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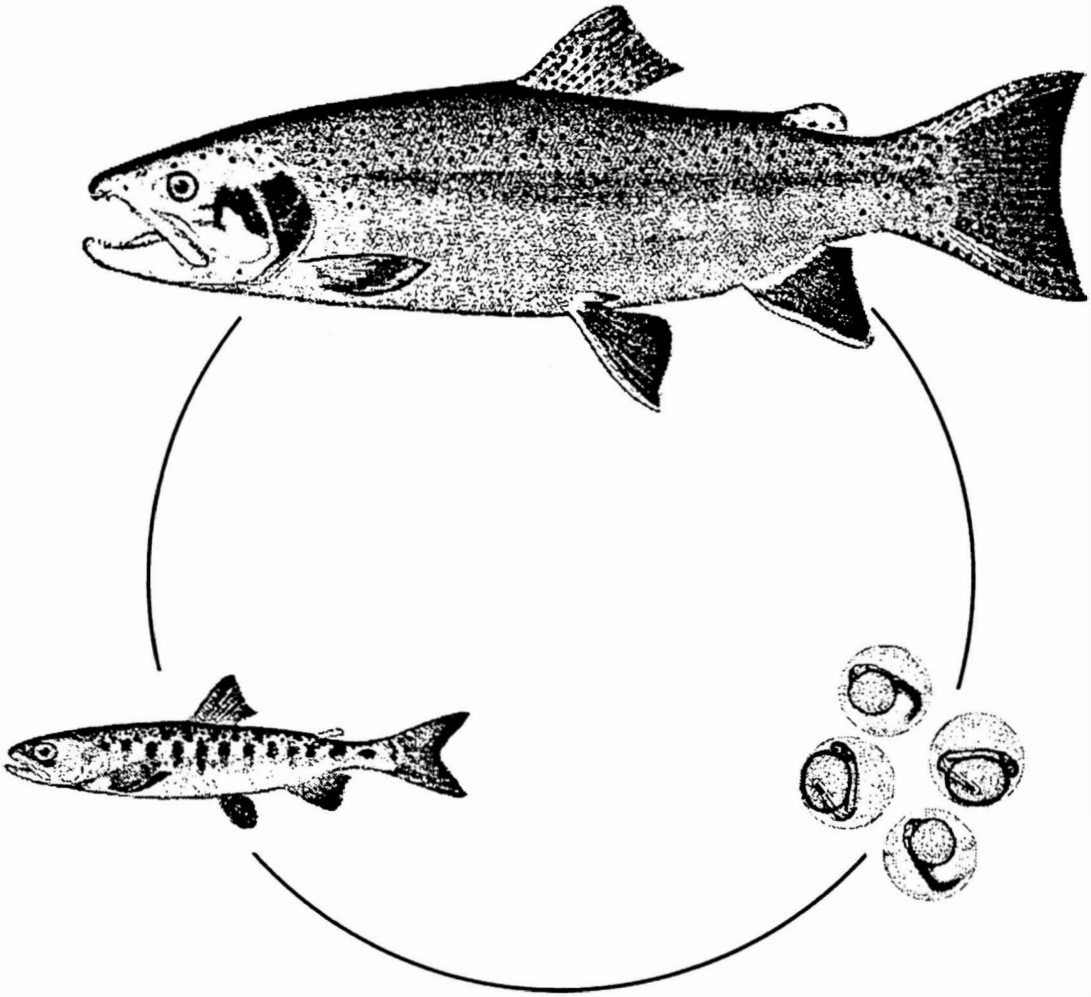

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STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

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The Michigan Department of Natural Resources (MDNR) first stocked chinook salmon *Oncorhynchus tshawytscha* in the northern end of Lake Huron in the Ocqueoc River, Presque Isle County, and Thunder Bay River, Alpena County, in 1968. Annual plants of chinook have continued at one or more locations in these two counties since that time. In 1983, the Swan River, Presque Isle County, became the sole site stocked in these two counties and an average of 897,142 spring fingerling chinook have been planted annually in Swan River for the past 8 years (Table 1). This represented a significant increase in the number of chinook salmon stocked in northern Lake Huron and became the largest plant at a single site lakewide. The Swan River plant during the period 1983-90 accounted for 24-29% of the chinook stocked in Lake Huron. This level of stocking was set to provide a salmon fishery throughout the entire lake, as the salmon tend to migrate from north to south and back on an annual basis.

Coho salmon *O. kisutch* were first stocked in Lake Huron in 1968. They were planted in a number of locations throughout the lake prior to 1983 at levels varying from 100,000 to 700,000 annually. In the years 1983-85, an average of 258,842 were stocked annually at the Swan River (Table 1). Poor return rates resulted in the discontinuance of the coho stocking program at the Swan River.

Swan River is a small stream which is a tributary to northern Lake Huron in Presque Isle County. It flows through Swan Lake and receives some groundwater pumped from nearby limestone quarries. This stream was chosen because it was located in a good area for a salmon lake fishery and large numbers of returning surplus salmon could be controlled due to its small size and private ownership. All of the salmon that run Swan River in the fall are harvested by and sold to a private contractor. An agreement exists between the private contractor and Michigan Limestone Operations Limited Partnership for the use of the harvest site.

The location of the salmon blocking weir and harvest operation is approximately 500 yards upstream of the river mouth. The harvest site was constructed in the fall of 1985 by the private contractor. A permanent harvest pond was dug adjacent to the stream, with a fish ladder at the downstream end to allow passage of salmon into the pond (Figure 1). A large capacity pump supplies water to the pond from the river when fish are present. During the fall harvest operations, a 2-inch stretched-mesh net backed by a chain-link fence is placed across the river to prevent the salmon from migrating further upstream and to force them into the harvest pond. In 1985, a second net was stretched across the river about 100 feet upstream of the first net as a precaution against escapement of fish through

the first net. No fish passed the first net and in subsequent years the second net was not used. In 1984, harvest operations took place closer to the mouth of the river (Figure 1) and the fish were taken with the use of a seine.

In 1986, there was a mortality of approximately 2,500-3,000 chinook salmon in the river. The cause of the mortality was thought to be low oxygen levels. High water levels in Lake Huron combined with strong onshore winds caused the mouth of the river to be closed off with sand. Sufficient numbers of salmon were present in the lower river to utilize the available oxygen resulting in the observed mortalities. Following this event, periodic dredging was done at the mouth of the river to prevent this from recurring. Water levels subsequently dropped in Lake Huron and this was not a problem after 1987.

Harvest Operations 1984-90

Salmon harvest operations on the Swan River began in 1984 and have continued on an annual basis through 1990. The total length of harvest operations per season varied from 40 days (1984) to 70 days (1989), with an average of 52 days. The earliest that harvest operations began was in 1988 when the first harvest occurred on August 29 and the latest start up date for harvest operations was on September 24, 1984. The earliest date that harvest operations ended was on October 19 (1988) and the latest harvest date occurred on November 8 in both 1984 and 1989. The length of harvest, start up date, and completion date do not correlate to the size of the harvest, as might be expected.

The salmon were harvested by Tempotech Industries personnel and all salmon were sold to this contractor. Fisheries Division personnel were on-site during harvest operations to monitor the harvest and collect biological data.

Chinook Salmon

The fewest number of chinook salmon harvested during the period 1984-90 were 10,998 fish weighing 98,399 pounds in 1984 and 16,662 fish weighing 170,561 pounds in 1985 (Table 2). The number of salmon harvested in 1984 and 1985 was relatively low, as would be expected because stocking at this location only began in 1983. The number increased in 1986 to a total of 38,781 fish weighing 508,597 pounds and peaked in 1987 at 51,447 fish weighing 676,780 pounds. The number returning began to decrease in 1988 when only 30,830 fish (405,994 pounds) were harvested followed by 30,119 fish (438,911 pounds) harvested in 1989. The decline continued in 1990 with the lowest harvest number to date of only 19,521 fish weighing 268,265 pounds. In general, the largest number of salmon usually ran during the third and fourth weeks of September (46-67% of the total run), although 1989 and 1990 showed fairly steady rates of return throughout the harvest season (Table 3).

Biological samples were taken each year, periodically throughout the run. The goal was to sample 100 chinook weekly, although this was not achieved in most years. The number of weeks sampled ranged from a low of 3 out of 7 weeks in 1984 to a high of 7 out of 7 in 1985 (Table 3). For those weeks when no biological sampling occurred, the biological sample from the preceding week was used for analysis. The percent of the total run of chinook sampled varied from 1.3% to 3.9% and averaged only 2.2%. Samples were taken by selecting a tote of fish and collecting data from each fish in the tote. Usually part of a second tote was used to reach the target of 100 fish per sample. Data collected included length, weight, sex, number of lamprey scars, and fin clips. Biological data was collected on chinook salmon in 1984, however, it has since been lost and is not included in the analysis that follows.

The salmon harvested at the Swan River were composed of fish aged 0.1 to 0.4. (In aging anadromous fish, the number preceding the decimal denotes age at smolting, 0 for most chinook, and the number following the decimal represents the number of annuli formed in the Great Lakes, mostly 0-5 for chinook.) No scale samples were taken for age analysis because the reabsorption of scales on spawning chinook makes analysis from such

scales inaccurate. Ages were assigned to the chinook sample based on a length-age key (Table 4). This table was derived from known-age chinook salmon collected during harvest operations at the Swan River and Van Etten Creek weirs during the period 1986-91. (Van Etten Creek is a tributary to the Au Sable River, Iosco County, which enters Lake Huron south of the Swan River.) The distribution was weighted by the total number of chinook harvested for a given year. For the length groups where no data were available, interpolation was used to estimate a distribution. When assigning ages to fish in the biological samples from the weir, there were some cases when inch groups represented by more than one age resulted in fractions of a fish. When this occurred, the fractions were assigned to an age group based on weight. There were no age-0.5 fish in the length-age distribution shown in Table 4 as none of the known-age fish returning to the two weirs were age 0.5. However, this is not conclusive, as only the fish marked in 1984 were old enough to have returned as 0.5's and sample size was small.

There was great variability in the percent age composition of the runs returning to the Swan River weir from the period 1987-90. For this period, the percent of the harvest that were age 0.1 was 9.1-17.7%, age 0.2 was 10.6-21.0%, age 0.3 was 51.5-60.4%, and 7.0-23.1% were age 0.4. The number of chinook stocked at Swan River for the years these fish represent was not constant (Table 1), which probably accounts for some of this variability. The percent age distribution for the years 1985 and 1986 is not meaningful as stocking did not begin at the Swan River until 1983, and the older fish (ages 0.3 and 0.4 in 1985 and age 0.4 in 1986) represent fish that strayed from other locations.

The sex ratio of the salmon run in 1985 was 88% males and 12% females (Table 5). Once again, this reflects the stocking history as generally more males return as ages 0.1 and 0.2 than females. In 1986, the run was 64.5% males and 35.5% females, which more closely resembles the 1987-90 period (only the age-0.4 fish returning in 1986 were not stocked at Swan River). For the years 1987-1990, the sex ratio was fairly similar ranging from 55.2 to 62.9% males and from 37.1 to 44.8% females. In 1987 and 1988, Table 5 indicates some females returned as age 0.1. No age-0.1 females were found in the fin-clipped fish, however, ages were assigned by the length-frequency distribution found in Table 4 and evidently some very small females were present in these 2 years. A larger sample size of known-age fish would determine whether any age-0.1 females return to the weirs.

Mean lengths for age 0.1 chinook ranged from 22.1 to 23.7 inches; for age 0.2, the range was 31.1-32.6 inches; for age 0.3, the range was 34.3-35.8 inches; and age 0.4 fish ranged from 34.3 to 35.7 inches (Table 6). The range of mean lengths of age-0.3 and age-0.4 fish was almost identical. Mean weights of age-0.1 fish ranged from 3.7 to 5.3 pounds; the range for age 0.2 was 10.2-11.6 pounds; the range for age 0.3 was 13.7-16.6 pounds; and the range in mean weights for the age-0.4 fish was 15.2-17.2 pounds (Table 6). There was no trend in either the mean lengths at age or mean weights at age during this 6 year period.

The total return rates of chinook salmon to the weir can be derived for the 1984-86 year classes (the percent of age 0.1 returning is unknown for the 1983 year class as these data are missing). The return rates for these four year classes ranged from 3.9% to 5.8% (Table 7). (These return rates represent only those fish returning to the weir and are not total return rates for the year classes as they do not include fish harvested in the sport fishery.) The 1984 year class showed the best rate of return at 5.8%. Successive year classes have shown a downward trend of 4.8% (1985) and 3.9% (1986). The total return rate for 1987 cannot be determined, but total return rate of ages 0.1-0.3 fish is only 1.9%, suggesting a continuance of the downward trend. The decrease in total return rates is reflected by an across the board decrease at each age, although the greatest decrease has occurred in the age-0.3 fish which ranged from a high of 3.5% in 1984 to a low of 1.1% in 1987, a difference of 2.4% (Table 7). The return rates of the other ages also followed the downward trend, with the exception of the relatively high rate of return of the age-0.1

fish in the 1986 year class (1.0%). Generally for all year classes, the highest number of chinook returned at age 0.3, followed in number by age 0.2, age 0.1, and age 0.4.

The decrease in total return rates of year classes to the Swan River weir has also been observed for chinook returning to the Little Manistee River weir (Lake Michigan). However, the decrease occurred 1 year earlier at the Little Manistee weir and the return rates seem to be recovering there. The Little Manistee River weir had return rates ranging from 5.6% to 9.1% for the year classes 1981 to 1983 (Hay 1990). There was a significant change in the return rates at the Little Manistee weir beginning with the 1984 year class, which had a total percent return of only 2.1. The return rate for the 1985 and 1986 (ages 0.1-0.4) year classes improved somewhat and were 3.3% and 3.6%, respectively (Ralph Hay, MDNR, personal communication).

Eggs were collected from chinook salmon at the Swan River weir in both 1989 and 1990 because of concerns that low salmon runs at the Little Manistee weir would produce insufficient numbers of eggs. Egg-take operations were conducted in a trailer provided by the salmon harvest contractor. Procedures were followed to reduce the incidence of bacterial kidney disease (BKD) in chinook salmon. All fish, including both males and females, were examined for gross signs of BKD and the sex products from fish with positive signs were discarded. Gear, hands, and knives used during egg-take operations were disinfected with 200-ppm iodophor solution (Betadine) after the handling of symptomatic fish. The dry spawn method was used and the fertilized eggs were water hardened in 100 ppm of iodophor solution for 30 minutes. The eggs were then water hardened for an additional 60 minutes by rinsing with freshwater.

Egg-take operations took place on three dates in 1989; on October 4, 5, and 9. A total of 2,883,680 eggs were taken, all of which were shipped to the Platte River Hatchery and had an eye-up rate of 67.2% (Chuck Pecor, MDNR, personal communication). In 1990, egg-take took place on 4 days; October 1-3, and October 8. A total of 3,552,736 eggs were taken. Platte Hatchery received 2,475,328 eggs which had an eye-up rate of 62.2% (Chuck Pecor, MDNR, personal communication). Thompson Hatchery received the other 1,077,408 eggs which had an eye-up rate of 67.2% (Warren Yoder, MDNR, personal communication). The overall percentage of fish that were discarded during egg-take operations due to the presence of clinical signs of BKD was 25.8 in 1989, and 28.5 in 1990 (John Hnath, MDNR, personal communication). There was a difference in the sexes both years; 27.9% of the females and 15.2% of the males showed clinical signs in 1989 and in 1990, 30.8% of the females and 11.1% of the males had positive signs of BKD.

Some chinook salmon that are not stocked in the Swan River enter the river during fall harvest operations. During the 1984 and 1985 harvest operations, fish showed up from the 1981 and 1982 year classes (Table 7), even though chinook stocking did not begin until 1983 at the Swan River. These fish are most likely from plants made in Nagels Creek, Presque Isle County or at Harrisville, Alcona County. Some may also be due to natural reproduction from other streams. Chinook stocked in Lake Huron, including the Swan River (see Table 1) were marked in 1984, 1987, and 1988, and some of these marked fish returned to the Swan River during the period 1985-90. Based on the clip returns in the biological samples, weighted by the size of the harvest, 92% of the fish harvested during the years 1985-90 were planted in the Swan River, 5% were planted in the Au Sable River, 2% were planted at Lexington (Sanilac County), and 1% were planted in Nunns Creek (Chippewa County). For this same period, no marked fish from the Swan River were collected during harvest operations at the Van Etten Creek weir (Kyle Kruger, MDNR, personal communication). It should be remembered that these figures are based on very small sample sizes.

The percent of the chinook salmon harvested at the Swan River weir with fresh sea lamprey *Petromyzon marinus* scars for the years 1987-90 were 4.3%, 8.5%, 6.2%, and 6.7%, respectively. (Lamprey scarring data for previous years were not taken.) This scarring

rate is much higher than is seen at salmon harvest weirs on northern Lake Michigan. The scarring rate (fresh scars) at Medusa Creek salmon harvest weir was only 0.2% in 1989 (Fenske 1991). The rates at the Little Manistee weir ranged between 0.0%-1.4% for the years 1980-88 (Hay 1990). However, the rate seen at the Swan River weir is much lower than reported from angler catch in northern Lake Huron. In 1990, charter captains reported (through the Charter Catch Reporting Program) that 33.9% of the chinook salmon caught had lamprey attached (Rakoczy and Rogers 1991).

Coho Salmon

Coho salmon were harvested at the Swan River during the years 1984-86 (Table 8), which reflects the stocking program at this location (Table 1). The number returning was greatest in 1984 when an estimated 10,093 fish weighing 73,512 pounds were harvested (Table 9). In 1985 and 1986, only 910 coho (6,271 pounds) and 1,375 coho (8,326 pounds), respectively, were harvested. The number of coho returning in 1984 was approximately equal to the number of chinook that returned that year, and the periodicity of these two runs was very similar (Tables 2 and 8).

Biological samples were taken of the coho run in the same manner discussed above for the chinook salmon. The percent of the total run of coho sampled was 3.0% in 1984, 60.5% in 1985, and 13.4% in 1986. Data collected included length, weight, sex, number of lamprey scars, and fin clips.

The coho harvested at the Swan River were composed of fish aged 1.0 and 1.1. (In aging anadromous fish, the number preceding the decimal denotes age at smolting, 1 for most coho, and the number following the decimal represents the number of annuli formed in the Great Lakes, mostly 0-1 for coho.) No scale samples were taken for age analysis and ages were assigned based on data collected on coho returning to the Platte River weir (Benzie County) (Kelley Smith, MDNR, personal communication). Males less than 18 inches in length were age 1.0, males greater than or equal to 18 inches were age 1.1, and all females were age 1.1 (there were no females less than 18 inches). All of the coho that returned to the Swan River weir were age 1.1 with the exception of a very few jacks in 1985 (Table 10).

In 1984, 43.2% of the run was males. The percentage of males increased in successive years to 57.7% (1985) and 78.8% (1986) (Table 10). The weighted seasonal mean lengths of age-1.1 fish (sexes combined) were 26.4 inches (1984), 26.5 inches (1985), and 25.5 inches (1986) (Table 11). The weighted seasonal mean weights for age-1.1 coho (males only) were 7.3, 6.9, and 6.1 pounds in 1984, 1985, and 1986, respectively. The age-1.0 coho that returned in 1985 had weighted seasonal means of 15.7 inches and 1.6 pounds.

Total returns to the weir for the three year classes stocked showed a dramatic decline over time. The 1982 year class had a 4.0% return rate (age 1.1 only as there was no harvest in 1983) (Table 12). The subsequent year classes had return rates of only 0.4% (1983) and 0.5% (1984). These low return rates may be indicative of poor survival, since low returns were also observed in the sport fishery. In 1986, the angler catch rates (fish per hour) for coho at Rockport and Rogers City was only 0.0016 (Rakoczy 1991).

Lamprey scarring rates for coho returning to the weir were only collected in 1984 and 1.0% of the fish sampled were scarred. This is lower than the scarring rate of chinook salmon harvested at the Swan River in 1984 and probably reflects the shorter length of time that coho are available to lamprey (generally, only 1.5 years).

A few clipped coho were found during all 3 years. In 1984, a 23.7 inch, 5.6 pound coho was collected with a right pectoral clip. The origin of this fish was unknown, as there was no record of marked coho being stocked in lakes Huron, Michigan, Superior, Erie, or their connecting waters in 1983. Two coho with right pectoral clips were also collected in 1985 (a 24.7 inch, 5.6 pound female, and a 27.4 inch, 7.3 pound female) and once again, their origin could not be determined. An adipose-clipped coho (a 27.7 inch, 8.7 pound

female) was also collected in 1985 and it is likely that this fish strayed from plants made in Lake Superior. In 1986, one coho had a right-pectoral clip (a 24.5 inch, 5.5 pound male) which was probably stocked in Lake Huron at Port Hope, Huron County in 1985. Two coho collected in 1986 had adipose clips (a 27.0 inch, 7.0 pound male, and a 26.0 inch, 6.5 pound male). These fish were likely stocked in Lake Huron at Seymour Creek, Chippewa County.

Other Species

Other species of fish that entered the Swan River during salmon harvest operations were steelhead *O. mykiss*, pink salmon *O. gorbuscha*, and brown trout *Salmo trutta*. The steelhead and brown trout were passed upstream and the pink salmon were harvested. Numbers of these species was very low, less than 10 individuals annually.

Summary

Chinook salmon harvest operations took place at the Swan River weir on an annual basis during the years 1984-90. The number harvested ranged from 10,998 to 51,447 and the weight of chinook harvested ranged from 98,399 to 676,780 pounds. The number and weight harvested peaked in 1987 and declined annually in succeeding years. The runs were composed of fish age 0.1 to 0.4 and the age composition of the runs varied greatly between years. The total return rate was highest for the 1984 year class (5.8%) and declined in subsequent year classes (4.8% for 1985, 3.9% for 1986, and 1.9% for ages 0.1-0.3 of the 1987 year class). Egg-take operations for chinook salmon took place in 1989 and 1990, and approximately 2.9 million and 3.6 million eggs were collected in these 2 years, respectively. The incidence of clinical signs of BKD in spawned female chinook was 27.9% in 1989 and 30.8% in 1990. Lamprey scarring rates on chinook for the years 1987-90 varied from 4.3% to 8.5%. Clipped chinook salmon stocked at the Au Sable River, Lexington, and Nunns Creek were collected at the Swan River during harvest operations.

Coho salmon were harvested during the years 1984-86. The largest harvest took place in 1984 when 10,093 fish weighing 73,512 pounds were harvested. The 1985 and 1986 harvests were very small and the coho stocking program was discontinued in 1986. The return of the 1982 year class was the highest at 4.0%. The 1983 and 1984 year classes were 0.4% and 0.5%, respectively. Lamprey scarring in 1984 was 1.0%. Clipped coho that returned to the weir were from plants made in Lake Superior, and Port Hope and Seymour Creek in Lake Huron.

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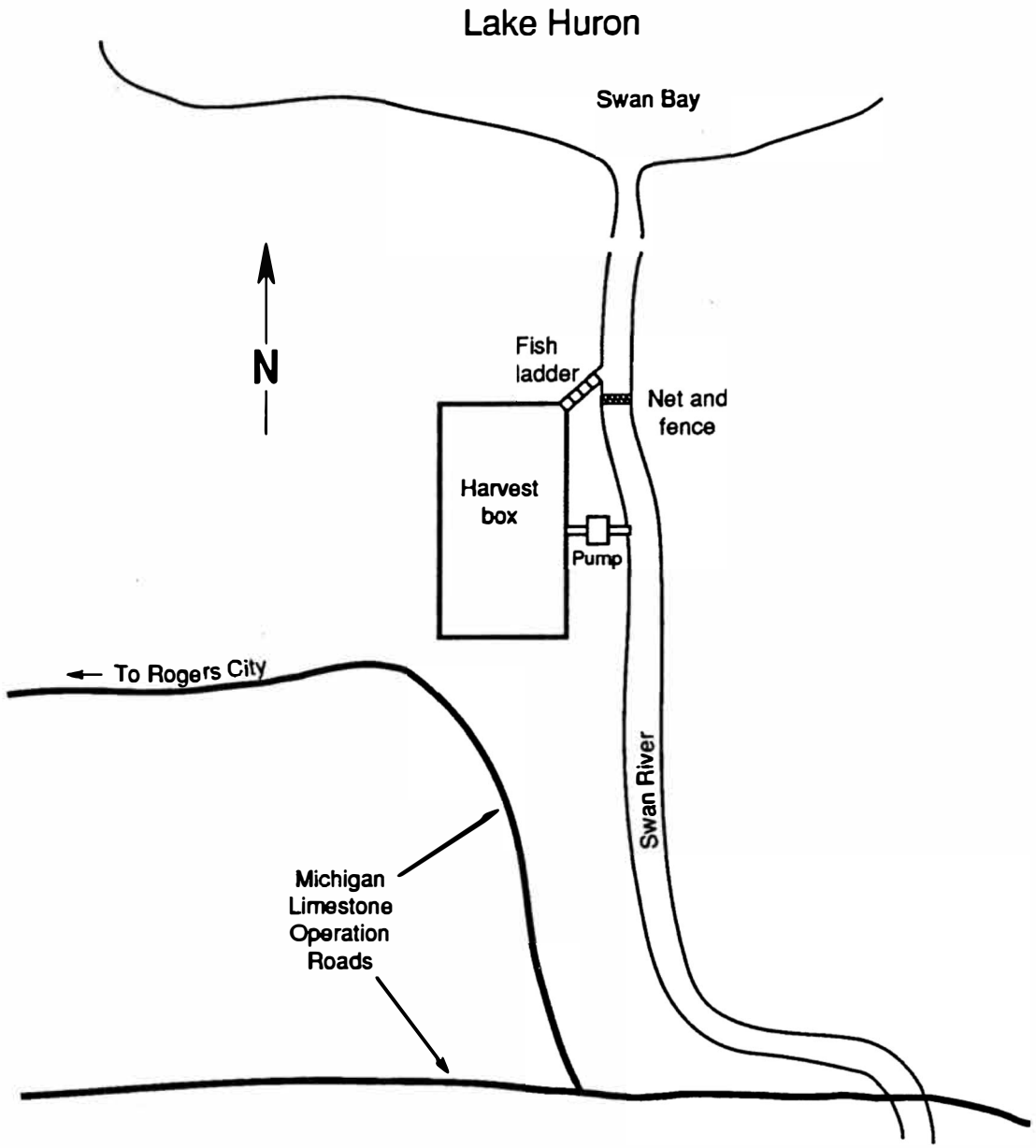

Figure 1.—Location and schematic diagram of the Swan River weir complex, approximately 4 miles southeast of Rogers City, Michigan (T35N, R6E, Section 29).

Table 1.—Number of spring fingerling chinook salmon and yearling coho salmon planted in Swan River, Presque Isle County, 1983-90.

Planting year	Chinook			Coho	
	Marked (clip)	Unmarked	Triploid (clip)	Total	Total
1983		770,000		770,000	250,138
1984	100,010 (RP)	800,199		900,209	250,051
1985		734,022		734,022	276,336
1986		925,886	24,382 (AD)	950,268	
1987	127,030 (MTAD)	758,535	24,198 (MTAD)	909,763	
1988	283,800 (RPLV)	646,000	27,968 (MTAD)	957,768	
1989		987,613	21,529 (MTAD)	1,009,142	
1990[1]		920,948	25,000 (MTAD)	945,948	
Total	510,840	6,543,203	123,077	7,177,120	776,525

[1]All chinook marked with tetracycline.

Table 2.—Number, by age, of chinook salmon harvested at Swan River weir, fall 1984-90. Weight (pounds) is in parentheses and was estimated using seasonal means.

Year	Age 0.1	0.2	0.3	0.4	Total
1984[1]	—	—	—	—	10,998
	—	—	—	—	(98,399)
1985	5,491	3,582	5,865	1,724	16,662
	(27,447)	(36,457)	(80,512)	(26,145)	(170,561)
1986	1,944	12,809	22,461	1,567	38,781
	(10,208)	(134,874)	(336,605)	(26,910)	(508,597)
1987	9,081	7,664	31,098	3,604	51,447
	(43,168)	(89,183)	(484,664)	(59,765)	(676,780)
1988	2,819	6,467	18,308	3,236	30,830
	(10,448)	(71,411)	(273,320)	(50,815)	(405,994)
1989	3,082	3,937	16,135	6,965	30,119
	(14,551)	(42,562)	(267,373)	(114,425)	(438,911)
1990	2,925	2,076	10,054	4,466	19,521
	(11,454)	(23,360)	(162,936)	(70,515)	(268,265)

[1]No biological data available for 1984 (weights based on random sampling of run, but data no longer available).

Table 3.—Number, by week, of chinook salmon harvested at the Swan River weir, fall 1984-90.

Year	Week beginning	Number in sample	Number harvested
1984	09/24	100	5,567
	10/01	100	2,056
	10/08	100	2,353
	10/15		451
	10/22		0
	10/29		371
	11/05		200
Total			10,998
1985	09/09	100	1,597
	09/16	100	4,291
	09/23	100	4,531
	09/30	100	3,156
	10/07	100	1,279
	10/14	100	1,660
	10/21	46	148
Total			16,662
1986	09/08	100	3,613
	09/15	200	16,577
	09/22	100	9,591
	09/29	100	2,747
	10/06		2,751
	10/13		2,450
	10/20		0
	10/27		1,052
Total			38,781
1987	08/31	126	3,039
	09/07	241	4,603
	09/14	289	12,669
	09/21	292	10,823
	09/28	138	10,342
	10/05	152	3,195
	10/12	152	4,043
	10/19		2,503
	10/26		0
	11/02		230
Total			51,447

Table 3.—Continued:

Year	Week beginning	Number in sample	Number harvested
1988	08/29	66	594
	09/05	76	4,256
	09/12		6,612
	09/19	100	10,442
	09/26		4,158
	10/03	100	3,060
	10/10		748
	10/17	57	960
Total			30,830
1989	08/28	100	1,326
	09/04		0
	09/11		6,572
	09/18	101	4,690
	09/25	100	6,034
	10/02	100	3,286
	10/09		5,226
	10/16	100	2,957
	10/23		0
	10/30		0
	11/06		28
Total			30,119
1990	09/10	100	1,300
	09/17	100	3,512
	09/24		3,640
	10/01	75	4,350
	10/08	100	5,715
	10/15		0
	10/22		1,004
Total			19,521

Table 4.—Length-age distribution (in percent by inch group) for chinook salmon based on 402 known-aged fish returning to the Swan River and Van Etten Creek weirs 1986-1991.[1]

Length (inches)	Age 0.1	0.2	0.3	0.4
20	100	—	—	—
21	100	—	—	—
22	100	—	—	—
23	100	—	—	—
24	100	—	—	—
25	100	—	—	—
26	77	23	—	—
27	53	47	—	—
28	—	100	—	—
29	—	91	6	3
30	—	81	19	—
31	—	71	28	1
32	—	39	33	28
33	—	3	82	15
34	—	9	58	33
35	—	—	72	28
36	—	—	83	17
37	—	15	69	16
38	—	—	72	28
39	—	—	100	—
40	—	—	89	11
41	—	—	36	64
42	—	—	18	82
43+	—	—	—	100

[1]The distribution was weighted based on total runs by year.

Table 5.—Summary of the number and weight, by age and sex, of chinook salmon harvested at the Swan River weir, fall 1985-90. Percentages in parentheses.

Week beginning	Male		Female		Total	
	Number	Pounds	Number	Pounds	Number	Pounds
Year: 1985						
Age 0.1						
09/09	543	2,772	—	—	543	2,772
09/16	1,416	7,256	—	—	1,416	7,256
09/23	1,540	7,727	—	—	1,540	7,727
09/30	979	4,687	—	—	979	4,687
10/07	563	2,802	—	—	563	2,802
10/14	415	2,045	—	—	415	2,045
10/21	35	158	—	—	35	158
Total	5,491	27,447	—	—	5,491	27,447
(Percent)	(33.0)	(16.1)	—	—	(33.0)	(16.1)
Age 0.2						
09/09	367	3,632	48	542	415	4,174
09/16	772	8,115	86	929	858	9,044
09/23	1,042	10,126	91	910	1,133	11,036
09/30	568	5,891	95	1,032	663	6,923
10/07	192	1,841	13	135	205	1,976
10/14	133	1,378	133	1,508	266	2,886
10/21	23	218	19	200	42	418
Total	3,097	31,201	485	5,256	3,582	36,457
(Percent)	(18.6)	(18.3)	(2.9)	(3.1)	(21.5)	(21.4)
Age 0.3						
09/09	479	6,339	16	229	495	6,568
09/16	1,416	18,648	215	3,281	1,631	21,929
09/23	1,133	15,264	181	2,910	1,314	18,174
09/30	1,073	14,205	189	2,722	1,262	16,927
10/07	230	3,188	128	1,946	358	5,134
10/14	332	4,807	415	6,081	747	10,888
10/21	16	204	42	688	58	892
Total	4,679	62,655	1,186	17,857	5,865	80,512
(Percent)	(28.1)	(36.7)	(7.1)	(10.5)	(35.2)	(47.2)
Age 0.4						
09/09	144	1,875	—	—	144	1,875
09/16	343	5,201	43	890	386	6,091
09/23	453	6,895	91	1,401	544	8,296
09/30	189	2,608	63	936	252	3,544
10/07	102	1,721	51	1,017	153	2,738
10/14	166	2,311	66	1,066	232	3,377
10/21	—	—	13	224	13	224
Total	1,397	20,611	327	5,534	1,724	26,145
(Percent)	(8.4)	(12.1)	(2.0)	(3.2)	(10.3)	(15.3)

Table 5.—Continued:

Week beginning	Male		Female		Total	
	Number	Pounds	Number	Pounds	Number	Pounds
			Year: 1986			
Age 0.1						
09/08	108	576	—	—	108	576
09/15	912	4,892	—	—	912	4,892
09/22	384	2,400	—	—	384	2,400
09/29[1]	540	2,340	—	—	540	2,340
Total	1,944	10,208	—	—	1,944	10,208
(Percent)	(5.0)	(2.0)	—	—	(5.0)	(2.0)
Age 0.2						
09/08	1,084	11,310	289	3,305	1,373	14,615
09/15	5,304	54,905	663	7,252	5,967	62,157
09/22	1,822	18,172	767	9,060	2,589	27,232
09/29[1]	1,890	18,630	990	12,240	2,880	30,870
Total	10,100	103,017	2,709	31,857	12,809	134,874
(Percent)	(26.0)	(20.3)	(7.0)	(6.3)	(33.0)	(26.5)
Age 0.3						
09/08	1,193	17,985	723	10,809	1,916	28,794
09/15	5,553	86,486	3,730	57,691	9,283	144,177
09/22	2,973	43,204	3,069	44,740	6,042	87,944
09/29[1]	2,430	35,100	2,790	40,590	5,220	75,690
Total	12,149	182,775	10,312	153,830	22,461	336,605
(Percent)	(31.3)	(35.9)	(26.6)	(30.2)	(57.9)	(66.2)
Age 0.4						
09/08	108	1,620	108	1,746	216	3,366
09/15	249	4,773	166	2,532	415	7,305
09/22	192	2,880	384	6,384	576	9,264
09/29[1]	270	5,040	90	1,935	360	6,975
Total	819	14,313	748	12,597	1,567	26,910
(Percent)	(2.1)	(2.8)	(1.9)	(2.5)	(4.0)	(5.3)

Table 5.—Continued:

Week beginning	Male		Female		Total	
	Number	Pounds	Number	Pounds	Number	Pounds
			Year: 1987			
Age 0.1						
08/31	24	120	—	—	24	120
09/07	248	1,164	19	114	267	1,278
09/14	1,227	5,894	—	—	1,227	5,894
09/21	1,853	8,413	—	—	1,853	8,413
09/28	3,298	16,265	—	—	3,298	16,265
10/05	673	3,239	—	—	673	3,239
10/12[2]	1,739	7,959	—	—	1,739	7,959
Total	9,062	43,054	19	114	9,081	43,168
(Percent)	(17.6)	(6.4)	(<0.1)	(<0.1)	(17.7)	(6.4)
Age 0.2						
08/31	217	2,315	265	2,939	482	5,254
09/07	382	4,584	344	4,071	726	8,655
09/14	1,096	12,034	921	11,249	2,017	23,283
09/21	1,075	11,306	445	6,008	1,520	17,314
09/28	824	9,364	899	10,713	1,723	20,077
10/05	336	3,129	147	2,090	483	5,219
10/12[2]	446	5,843	267	3,538	713	9,381
Total	4,376	48,575	3,288	40,608	7,664	89,183
(Percent)	(8.5)	(7.2)	(6.4)	(6.0)	(14.9)	(13.2)
Age 0.3						
08/31	1,206	19,272	941	15,092	2,147	34,364
09/07	2,178	35,307	1,184	18,371	3,362	53,678
09/14	4,340	68,432	3,770	56,725	8,110	125,157
09/21	3,706	59,907	2,965	43,956	6,671	103,863
09/28	2,248	37,204	2,698	39,233	4,946	76,437
10/05	1,030	16,228	820	12,796	1,850	29,024
10/12[2]	2,184	34,654	1,828	27,487	4,012	62,141
Total	16,892	271,004	14,206	213,660	31,098	484,664
(Percent)	(32.8)	(40.0)	(27.6)	(31.6)	(60.4)	(71.6)
Age 0.4						
08/31	193	3,088	193	3,245	386	6,333
09/07	191	3,056	57	931	248	3,987
09/14	745	11,964	570	9,580	1,315	21,544
09/21	334	5,938	445	7,621	779	13,559
09/28	300	4,950	75	1,238	375	6,188
10/05	63	1,061	126	1,922	189	2,983
10/12[2]	223	3,791	89	1,380	312	5,171
Total	2,049	33,848	1,555	25,917	3,604	59,765
(Percent)	(4.0)	(5.0)	(3.0)	(3.8)	(7.0)	(8.8)

Table 5.—Continued:

Week beginning	Male		Female		Total	
	Number	Pounds	Number	Pounds	Number	Pounds
			Year: 1988			
Age 0.1						
08/29	18	74	9	57	27	131
09/05[3]	1,144	3,933	—	—	1,144	3,933
09/19[4]	1,314	5,256	—	—	1,314	5,256
10/03[5]	267	877	—	—	267	877
10/17	67	251	—	—	67	251
Total	2,810	10,391	9	57	2,819	10,448
(Percent)	(9.1)	(2.6)	(<0.1)	(<0.1)	(9.1)	(2.6)
Age 0.2						
08/29	36	239	45	486	81	725
09/05[3]	2,002	22,594	1,287	14,729	3,289	37,323
09/19[4]	1,460	13,359	1,168	15,111	2,628	28,470
10/03[5]	228	2,413	190	1,995	418	4,408
10/17	17	128	34	357	51	485
Total	3,743	38,733	2,724	32,678	6,467	71,411
(Percent)	(12.1)	(9.5)	(8.8)	(8.0)	(21.0)	(17.6)
Age 0.3						
08/29	135	1,976	171	2,288	306	4,264
09/05[3]	3,718	61,347	2,431	36,036	6,149	97,383
09/19[4]	4,526	63,510	4,672	68,912	9,198	132,422
10/03[5]	876	12,950	1,257	18,512	2,133	31,462
10/17	135	2,152	387	5,637	522	7,789
Total	9,390	141,935	8,918	131,385	18,308	273,320
(Percent)	(30.5)	(35.0)	(28.9)	(32.4)	(59.4)	(67.3)
Age 0.4						
08/29	54	887	126	1,505	180	2,392
09/05[3]	—	—	286	4,433	286	4,433
09/19[4]	438	8,395	1,022	14,965	1,460	23,360
10/03[5]	495	8,282	495	7,615	990	15,897
10/17	101	1,591	219	3,142	320	4,733
Total	1,088	19,155	2,148	31,660	3,236	50,815
(Percent)	(3.5)	(4.7)	(7.0)	(7.8)	(10.5)	(12.5)

Table 5.—Continued:

Week beginning	Male		Female		Total	
	Number	Pounds	Number	Pounds	Number	Pounds
			Year: 1989			
Age 0.1						
08/28[6]	395	2,054	—	—	395	2,054
09/18	139	834	—	—	139	834
09/25	543	2,956	—	—	543	2,956
10/02[7]	1,617	7,191	—	—	1,617	7,191
10/16[8]	388	1,516	—	—	388	1,516
Total	3,082	14,551	—	—	3,082	14,551
(Percent)	(10.2)	(3.3)	—	—	(10.2)	(3.3)
Age 0.2						
08/28[6]	1,264	12,245	790	8,493	2,054	20,738
09/18	232	2,993	186	2,279	418	5,272
09/25	362	4,193	60	1,080	422	5,273
10/02[7]	596	6,301	—	—	596	6,301
10/16[8]	119	1,125	328	3,853	447	4,978
Total	2,573	26,857	1,364	15,705	3,937	42,562
(Percent)	(8.5)	(6.1)	(4.5)	(3.6)	(13.1)	(9.7)
Age 0.3						
08/28[6]	1,737	27,808	2,211	35,352	3,948	63,160
09/18	1,672	27,774	836	15,141	2,508	42,915
09/25	2,354	40,109	1,086	19,337	3,440	59,446
10/02[7]	1,703	28,014	2,894	47,496	4,597	75,510
10/16[8]	299	4,039	1,343	22,303	1,642	26,342
Total	7,765	127,744	8,370	139,629	16,135	267,373
(Percent)	(25.8)	(29.1)	(27.8)	(31.8)	(53.6)	(60.9)
Age 0.4						
08/28[6]	553	8,572	948	13,509	1,501	22,081
09/18	975	17,271	650	11,886	1,625	29,157
09/25	1,086	17,798	543	9,653	1,629	27,451
10/02[7]	936	14,848	766	12,724	1,702	27,572
10/16[8]	30	456	478	7,708	508	8,164
Total	3,580	58,945	3,385	55,480	6,965	114,425
(Percent)	(11.9)	(13.4)	(11.2)	(12.6)	(23.1)	(26.1)

Table 5.—Continued:

Week beginning	Male Number	Male Pounds	Female Number	Female Pounds	Total Number	Total Pounds
			Year: 1990			
Age 0.1						
09/10	39	195	—	—	39	195
09/17[9]	501	1,932	—	—	501	1,932
10/01	638	2,453	—	—	638	2,453
10/08[10]	1,747	6,874	—	—	1,747	6,874
Total	2,925	11,454	—	—	2,925	11,454
(Percent)	(15.0)	(4.3)	—	—	(15.0)	(4.3)
Age 0.2						
09/10	169	1,788	91	1,099	260	2,887
09/17[9]	715	7,579	215	2,365	930	9,944
10/01	290	3,097	58	713	348	3,810
10/08[10]	336	4,005	202	2,714	538	6,719
Total	1,510	16,469	566	6,891	2,076	23,360
(Percent)	(7.7)	(6.1)	(2.9)	(2.6)	(10.6)	(8.7)
Age 0.3						
09/10	429	7,111	403	7,352	832	14,463
09/17[9]	2,431	37,645	1,216	21,602	3,647	59,247
10/01	1,508	23,473	1,044	18,171	2,552	41,644
10/08[10]	739	10,501	2,284	37,081	3,023	47,582
Total	5,107	78,730	4,947	84,206	10,054	162,936
(Percent)	(26.2)	(29.3)	(25.3)	(31.4)	(51.5)	(60.7)
Age 0.4						
09/10	65	1,034	104	1,755	169	2,789
09/17[9]	1,287	19,019	787	13,558	2,074	32,577
10/01	232	3,538	580	9,976	812	13,514
10/08[10]	605	8,423	806	13,212	1,411	21,635
Total	2,189	32,014	2,277	38,501	4,466	70,515
(Percent)	(11.2)	(11.9)	(11.7)	(14.4)	(22.9)	(26.3)

[1] Includes fish harvested during the weeks of 09/29, 10/06, 10/13, 10/20, and 10/27.
[2] Includes fish harvested during the weeks of 10/12, 10/19, 10/26, and 11/02.
[3] Includes fish harvested during the weeks of 09/05 and 09/12.
[4] Includes fish harvested during the weeks of 09/19 and 09/26.
[5] Includes fish harvested during the weeks of 10/03 and 10/10.
[6] Includes fish harvested during the weeks of 08/28, 09/04, and 09/11.
[7] Includes fish harvested during the weeks of 10/02 and 10/09.
[8] Includes fish harvested during the weeks of 10/16, 10/23, 10/30, and 11/06.
[9] Includes fish harvested during the weeks of 09/17 and 09/24.
[10] Includes fish harvested during the weeks of 10/08, 10/15, and 10/22.

Table 6.—Mean total length (inches) and weight (pounds), by age and sex, of chinook salmon harvested at the Swan River weir, fall 1985-90. Two standard errors in parentheses.

Week beginning	Measure-ment	Age 0.1		Age 0.2	
		Male	Female	Male	Female
		Year: 1985			
09/09	Length	23.5	—	31.1	31.7
		(0.4)	—	(0.6)	(1.6)
	Weight	5.1	—	9.9	11.3
		(0.3)	—	(0.5)	(1.5)
09/16	Length	23.6	—	31.3	32.1
		(0.4)	—	(1.2)	(2.6)
	Weight	5.1	—	10.5	10.8
		(0.2)	—	(0.9)	(1.0)
09/23	Length	23.6	—	31.1	30.8
		(0.5)	—	(0.4)	(1.6)
	Weight	5.0	—	9.7	10.0
		(0.5)	—	(0.5)	—
09/30	Length	23.6	—	31.8	31.6
		(0.4)	—	(0.6)	(3.0)
	Weight	4.8	—	10.4	10.9
		(0.3)	—	(0.5)	(2.0)
10/07	Length	23.6	—	31.0	30.2
		(0.4)	—	(0.6)	—
	Weight	5.0	—	9.6	10.4
		(0.3)	—	(0.5)	—
10/14	Length	23.8	—	31.5	31.5
		(0.4)	—	(0.6)	(0.5)
	Weight	4.9	—	10.4	11.3
		(0.3)	—	(0.4)	(0.4)
10/21	Length	23.9	—	30.9	31.8
		(0.7)	—	(0.7)	(2.3)
	Weight	4.5	—	9.5	10.5
		(0.5)	—	(0.9)	(1.2)
Weighted seasonal mean	Length	23.6	—	31.3	31.5
		(0.2)	—	(0.4)	(0.8)
	Weight	5.0	—	10.1	10.8
		(0.2)	—	(0.3)	(0.5)
Sexes combined	Length	23.6		31.3	
		(0.2)		(0.3)	
	Weight	5.0		10.2	
		(0.2)		(0.3)	

Table 6.—Continued:

Week beginning	Measure-ment	Age 0.3 Male	Age 0.3 Female	Age 0.4 Male	Age 0.4 Female
		Year: 1985			
09/09	Length	34.2	33.7	33.0	—
		(0.9)	—	(0.4)	—
	Weight	13.2	14.3	13.0	—
		(1.1)	—	(0.5)	—
09/16	Length	33.9	33.9	34.3	37.3
		(0.7)	(1.9)	(2.2)	—
	Weight	13.2	15.3	15.2	20.7
		(0.9)	(1.9)	(3.0)	—
09/23	Length	34.3	35.4	34.4	34.1
		(0.9)	(1.9)	(0.9)	(3.4)
	Weight	13.5	16.1	15.2	15.4
		(1.1)	(2.6)	(1.0)	(3.6)
09/30	Length	34.2	35.1	33.0	34.3
		(0.8)	(1.3)	(0.6)	(0.1)
	Weight	13.2	14.4	13.8	14.9
		(1.0)	(1.2)	(1.3)	(0.3)
10/07	Length	34.6	35.1	35.6	37.1
		(1.3)	(1.7)	(1.7)	(1.4)
	Weight	13.9	15.2	16.9	20.0
		(1.3)	(1.3)	(2.6)	(3.3)
10/14	Length	35.1	34.8	33.8	33.8
		(1.2)	(0.7)	(1.1)	(1.8)
	Weight	14.5	14.7	13.9	16.1
		(1.6)	(0.8)	(1.4)	(2.8)
10/21	Length	33.7	35.7	—	35.1
		(2.1)	(1.3)	—	(1.7)
	Weight	12.7	16.4	—	17.3
		(2.3)	(1.7)	—	(2.2)
Weighted seasonal mean	Length	34.2	34.8	34.1	35.2
		(0.4)	(0.6)	(0.6)	(1.2)
	Weight	13.4	15.1	14.8	16.9
		(0.5)	(0.6)	(0.8)	(1.4)
Sexes combined	Length	34.3		34.3	
		(0.3)		(0.6)	
	Weight	13.7		15.2	
		(0.4)		(0.8)	

Table 6.--Continued:

Week beginning	Measure-ment	Age 0.1 Male	Age 0.1 Female	Age 0.2 Male	Age 0.2 Female
		Year: 1986			
09/08	Length	23.5	—	30.5	32.1
		(3.5)	—	(0.6)	(1.0)
	Weight	5.3	—	10.4	11.4
		(1.2)	—	(0.5)	(0.6)
09/15	Length	23.8	—	30.9	31.2
		(1.5)	—	(0.4)	(1.6)
	Weight	5.4	—	10.4	10.9
		(1.0)	—	(0.4)	(1.2)
09/22	Length	24.6	—	30.6	31.6
		(2.8)	—	(0.8)	(1.0)
	Weight	6.3	—	10.0	11.8
		(1.5)	—	(0.9)	(1.3)
09/29[1]	Length	23.0	—	31.1	33.8
		(1.4)	—	(0.8)	(1.2)
	Weight	4.3	—	9.9	12.4
		(0.7)	—	(0.8)	(1.7)
Weighted seasonal mean	Length	23.7	—	30.8	32.3
		(1.0)	—	(0.3)	(0.6)
	Weight	5.3	—	10.2	11.8
		(0.6)	—	(0.3)	(0.8)
Sexes combined	Length	23.7		31.2	
		(1.0)		(0.3)	
	Weight	5.3		10.5	
		(0.6)		(0.3)	

Table 6.—Continued:

Week beginning	Measure-ment	Age 0.3		Age 0.4	
		Male	Female	Male	Female
		Year: 1986			
09/08	Length	35.1	34.3	33.8	34.5
		(0.7)	(0.6)	(1.3)	(2.0)
	Weight	15.1	14.9	15.0	16.2
		(1.0)	(0.9)	(1.0)	(2.2)
09/15	Length	35.6	35.0	36.2	34.5
		(0.6)	(0.4)	(1.8)	—
	Weight	15.6	15.5	19.2	15.3
		(0.7)	(0.6)	(6.4)	(0.5)
09/22	Length	35.1	34.3	34.5	35.5
		(0.7)	(0.4)	—	(2.0)
	Weight	14.5	14.6	15.0	16.6
		(1.0)	(0.9)	—	(2.9)
09/29[1]	Length	35.5	34.6	37.2	38.5
		(0.8)	(0.5)	(2.7)	—
	Weight	14.4	14.5	18.7	21.5
		(1.0)	(0.7)	(4.7)	—
Weighted seasonal mean	Length	35.4	34.6	35.8	35.5
		(0.4)	(0.2)	(1.0)	(1.2)
	Weight	15.0	14.9	17.5	16.8
		(0.4)	(0.4)	(2.5)	(1.7)
Sexes combined	Length	35.0		35.7	
		(0.2)		(0.8)	
	Weight	15.0		17.2	
		(0.3)		(1.5)	

Table 6.—Continued:

Week beginning	Measure-ment	Age 0.1		Age 0.2	
		Male	Female	Male	Female
		Year: 1987			
08/31	Length	22.5	—	31.2	30.8
		—	—	(1.5)	(0.8)
	Weight	5.0	—	10.7	11.1
		—	—	(1.4)	(1.0)
09/07	Length	23.0	25.0	33.5	32.6
		(0.5)	—	(1.4)	(1.5)
	Weight	4.7	6.0	12.0	11.8
		(0.3)	—	(1.2)	(1.8)
09/14	Length	22.9	—	31.9	32.6
		(0.5)	—	(1.1)	(1.2)
	Weight	4.8	—	11.0	12.2
		(0.5)	—	(0.9)	(1.3)
09/21	Length	23.2	—	32.1	33.8
		(0.4)	—	(1.0)	(1.7)
	Weight	4.5	—	10.5	13.5
		(0.3)	—	(1.0)	(2.1)
09/28	Length	23.8	—	33.1	32.8
		(0.5)	—	(1.8)	(1.3)
	Weight	4.9	—	11.4	11.9
		(0.3)	—	(1.5)	(1.5)
10/05	Length	23.2	—	29.9	34.5
		(0.4)	—	(0.8)	(2.0)
	Weight	4.8	—	9.3	14.2
		(0.2)	—	(0.8)	(2.0)
10/12[2]	Length	23.2	—	35.0	34.1
		(0.4)	—	(1.6)	(2.0)
	Weight	4.6	—	13.1	13.3
		(0.3)	—	(1.5)	(1.8)
Weighted seasonal mean	Length	23.4	25.0	32.5	32.9
		(0.2)	—	(0.5)	(0.6)
	Weight	4.8	6.0	11.1	12.4
		(0.1)	—	(0.5)	(0.7)
Sexes combined	Length	23.4		32.6	
		(0.2)		(0.4)	
	Weight	4.8		11.6	
		(0.1)		(0.4)	

Table 6.—Continued:

Week beginning	Measure-ment	Age 0.3 Male	Age 0.3 Female	Age 0.4 Male	Age 0.4 Female
		Year: 1987			
08/31	Length	35.9	35.0	35.1	35.1
		(0.6)	(0.5)	(0.5)	(0.4)
	Weight	16.0	16.0	16.0	16.8
		(0.8)	(0.8)	(1.0)	(0.7)
09/07	Length	36.4	35.0	35.4	34.8
		(0.4)	(0.3)	(0.8)	(0.7)
	Weight	16.2	15.5	16.0	16.3
		(0.5)	(0.5)	(1.0)	(1.8)
09/14	Length	36.2	34.9	35.6	35.0
		(0.4)	(0.4)	(0.9)	(0.3)
	Weight	15.8	15.0	16.1	16.8
		(0.6)	(0.5)	(1.8)	(0.7)
09/21	Length	36.3	34.5	36.3	34.8
		(0.4)	(0.3)	(1.0)	(0.5)
	Weight	16.2	14.8	17.8	17.1
		(0.6)	(0.5)	(1.5)	(2.1)
09/28	Length	36.9	34.5	35.5	34.5
		(0.7)	(0.5)	(1.2)	—
	Weight	16.5	14.5	16.5	16.5
		(1.3)	(0.6)	(2.6)	—
10/05	Length	36.2	34.8	35.5	33.8
		(0.6)	(0.5)	(3.5)	(0.8)
	Weight	15.8	15.6	16.8	15.3
		(0.8)	(0.9)	(3.5)	(1.0)
10/12[2]	Length	36.4	35.1	36.1	34.5
		(0.5)	(0.5)	(1.4)	—
	Weight	15.9	15.0	17.0	15.5
		(0.8)	(0.7)	(1.7)	(1.0)
Weighted seasonal mean	Length	36.3	34.8	35.7	34.8
		(0.2)	(0.2)	(0.5)	(0.2)
	Weight	16.0	15.0	16.5	16.7
		(0.3)	(0.2)	(0.8)	(0.7)
Sexes combined	Length	35.6		35.3	
		(0.1)		(0.3)	
	Weight	15.6		16.6	
		(0.2)		(0.5)	

Table 6.—Continued:

Week beginning	Measure-ment	Age 0.1		Age 0.2	
		Male	Female	Male	Female
		Year: 1988			
08/29	Length	24.0	27.2	27.8	32.6
		(0.4)	—	(1.0)	(2.3)
	Weight	4.1	6.3	6.7	10.8
		(0.8)	—	(1.0)	(3.4)
09/05[3]	Length	21.9	—	32.6	31.8
		(1.0)	—	(1.3)	(1.6)
	Weight	3.4	—	11.3	11.4
		(0.6)	—	(1.2)	(2.1)
09/19[4]	Length	23.4	—	30.9	33.9
		(0.6)	—	(1.0)	(1.8)
	Weight	4.0	—	9.1	12.9
		(0.4)	—	(0.9)	(2.0)
10/03[5]	Length	22.9	—	32.0	30.9
		(0.8)	—	(0.9)	(0.4)
	Weight	3.3	—	10.6	10.5
		(0.5)	—	(1.0)	(1.1)
10/17	Length	23.2	—	29.1	31.4
		(1.3)	—	—	(1.7)
	Weight	3.8	—	7.5	10.5
		(1.0)	—	—	(2.0)
Weighted seasonal mean	Length	22.8	27.2	32.5	32.6
		(0.5)	—	(0.5)	(1.1)
	Weight	3.7	6.3	11.1	12.0
		(0.3)	—	(0.5)	(1.3)
Sexes combined	Length	22.8		32.6	
		(0.5)		(0.4)	
	Weight	3.7		11.6	
		(0.3)		(0.4)	

Table 6.—Continued:

Week beginning	Measure-ment	Age 0.3		Age 0.4	
		Male	Female	Male	Female
		Year: 1988			
08/29	Length	36.2	34.3	37.5	33.9
		(1.5)	(0.6)	(2.4)	(0.6)
	Weight	14.6	13.4	16.4	11.9
		(2.1)	(1.0)	(3.0)	(0.7)
09/05[3]	Length	36.9	35.2	—	35.3
		(0.7)	(0.7)	—	(1.5)
	Weight	16.5	14.8	—	15.5
		(1.2)	(0.8)	—	—
09/19[4]	Length	35.2	34.8	37.3	34.8
		(0.7)	(0.6)	(4.7)	(0.6)
	Weight	14.0	14.8	19.2	14.6
		(0.9)	(0.9)	(6.8)	(1.1)
10/03[5]	Length	35.9	35.1	37.1	35.2
		(1.2)	(0.6)	(1.6)	(1.1)
	Weight	14.8	14.7	16.7	15.4
		(1.6)	(0.9)	(2.6)	(1.8)
10/17	Length	36.5	34.9	36.6	34.6
		(1.5)	(0.8)	(1.3)	(0.8)
	Weight	15.9	14.6	15.8	14.3
		(2.0)	(1.3)	(2.3)	(1.3)
Weighted seasonal mean	Length	36.0	34.9	37.1	34.9
		(0.5)	(0.4)	(2.0)	(0.4)
	Weight	15.1	14.7	17.6	14.7
		(0.7)	(0.5)	(3.0)	(0.7)
Sexes combined	Length	35.5		35.6	
		(0.3)		(0.8)	
	Weight	14.9		15.7	
		(0.4)		(1.2)	

Table 6.—Continued:

Week beginning	Measure-ment	Age 0.1 Male	Age 0.1 Female	Age 0.2 Male	Age 0.2 Female
		Year: 1989			
08/28[6]	Length	23.7	—	30.3	30.8
		(0.7)	—	(0.4)	(0.8)
	Weight	5.2	—	9.7	10.8
		(0.7)	—	(0.5)	(0.5)
09/18	Length	22.8	—	31.8	31.7
		(0.2)	—	(0.4)	(0.9)
	Weight	6.0	—	12.9	12.3
		(1.5)	—	(1.1)	(1.0)
09/25	Length	24.0	—	31.7	37.0
		(0.8)	—	(0.6)	—
	Weight	5.4	—	11.6	18.0
		(0.7)	—	(0.9)	—
10/02[7]	Length	23.1	—	31.0	—
		(0.9)	—	(0.7)	—
	Weight	4.4	—	10.6	—
		(0.5)	—	(0.8)	—
10/16[8]	Length	22.7	—	31.0	32.2
		(0.8)	—	(4.2)	(1.5)
	Weight	3.9	—	9.4	11.7
		(0.5)	—	(4.7)	(1.6)
Weighted seasonal mean	Length	23.3	—	30.8	31.5
		(0.5)	—	(0.3)	(0.6)
	Weight	4.7	—	10.4	11.5
		(0.3)	—	(0.4)	(0.5)
Sexes combined	Length	23.3		31.1	
		(0.5)		(0.3)	
	Weight	4.7		10.8	
		(0.3)		(0.4)	

Table 6.—Continued:

Week beginning	Measure-ment	Age 0.3		Age 0.4	
		Male	Female	Male	Female
		Year: 1989			
08/28[6]	Length	35.4	34.6	35.1	33.2
		(0.8)	(0.8)	(0.8)	(0.8)
	Weight	16.0	16.0	15.5	14.3
		(1.3)	(1.0)	(1.6)	(1.1)
09/18	Length	35.3	35.3	36.5	35.2
		(0.9)	(0.7)	(0.9)	(0.7)
	Weight	16.6	18.1	17.7	18.3
		(1.3)	(1.5)	(1.5)	(1.1)
09/25	Length	35.9	35.7	36.0	35.7
		(0.8)	(1.2)	(1.1)	(1.1)
	Weight	17.0	17.8	16.4	17.8
		(1.3)	(2.1)	(1.5)	(1.6)
10/02[7]	Length	36.3	34.9	36.0	35.7
		(1.0)	(0.7)	(1.6)	(0.9)
	Weight	16.5	16.4	15.9	16.6
		(1.2)	(1.3)	(2.7)	(1.5)
10/16[8]	Length	34.5	35.2	36.6	34.7
		(1.7)	(0.5)	—	(0.9)
	Weight	13.5	16.6	15.2	16.1
		(1.9)	(0.9)	—	(1.3)
Weighted seasonal mean	Length	35.7	35.0	36.0	34.8
		(0.4)	(0.4)	(0.6)	(0.4)
	Weight	16.5	16.7	16.5	16.4
		(0.6)	(0.6)	(1.0)	(0.6)
Sexes combined	Length	35.3		35.4	
		(0.3)		(0.4)	
	Weight	16.6		16.4	
		(0.4)		(0.6)	

Table 6.—Continued:

Week beginning	Measure-ment	Age 0.1 Male	Age 0.1 Female	Age 0.2 Male	Age 0.2 Female
		Year: 1990			
09/10	Length	23.5	—	31.2	32.6
		(1.2)	—	(1.3)	(0.6)
	Weight	5.0	—	10.6	12.1
		(0.6)	—	(1.3)	(0.9)
09/17[9]	Length	21.7	—	31.5	31.0
		(1.0)	—	(1.0)	(1.0)
	Weight	3.9	—	10.6	11.0
		(0.5)	—	(0.9)	(1.0)
10/01	Length	22.1	—	32.1	31.4
		(0.8)	—	(1.0)	—
	Weight	3.8	—	10.7	12.3
		(0.6)	—	(1.3)	—
10/08[10]	Length	22.2	—	32.9	33.1
		(0.5)	—	(2.1)	(4.1)
	Weight	3.9	—	11.9	13.4
		(0.3)	—	(2.1)	(4.8)
Weighted seasonal mean	Length	22.1	—	31.9	32.0
		(0.4)	—	(0.7)	(1.7)
	Weight	3.9	—	10.9	12.2
		(0.2)	—	(0.7)	(2.0)
Sexes combined	Length	22.1		31.9	
		(0.4)		(0.6)	
	Weight	3.9		11.3	
		(0.2)		(0.7)	

Table 6.—Continued:

Week beginning	Measure-ment	Age 0.3		Age 0.4	
		Male	Female	Male	Female
		Year: 1990			
09/10	Length	36.7	36.2	35.3	35.3
		(0.8)	(0.6)	(1.6)	(1.2)
	Weight	16.6	18.2	15.9	16.9
		(1.1)	(0.9)	(2.9)	(1.6)
09/17[9]	Length	35.2	36.5	35.1	35.9
		(1.0)	(0.8)	(0.9)	(1.1)
	Weight	15.5	17.8	14.8	17.2
		(1.2)	(1.3)	(1.3)	(1.8)
10/01	Length	35.5	36.1	35.5	35.5
		(1.0)	(1.0)	(2.5)	(0.9)
	Weight	15.6	17.4	15.3	17.2
		(1.2)	(1.4)	(2.9)	(1.8)
10/08[10]	Length	35.2	35.9	35.1	35.6
		(1.6)	(0.5)	(1.6)	(0.9)
	Weight	14.2	16.2	13.9	16.4
		(1.9)	(0.9)	(2.0)	(1.0)
Weighted seasonal mean	Length	35.4	36.1	35.1	35.7
		(0.6)	(0.4)	(0.8)	(0.6)
	Weight	15.4	17.0	14.6	16.9
		(0.7)	(0.6)	(1.0)	(0.8)
Sexes combined	Length	35.8		35.4	
		(0.4)		(0.5)	
	Weight	16.2		15.8	
		(0.5)		(0.7)	

[1] Includes fish harvested during the weeks of 09/29, 10/06, 10/13, 10/20, and 10/27.
[2] Includes fish harvested during the weeks of 10/12, 10/19, 10/26, and 11/02.
[3] Includes fish harvested during the weeks of 09/05 and 09/12.
[4] Includes fish harvested during the weeks of 09/19 and 09/26.
[5] Includes fish harvested during the weeks of 10/03 and 10/10.
[6] Includes fish harvested during the weeks of 08/28, 09/04, and 09/11.
[7] Includes fish harvested during the weeks of 10/02 and 10/09.
[8] Includes fish harvested during the weeks of 10/16, 10/23, 10/30, and 11/06.
[9] Includes fish harvested during the weeks of 09/17 and 09/24.
[10] Includes fish harvested during the weeks of 10/08, 10/15, and 10/22.

Table 7.—Numbers, and in parentheses percent, by age, of chinook salmon in various year classes returning to Swan River weir 1 to 4 years after stocking.

Year	Number stocked	Age 0.1	0.2	0.3	0.4	Total
1981	0	—	—	—	1,724	1,724
		—	—	—	—	—
1982	0	—	—	5,865	1,567	7,432
		—	—	—	—	—
1983	770,000	—	3,582	22,461	3,604	29,647
		—	(0.5)	(2.9)	(0.5)	(3.9)
1984	900,209	5,491	12,809	31,098	3,236	52,634
		(0.6)	(1.4)	(3.5)	(0.4)	(5.8)
1985	734,022	1,944	7,664	18,308	6,965	34,881
		(0.3)	(1.0)	(2.5)	(0.9)	(4.8)
1986[1]	925,886	9,081	6,467	16,135	4,466	36,149
		(1.0)	(0.7)	(1.7)	(0.5)	(3.9)
1987[1]	885,565	2,819	3,937	10,054	—	16,810
		(0.3)	(0.4)	(1.1)	—	(1.9)
1988[1]	929,800	3,082	2,076	—	—	5,158
		(0.3)	(0.2)	—	—	(0.6)
1989[1]	987,613	2,925	—	—	—	2,925
		(0.3)	—	—	—	(0.3)

[1]Triploid chinook fingerlings stocked not included.

Table 8.—Number, by week, of coho salmon harvested at the Swan River weir, fall 1984-86.

Year	Week beginning	Number harvested
1984	09/24	5,943
	10/01	1,527
	10/08	1,415
	10/15	560
	10/22	0
	10/29	648
Total		10,093
1985	09/09	255
	09/16	175
	09/23	223
	09/30	103
	10/07	60
	10/14	54
	10/21	40
Total		910
1986	09/08	160
	09/15	932
	09/22	131
	09/29	37
	10/06	65
	10/13	35
	10/20	0
	10/27	15
Total		1,375

Table 9.—Number, by age, of coho salmon harvested at Swan River weir, fall 1984-86. Weight (pounds) is in parentheses and was estimated using seasonal means.

Year	Age 1.0	Age 1.1	Total
1984	0	10,093	10,093
	—	(73,512)	(73,512)
1985	9	901	910
	(15)	(6,256)	(6,271)
1986	0	1,375	1,375
	—	(8,326)	(8,326)

Table 10.—Summary of the number and weight, by age and sex, of coho salmon harvested at the Swan River weir, fall 1984-86.

Week beginning	Male		Female		Total	
	Number	Pounds	Number	Pounds	Number	Pounds
			Year: 1984			
Age 1.1						
09/24	2,401	17,323	3,542	26,229	5,943	43,552
10/01	596	4,424	931	6,795	1,527	11,219
10/08[1]	1,364	9,755	1,259	8,986	2,623	18,741
Total	4,361	31,502	5,732	42,010	10,093	73,512
(Percent)	(43.2)	(42.9)	(56.8)	(57.1)	(100.0)	(100.0)
			Year: 1985			
Age 1.0						
09/09	—	—	—	—	—	—
09/16	7	11	—	—	7	11
09/23	—	—	—	—	—	—
09/30	1	2	—	—	1	2
10/07	—	—	—	—	—	—
10/14	1	2	—	—	1	2
10/21	—	—	—	—	—	—
Total	9	15	—	—	9	15
(Percent)	(1.0)	(0.2)	—	—	(1.0)	(0.2)
Age 1.1						
09/09	153	1,052	102	695	255	1,747
09/16	83	585	85	610	168	1,195
09/23	116	821	107	702	223	1,523
09/30	70	513	32	218	102	731
10/07	38	281	22	154	60	435
10/14	31	194	22	148	53	342
10/21	25	187	15	96	40	283
Total	516	3,633	385	2,623	901	6,256
(Percent)	(56.7)	(57.9)	(42.3)	(41.8)	(99.0)	(99.8)
			Year: 1986			
Age 1.1						
09/08	160	929	—	—	160	929
09/15[2]	848	5,287	215	1,236	1,063	6,523
09/29[3]	76	475	76	399	152	874
Total	1,084	6,691	291	1,635	1,375	8,326
(Percent)	(78.8)	(80.4)	(21.2)	(19.6)	(100.0)	(100.0)

[1] Includes fish harvested during the weeks of 10/08, 10/15, 10/22, and 10/29.
[2] Includes fish harvested during the weeks of 09/15 and 09/22.
[3] Includes fish harvested during the weeks of 09/29, 10/06, 10/13, 10/20, and 10/27.

Table 11.—Mean total length (inches) and weight (pounds), by age and sex, of coho salmon harvested at the Swan River weir, fall 1984-86. Two standard errors in parentheses.

Week beginning	Measurement	Age 1.1 Male	Age 1.1 Female
	Year: 1984		
09/24	Length	26.6	26.1
		(0.4)	(0.3)
	Weight	7.2	7.4
		(0.4)	(0.3)
10/01	Length	26.5	25.6
		(0.6)	(0.5)
	Weight	7.4	7.3
		(0.5)	(0.4)
10/08[1]	Length	27.4	26.3
		(0.4)	(0.5)
	Weight	7.2	7.1
		(0.4)	(0.4)
Weighted seasonal mean	Length	26.8	26.1
		(0.3)	(0.2)
	Weight	7.2	7.3
		(0.3)	(0.2)
Sexes combined	Length	26.4	
		(0.2)	
	Weight	7.3	
		(0.2)	

Table 11.—Continued:

Week beginning	Measure-ment	Age 1.0 Male	Age 1.0 Female	Age 1.1 Male	Age 1.1 Female
		Year: 1985			
09/09	Length	—	—	26.4	26.2
		—	—	(0.6)	(0.4)
	Weight	—	—	6.9	6.8
		—	—	(0.5)	(0.4)
09/16	Length	15.2	—	26.8	26.6
		(1.8)	—	(0.9)	(0.4)
	Weight	1.5	—	7.0	7.2
		(0.5)	—	(0.6)	(0.4)
09/23	Length	—	—	27.0	25.8
		—	—	(0.6)	(0.4)
	Weight	—	—	7.1	6.6
		—	—	(0.5)	(0.4)
09/30	Length	17.9	—	27.2	25.8
		—	—	(0.5)	(0.6)
	Weight	2.0	—	7.3	6.8
		—	—	(0.4)	(0.4)
10/07	Length	—	—	27.4	25.9
		—	—	(0.6)	(0.5)
	Weight	—	—	7.4	7.0
		—	—	(0.6)	(0.5)
10/14	Length	17.0	—	26.2	26.2
		—	—	(1.0)	(0.5)
	Weight	1.7	—	6.3	6.7
		—	—	(0.7)	(0.6)
10/21	Length	—	—	28.0	25.8
		—	—	(0.5)	(0.8)
	Weight	—	—	7.5	6.4
		—	—	(0.5)	(0.6)
Weighted seasonal mean	Length	15.7	—	26.8	26.1
		(1.2)	—	(0.2)	(0.1)
	Weight	1.6	—	7.0	6.8
		(0.3)	—	(0.1)	(0.1)
Sexes combined	Length	15.7		26.5	
		(1.2)		(0.1)	
	Weight	1.6		6.9	
		(0.3)		(0.1)	

Table 11.—Continued:

Week beginning	Measurement	Age 1.1 Male	Age 1.1 Female
	Year: 1986		
09/08	Length	24.8	—
		(0.3)	—
	Weight	5.8	—
		(0.2)	—
09/15[2]	Length	25.8	25.0
		(0.3)	(0.7)
	Weight	6.2	5.8
		(0.2)	(0.5)
09/29[3]	Length	26.0	25.0
		(1.0)	(2.0)
	Weight	6.3	5.3
		(1.5)	(0.5)
Weighted seasonal mean	Length	25.7	25.0
		(0.3)	(0.7)
	Weight	6.2	5.6
		(0.2)	(0.4)
Sexes combined	Length	25.5	
		(0.3)	
	Weight	6.1	
		(0.2)	

[1] Includes fish harvested during the weeks of 10/08, 10/15, 10/22, and 10/29.
[2] Includes fish harvested during the weeks of 09/15 and 09/22.
[3] Includes fish harvested during the weeks of 09/29, 10/06, 10/13, 10/20, and 10/27.

Table 12.—Numbers, and in parentheses percent, by age, of coho salmon in various year classes returning to Swan River weir 1 to 2 years after stocking.

Year class	Number stocked	Age 1.0	Age 1.1	Total
1982	250,138	—[1]	10,093	10,093
		—	(4.0)	(4.0)
1983	250,051	9	901	910
		(<0.1)	(0.4)	(0.4)
1984	276,336	0	1,375	1,375
		—	(0.5)	(0.5)

[1]No harvest in 1983.

References

Fenske, J. L. 1991. Medusa Creek harvest weir report, 1989. Michigan Department of Natural Resources, Fisheries Technical Report 91-7, Ann Arbor.

Hay, R. L. 1990. Little Manistee River harvest weir and chinook salmon egg-take report, 1986. Michigan Department of Natural Resources, Fisheries Technical Report 90-6, Ann Arbor.

Rakoczy, G. P. 1991. Harvest, movement, return to the creel, and growth of chinook and coho salmon in Lake Huron, 1985-88. Michigan Department of Natural Resources, Fisheries Research Report No. 1983, Ann Arbor.

Rakoczy, G. P., and R. D. Rogers 1991. Charter boat catch and effort from the Michigan waters of the great lakes, 1990. Michigan Department of Natural Resources, Fisheries Technical Report 91-12, Ann Arbor.

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