam bypass trap, June, 1987.

	Chinook Brands					Ad Clips		Steelhead Brands			
Date	7S/LA/1	7S/LA/3	7S/RD/1	7T/LD/3	T/LA/4	Subyr	Yrlng	7C/LA/1	7C/LA/3	7C/RD/1	Ad Clips
06/01/87									1		57
06/02/87		1			1		1				47
06/03/87											69
06/04/87					2					1	65
06/05/87											48
06/06/87					4						55
06/07/87		1			4						65
06/08/87	4	4	1		1			1			36
06/09/87		2			2	1	1				18
06/10/87	2	7	2			1	1				18
06/11/87	1		1								15
06/12/87		4			3						14
06/13/87											9
06/14/87											12
06/15/87											10
06/16/87		1					1				3
06/17/87	1	1			3		3				4
06/18/87											1
06/19/87						2	1				
06/20/87											1
06/21/87											
06/22/87					2						2
06/23/87											1
06/24/87					4						1
06/25/87						2					1
06/26/87						2					
06/27/87						1					1
06/28/87						2					
06/29/87					1	3					
06/30/87					1	4					
Totals:	8	22	4	0	28	16	8	1	1	1	553

Appendix D-4. Daily summary of branded chinook and steelhead sampled from the Rock Island Dam bypass trap, July, 1987.

	Chinook Brands					Ad Clips		Steelhead Brands			
Date	7S/LA/1	7S/LA/3	7S/RD/1	7T/LD/3	T/LA/4	Subyr	Yrlng	7C/LA/1	7C/LA/3	7C/RD/1	Ad Clips
07/01/87					5	4					
07/02/87					1	18					
07/03/87					1	6					2
07/04/87						4					2
07/05/87											
07/06/87						5					
07/07/87					1	4					
07/08/87					3	1					
07/09/87						4					1
07/10/87						4					2
07/11/87						2					2
07/12/87						3					1
07/13/87						2					2
07/14/87						5					1
07/15/87						4					
07/16/87						6					
07/17/87						1					1
07/18/87						6					2
07/19/87					1	1					
07/20/87											1
07/21/87						1:					
07/22/87						12					
07/23/87						5					
07/24/87						2					
07/25/87						2					
07/26/87						2					
07/27/87						1					
07/28/87						4					1
07/29/87						0					
07/30/87					1	16					
07/31/87						12					
Totals:	0	0	0	0	13	149	0	0	0	0	18

Appendix D-5. Daily summary of branded chinook and steelhead sampled from the Rock Island Dam bypass trap, August, 1987.

	Chinook Brands					Ad Clips		Steelhead Brands				
Date	7S/LA/1	7S/LA/3	7S/RD/1	7T/LD/3	T/LA/4	Subyr	Yrlng	7C/LA/1	7C/LA/3	7C/RD/1	Ad	Clips
08/01/87						21						
08/02/87						10						
08/03/87						5						1
08/04/87						7						
08/05/87						1						
08/06/87						1						
08/07/87						4						
08/08/87						1						
08/09/87												
08/10/87					1							
08/11/87						1						
08/12/87												
08/13/87						2						
08/14/87												
08/15/87						1						
08/16/87												
08/17/87												
08/18/87												
08/19/87												
08/20/87												
08/21/87												
08/22/87												
08/23/87												
08/24/87												
08/25/87												
08/26/87												
08/27/87												
08/28/87												
08/29/87												
08/30/87												
08/31/87												
Totals:	0	0	0	0	1	54	0	0	0	0		2

Appendix D-6. Monthly summary of marked chinook and steelhead sampled from the Rock Island Dam bypass trap, 1 April - 31 August, 1987.

	Chinook Brands					Ad Clips		Steelhead Brands			
Month	7S/LA/1	7S/LA/3	7S/RD/1	7T/LD/3	T/LA/4	Subyr	Yrlng	7C/LA/1	7C/LA/3	7C/RD/1	Ad Clips
April	0	0	0	7	0	0	0	11	0	0	263
May	95	143	67	24	0	0	381	178	711	735	15683
June	a	22	4	0	28	16	a	1	1	1	553
July	0	0	0	0	13	149	0	0	0	0	la
August	0	0	0	0	1	54	0	0	0	0	2
Totals:	103	165	71	31	42	219	389	190	212	236	16519