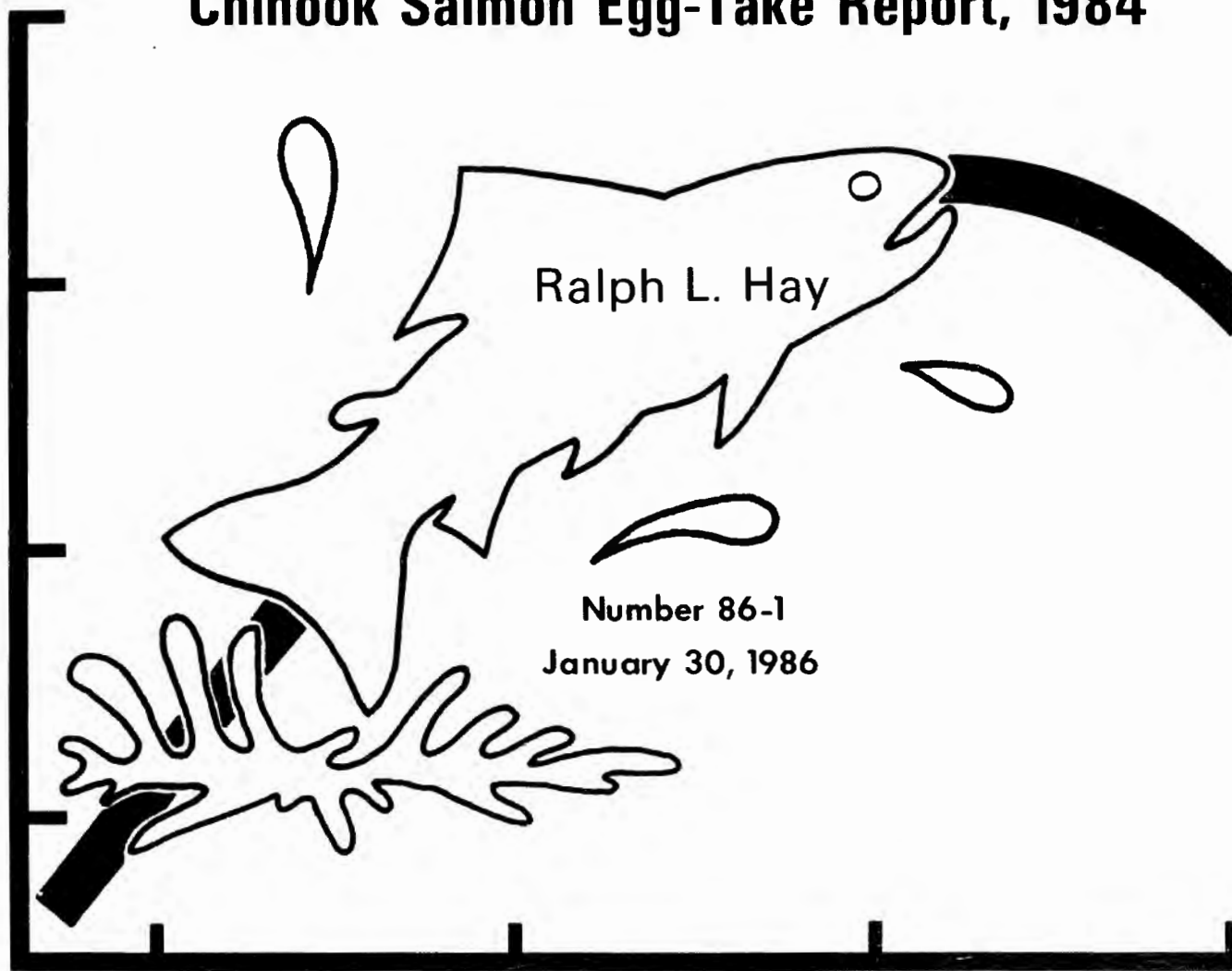


FISHERIES DIVISION

TECHNICAL REPORT

Little Manistee River Harvest Weir and Chinook Salmon Egg-Take Report, 1984



Ralph L. Hay

Number 86-1

January 30, 1986



Michigan Department of
Natural Resources

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INTRODUCTION

As part of the Michigan Department of Natural Resources salmon management program for Lake Michigan, the Little Manistee River has been planted annually since 1967 with both coho and chinook salmon (Table 1). Construction of a blocking weir, fish ladder, holding ponds, and harvest facility on the river, about 5 miles upstream from Manistee Lake, Manistee County, began in 1967 and was completed in 1968 (Fig. 1). All chinook and coho salmon reaching the weir are harvested and sold to a commercial contractor. Normally, all other salmonids are passed upstream. The few salmon that enter the river when the weir is not in operation provide a limited stream fishery. The Little Manistee weir is Michigan's primary source for chinook eggs for in-state and out-of-state hatchery rearing and serves as a back-up (to the Platte River upper weir) for coho eggs. The facility is also used to monitor fall steelhead runs and each spring provides the majority of steelhead eggs for in-state hatchery rearing. Biological data have been collected on chinook and other anadromous salmonids since 1968.

From 1968 through 1978 chinook fingerlings were stocked in the Little Manistee River at an average rate of about 322,000 per year (Table 1, Fig. 2). Beginning in 1979, the planting rate was increased by over 90% to an average of nearly 623,000 fingerlings. Substantial runs of returning adults have been produced but run size has not been closely related to stocking rate. The number of chinook actually harvested at the weir has varied between 11,136 (in 1977) and 39,359 (in 1983) (Table 2).

Chinook return to the weir at either age 0.1 (jacks), age 0.2, or age 0.3—but most commonly at age 0.2.¹ For the 1967, 1968, and 1981 year classes and plants, return rates were 0.4–1.9% at age 0.1, 3.4–3.5% at age 0.2, and 1.7–3.1% at age 0.3 (Table 3). Comparable estimates cannot be made for the 1969–80 plants because the age composition of the run has not been monitored consistently; however, for jacks alone returns have averaged 0.7%.

The return rate of chinook salmon to the weir was high initially (1960's), declined (1970's), then increased (1980's). Return rates by chinook of all ages totaled 8.5% for the 1967 plant, 7.2% for the 1968 plant, and 5.6% for the 1981 plant (Table 3). Returns from plants in the 1970's must have been lower because relatively low numbers came back to the weir in 1976–77 and 1980–82 (Table 2). Large runs occurred in 1983 and 1984. These return rates represent

¹In aging anadromous fish, the number preceding the decimal denotes age at smolting (0 for most chinook, 1 for most coho) and the number following the decimal represents the number of annuli formed in the Great Lakes (mostly 1, 2, or 3 for chinook and 0 or 1 for coho). Note: a very recent study of scale samples from the Lake Michigan fishery indicates some chinook live to age 0.4 and 0.5. This finding suggests that some spawning chinook absorb one or two annuli from their scales while in the rivers and that the aging data given in this and the preceding report may be underestimates.

only the weir harvest and do not include the angler harvest, which has increased since the 1960's.

Growth rate of chinook has fluctuated considerably (Table 4, Fig. 3). Average weight has varied from 3.0 to 9.5 pounds for age 0.1, from 10.1 to 20.9 pounds for age 0.2, and from 15.5 to 29.2 pounds for age 0.3.

Annual plants of yearling coho salmon in the Little Manistee River have varied widely, from 91,000 in 1971 to 700,000 in 1969 (Table 1). Annual runs of coho to the weir have varied from 2,314 in 1972 to 108,400 in 1970 (Table 5). The return rate of jacks (age 1.0) has been relatively low, 0.2% to 0.7%, compared to adults (age 1.1), 7.9% to 15.0% (Fig. 4). The return rate of coho does not seem to be related to stocking density and does not show a clear trend (Fig. 4). As with chinook, these return rates represent only the weir harvest and do not include the angler harvest, which has also fluctuated annually.

Since 1974, the average size of coho jacks (age 1.0) has increased slightly (Fig. 5, Table 4). Weight has ranged from 1.2 to 1.9 pounds. However, the size of adult coho decreased from 8.7 pounds in 1968 to less than 5.0 pounds in 1979, then increased to 7.0 pounds by 1983. In 1984, size again decreased to 5.7 pounds (Table 4). It is assumed that the annual variations in size are primarily related to a combination of predator density and forage density in Lake Michigan.

The Little Manistee River is one of the top quality steelhead streams in Michigan. The fishery is supported almost entirely by natural reproduction. However, a plant of 100,188 fall fingerlings was made in 1974, and from 1981 through 1983 annual plants were made in conjunction with a research project on steelhead production (Table 1). In 1984 a small planting of three strains of summer steelhead yearlings was made to extend the steelhead fishery. The strains (Siletz, Rogue, and Umpqua River) were imported from the State of Oregon. The number of steelhead returning to the weir each fall has not been consistent, ranging from 320 in 1978 to 7,523 in 1971 (Table 6). Mean weight of steelhead (all age groups) has varied from 6.5 pounds in 1973 to 9.3 pounds in 1972 (Table 6).

Small runs of anadromous brown trout occur in the Little Manistee River. The largest run, 238, was in 1975 (Table 7).

Atlantic salmon yearlings were first planted in the Little Manistee River in 1977 (Table 1). Subsequent plants have been made in an attempt to establish this new species. Until 1984 only an occasional fish had been captured. Of the several strains and hybrids planted only the Sebago strain (from Maine) shows promise.

HARVEST WEIR OPERATIONS, 1984

On September 4, 1984, the weir grates were installed, blocking all anadromous fish. On September 14, the ponds were filled and the fish ladder was activated. Harvest began on the

same day. The weir remained operational until November 5, at which time the grates were removed and the building was winterized. The weir was in operation for 63 days. All harvested chinook and coho salmon were sold on contract to Tempotech Industries, Hart, Michigan.

Chinook salmon

Harvest of chinook salmon began September 14 and ended November 5, a period of 53 days. Two peak harvests occurred, the first during late September and the second near mid-October (Fig. 6). The first good run of chinook entered the facility about the third week of September. Fish that were not ripe were harvested because, in other years, holding early-run chinook in maturation ponds resulted in high mortality. A total of 32,632 chinook were harvested in 1984, the third best harvest since 1968. The calculated total weight of all chinook, in the round, was 436,057 pounds (Table 2).

Each week of the run, biological data were obtained from a randomly selected sample of 100 chinook to provide information on age composition and growth. The total harvest consisted of 5,914 (18.1%) age-0.1 jacks weighing 30,879 pounds, 18,342 (56.2%) age-0.2 adults weighing 246,654 pounds, and 8,376 (25.7%) age-0.3 adults weighing 158,524 pounds (Table 8). The 1984 run of jacks was the third largest on record (Table 2) and represented 0.9% of the fingerlings stocked in 1983 (Fig. 2). The returning age-0.2 adults were 3.1% of the 1982 plant and the age-0.3 adults were 1.7% of the 1981 plant.

Females constituted about 49% of the total run — 1.4% of age 0.1, 55.9% of age 0.2, and 66.5% of age 0.3. Mean lengths and weights of males and females combined were: age 0.1, 24.3 inches and 5.2 pounds; age 0.2, 34.3 inches and 13.4 pounds; and age 0.3, 38.3 inches and 18.9 pounds (Table 9). Females were slightly larger than males at each age.

The 1984 chinook egg-take operation began September 26 and ended October 25. During the 30-day period 25 million eggs were collected of which 12 million were for in-state rearing and 13 million were for out-of-state commitments (Table 11). A total of 5,722 female chinook (ages 0.2 and 0.3) were stripped, excluding those which yielded low-quality eggs or were otherwise unsatisfactory. Assuming that about 8,000 females were handled to provide the 25 million eggs, a total run of 16,000 chinook (8,000/50% females) should provide sufficient eggs for current in-state and out-of-state requirements.

Fecundity data were collected from 25 randomly selected ripe female chinook. The average number of eggs was 5,725 (2,901 eggs/quart) for age-0.2 fish and 6,412 (2,772 eggs/quart) for age-0.3 fish (Table 12). Older fish had more and larger eggs.

Only 0.1% of the chinook sampled had a lamprey wound (Table 10).

Coho salmon

In 1984 the coho harvest coincided with the chinook harvest (September 14 through November 5, a total of 53 days). The peak harvest occurred on September 21, and since coho were not held for egg-take, the harvest dates roughly coincide with migration of coho into the river (Fig. 7).

A total of 33,982 coho were harvested. The total weight calculated from biological samples was 192,071 pounds (Table 5).

The age composition of the harvested coho was 218 (0.6%) age-1.0 jacks weighing 388 pounds and 33,764 (99.4%) age-1.1 adults weighing 191,683 pounds (Table 13). The returning age-1.0 jacks were 0.04% of the 1984 plant and the age-1.1 adults were 7.9% of the 1983 plant.

All age-1.0 and 41.6% of the age-1.1 coho were males. The total run consisted of 57.8% females. Mean lengths and weights were: age-1.0 males, 16.2 inches and 1.8 pounds; age-1.1 males, 24.7 inches and 5.9 pounds; age-1.1 females, 24.8 inches and 5.5 pounds; and age-1.1 sexes combined, 24.7 inches and 5.7 pounds (Table 14). Males were slightly larger than females at age 1.1.

Only 0.1% of the coho had lamprey wounds (Table 10).

No coho eggs were taken at the Little Manistee weir in 1984.

Steelhead trout

Fall steelhead began entering the river in early September and the run peaked about November 1 (Fig. 8). As in most previous years, all steelhead were passed above the weir.

The 1984 run of 1,909 fish was down from last year (3,100) but still the second best run since 1977 (Table 6). Seventy percent (70%) of the returning adults were age 2.1 or 2.2 (Table 15). These two age groups also represented 74% of the total estimated weight of 13,496 pounds. Mean lengths and weights for 10 different age groups are given in Table 16. Size of returning adults is more dependent upon years spent in Lake Michigan than on age at smolting (Fig. 9).

An intensive study of steelhead and their reproduction in the Little Manistee River is being conducted by Paul Seelbach, Institute for Fisheries Research, Ann Arbor, Michigan.

Brown trout

The anadromous brown trout run peaked in September and lingered into November (Fig. 10). As in previous years, all brown trout were passed above the weir.

The 1984 run of 141 fish was the largest run since 1975 and the third largest since 1968 (Table 7). About 71% of the returning adults were age 2.1 (Table 17). This one age group

represented 75% of the total estimated weight of 750 pounds. Mean lengths and weights for the five different age groups are given in Table 18. Size of returning adults is more dependent upon years spent in Lake Michigan than on age at smolting (Fig. 11).

Brown trout are not planted in the Little Manistee River. Therefore, it is assumed that these anadromous fish are from wild stock or from hatchery stock planted in Lake Michigan at Manistee.

Atlantic salmon

Only one Atlantic salmon was collected at the weir and passed upstream.

SUMMARY

In 1984 the Little Manistee harvest weir was in operation from September 4 through November 5 (63 days). Harvest of chinook and coho salmon and passage of other anadromous salmonids occurred from September 14 through November 5.

The entire salmon run of 32,632 chinook (436,057 pounds) and 33,982 coho (192,071 pounds) was harvested and sold to Tempotech Industries, Hart, Michigan.

The chinook run consisted of 5,914 age-0.1 jacks (0.9% of the 1983 fingerling plant), 18,342 age-0.2 adults (3.1% of the 1982 fingerling plant), and 8,376 age-0.3 adults (1.7% of the 1981 fingerling plant). Mean sizes were: age 0.1, 24.3 inches (5.2 pounds); age 0.2, 34.3 inches (13.4 pounds); and age 0.3, 38.3 inches (18.9 pounds). During chinook egg-take operations (September 26 through October 25) 5,722 females (ages 0.2 and 0.3) were stripped to obtain 25,493,653 eggs. The average number of eggs per female was 6,055 (2,841 eggs/quart).

The 1984 coho run was composed of 218 age-1.0 jacks (0.04% of the 1984 yearling plant) and 33,764 age-1.1 adults (7.9% of the 1983 yearling plant). Mean sizes were: age 1.0, 16.2 inches (1.8 pounds); and age 1.1, 24.7 inches (5.7 pounds).

The 1984 fall steelhead run of 1,909 fish, the second best run since 1977, included 10 different age groups. Nearly three-quarters of the fish were age 2.1 or 2.2.

The fall brown trout run of 141 fish was the largest since 1975. About 71% of the returning adults were age 2.1.

Only one Atlantic salmon returned to the weir in 1984.

RECOMMENDATIONS FOR 1985

Use only data from biological samples to calculate weekly weights of chinook and coho salmon harvested. Reduce the biological sample size on steelhead. Do not scale sample river-run chinook salmon because their scales are severely eroded and are missing annuli; instead, collect scale samples from Lake Michigan chinook in the fall.

ACKNOWLEDGMENTS

Data collection, tabulation, and scale reading were done by Alfred Allen, Janice Sapak, and Steve Lazar. Vernon Bennett and Linda Johnson provided assistance on computer use. Paul Seelbach and James Ryckman provided technical advice. Ludwig Frankenberger and James Schneider reviewed the report.

Report approved by W. C. Latta

Typed by G. M. Zurek

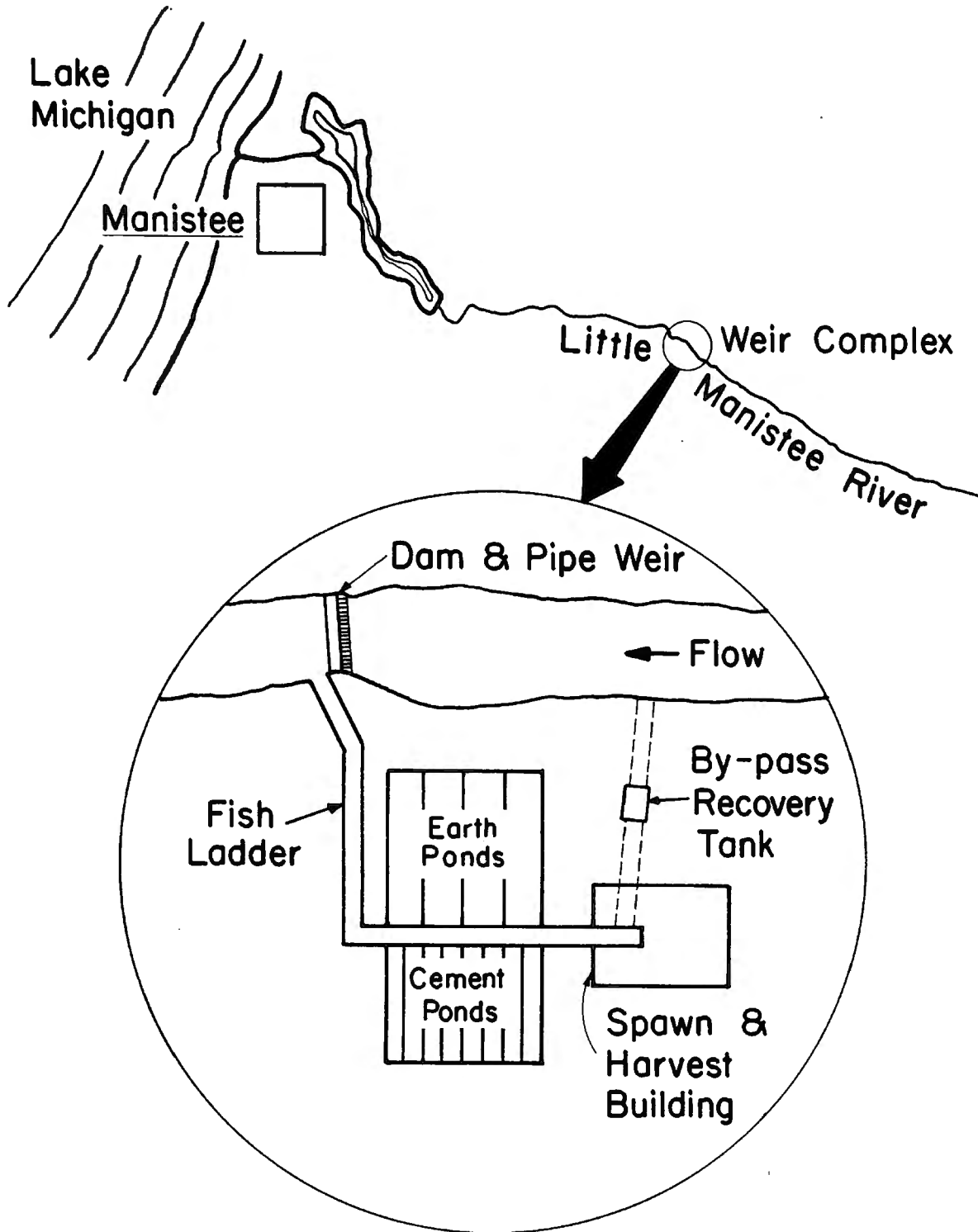


Figure 1. Location and schematic diagram of the Little Manistee River weir complex.

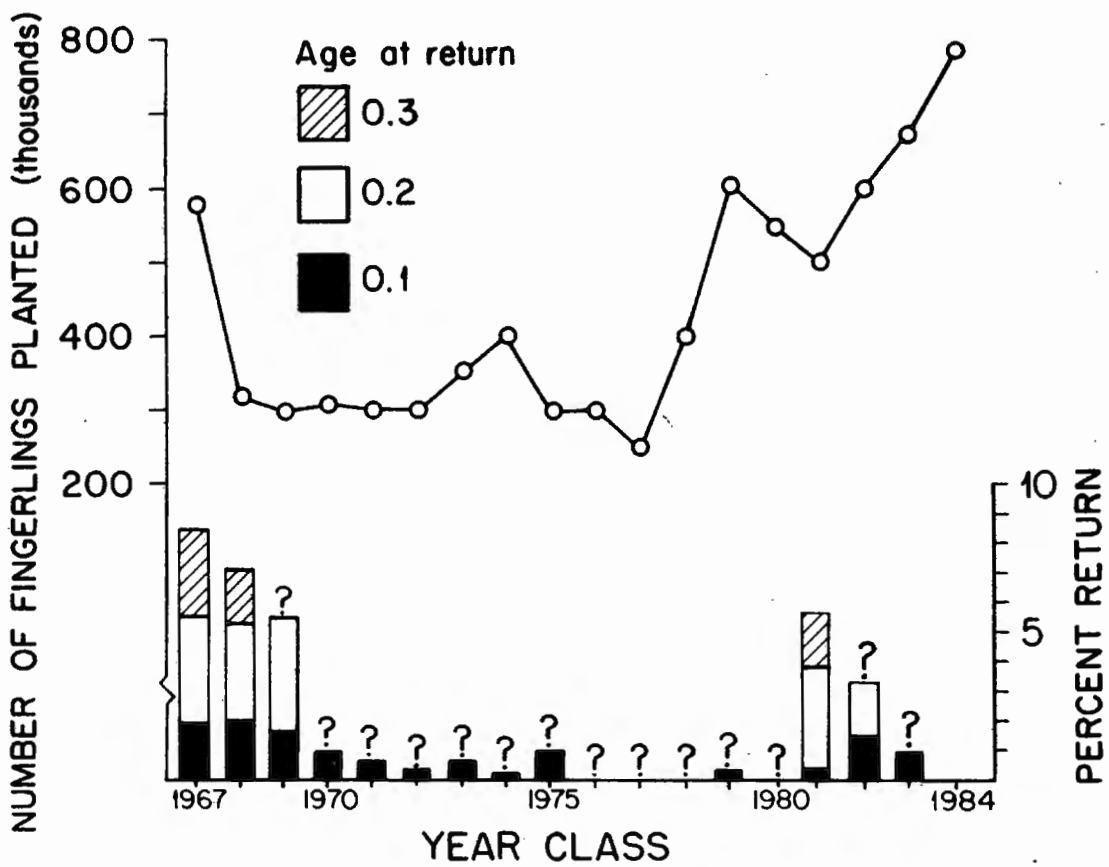


Figure 2. Percent return of chinook salmon year classes, by age, to the Little Manistee River weir compared with the number of fingerlings planted. Question marks (?) indicate return data are incomplete.

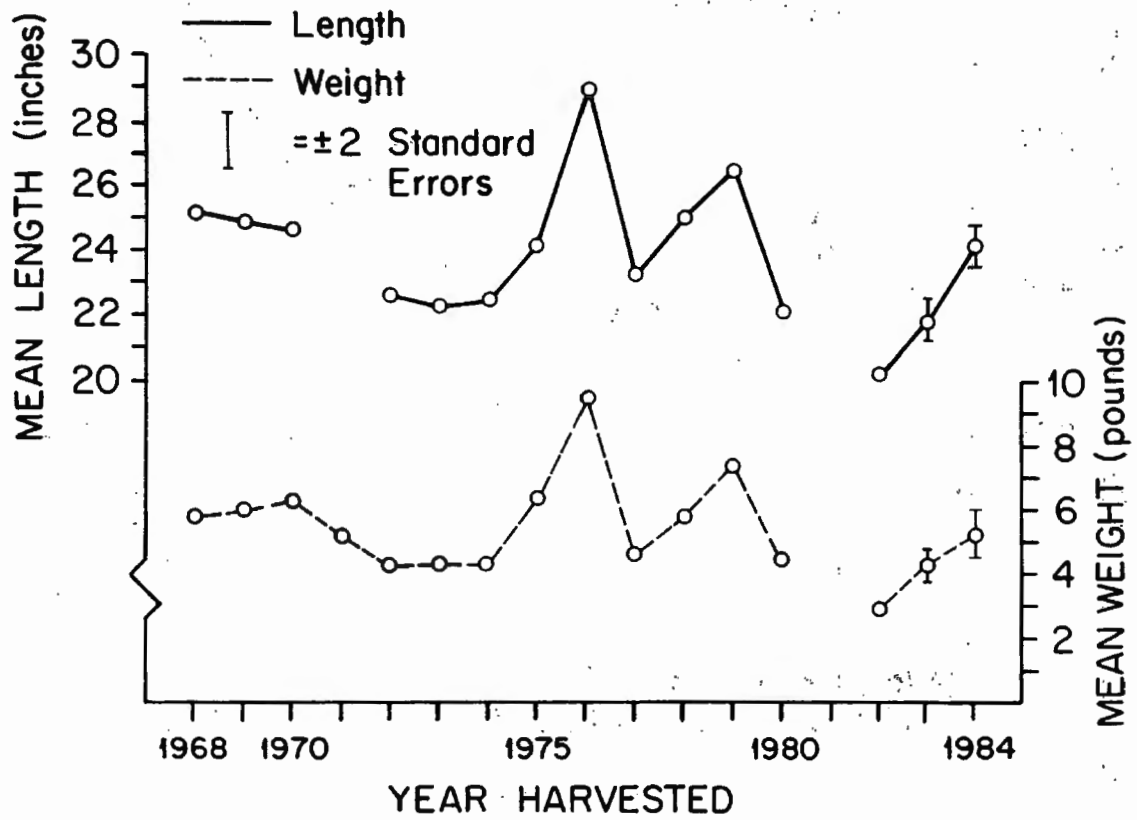


Figure 3. Mean total length (inches) and round weight (pounds) of age-0.1 (jack) chinook salmon harvested at the Little Manistee River weir.

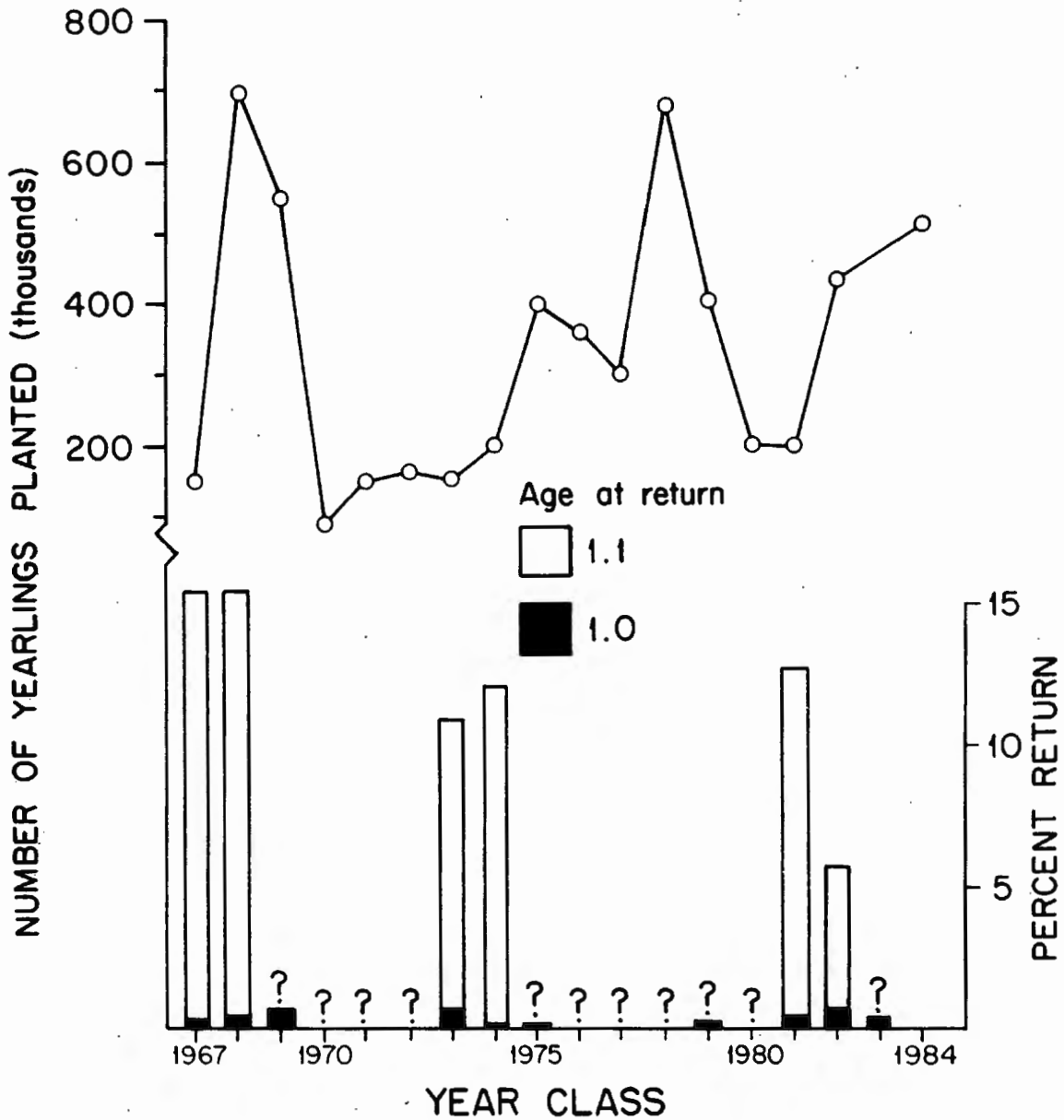


Figure 4. Percent return of coho salmon year classes, by age, to the Little Manistee River weir compared with the number of yearlings planted. Question marks (?) indicate incomplete return data.

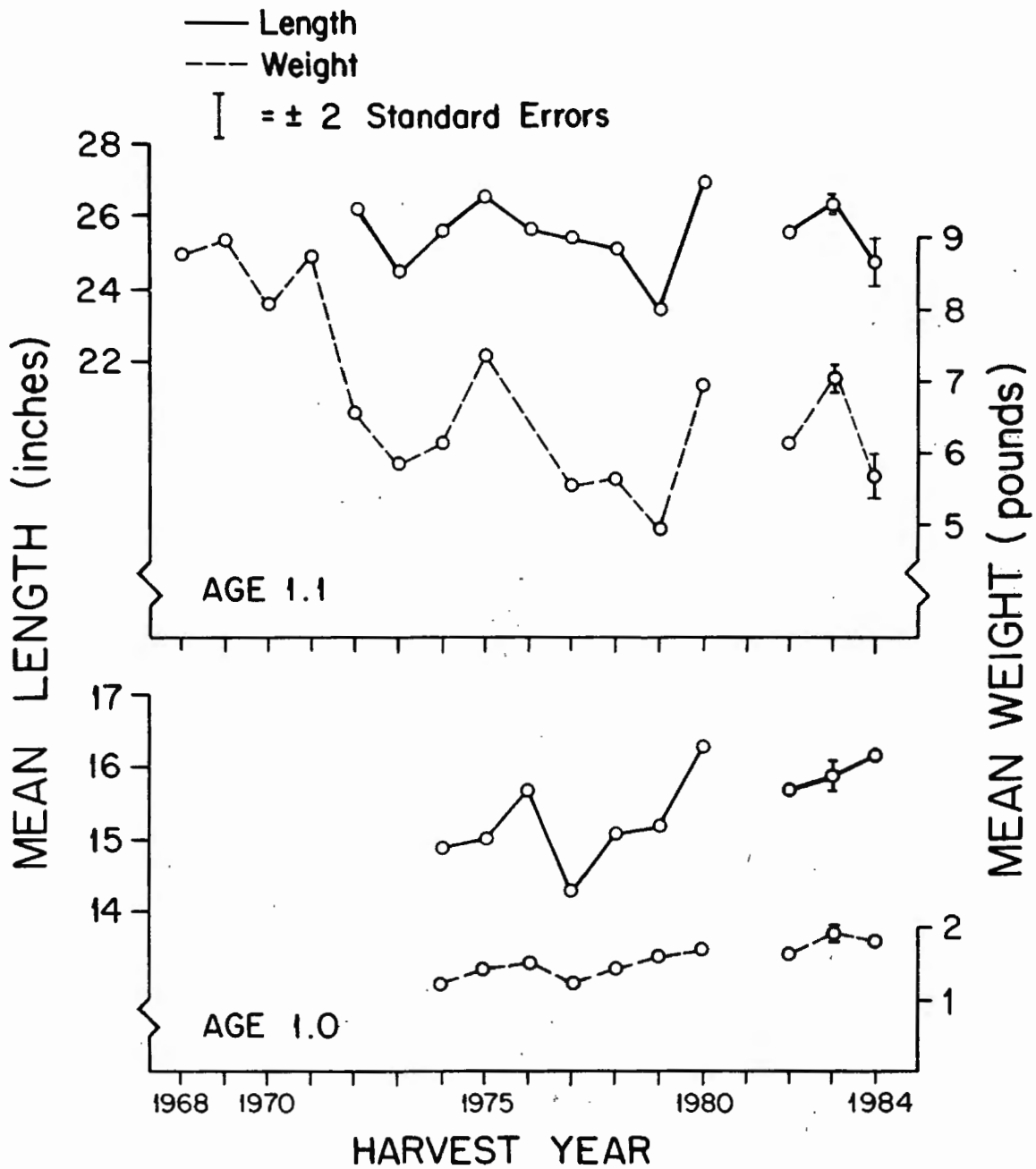


Figure 5. Mean total length (inches) and round weight (pounds) of age-1.0 and age-1.1 coho salmon harvested at the Little Manistee River weir.

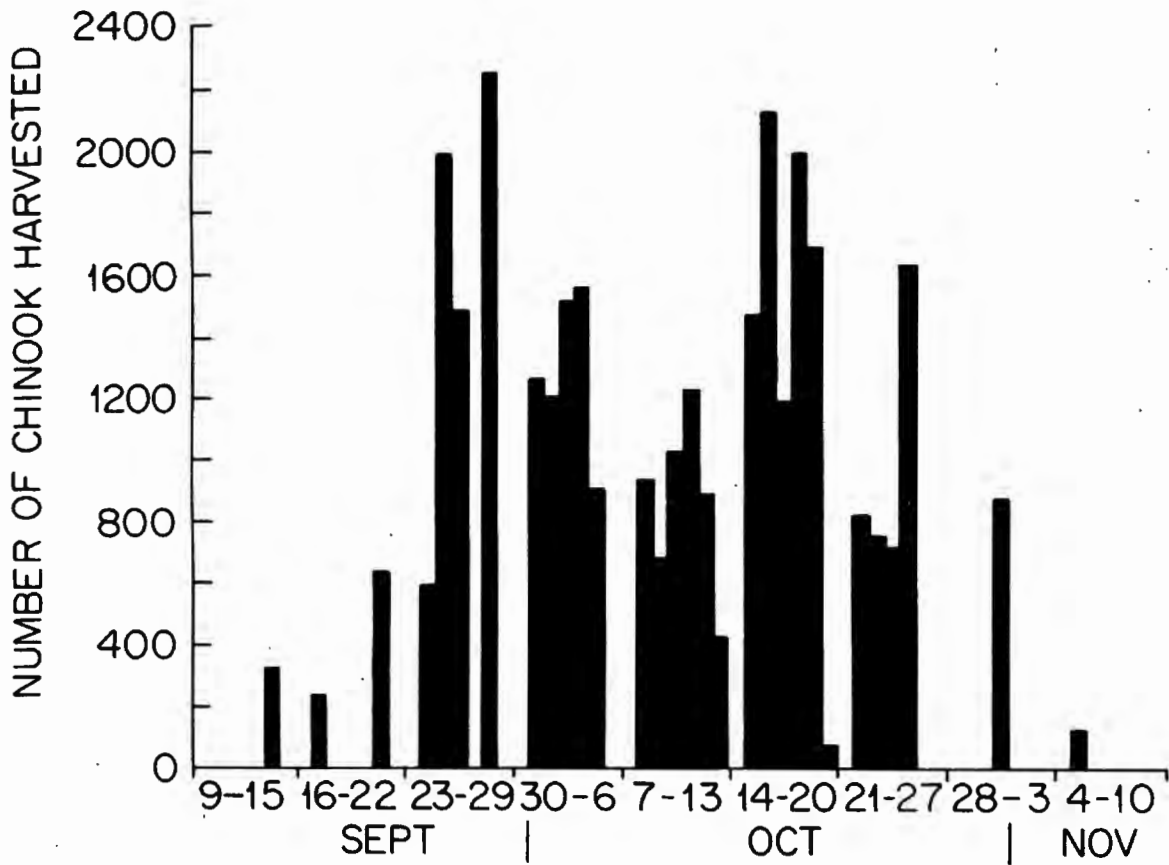


Figure 6. Periodicity of chinook salmon harvested at the Little Manistee River, fall 1984.

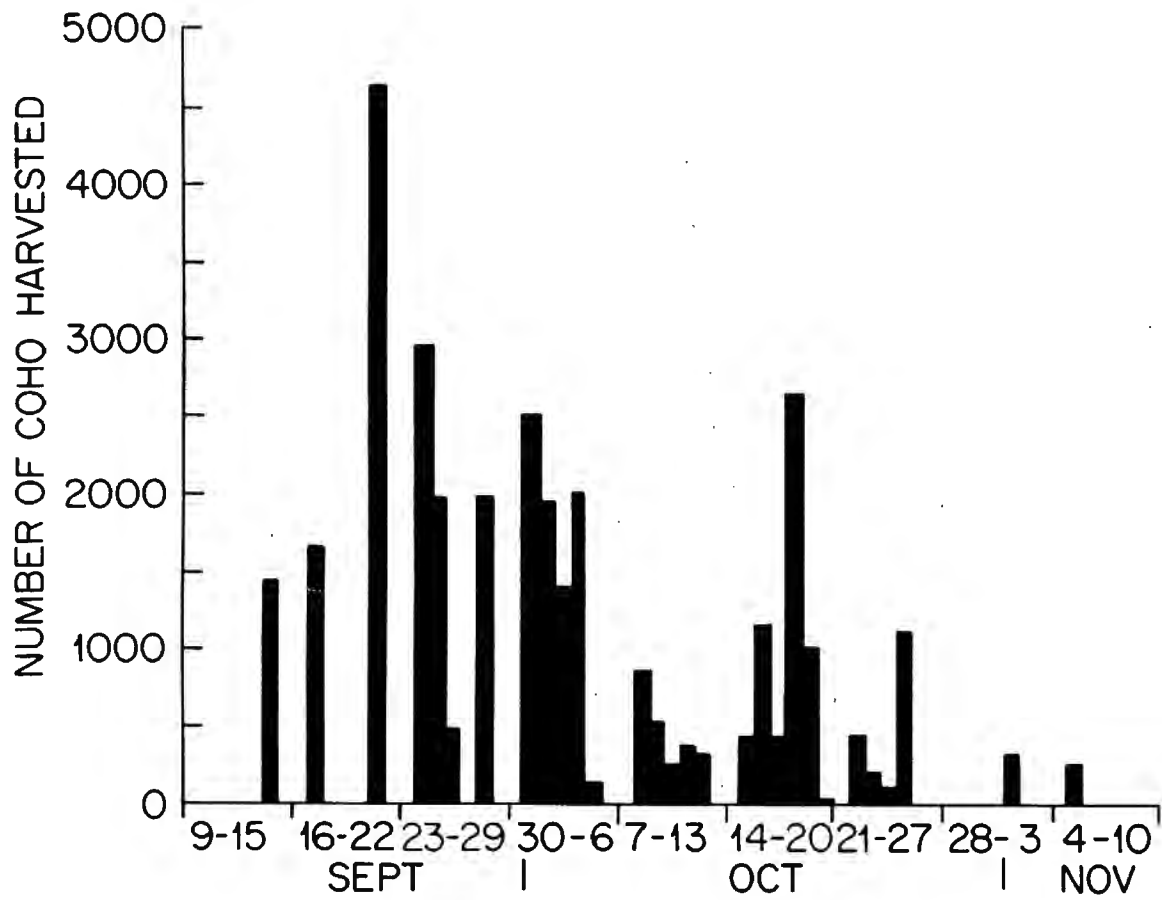


Figure 7. Periodicity of coho salmon harvested at the Little Manistee River weir, 1984.

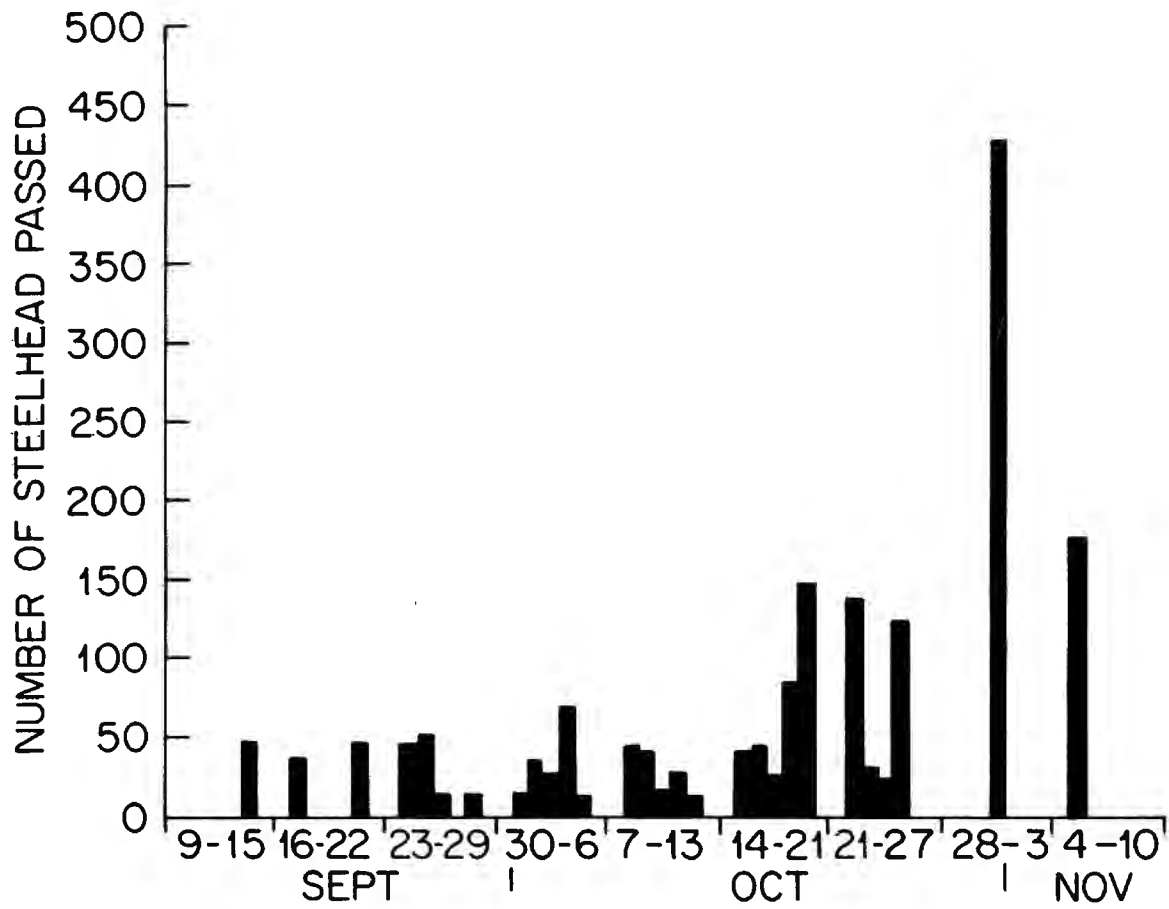


Figure 8. Periodicity of steelhead passed at the Little Manistee River weir, fall 1984.

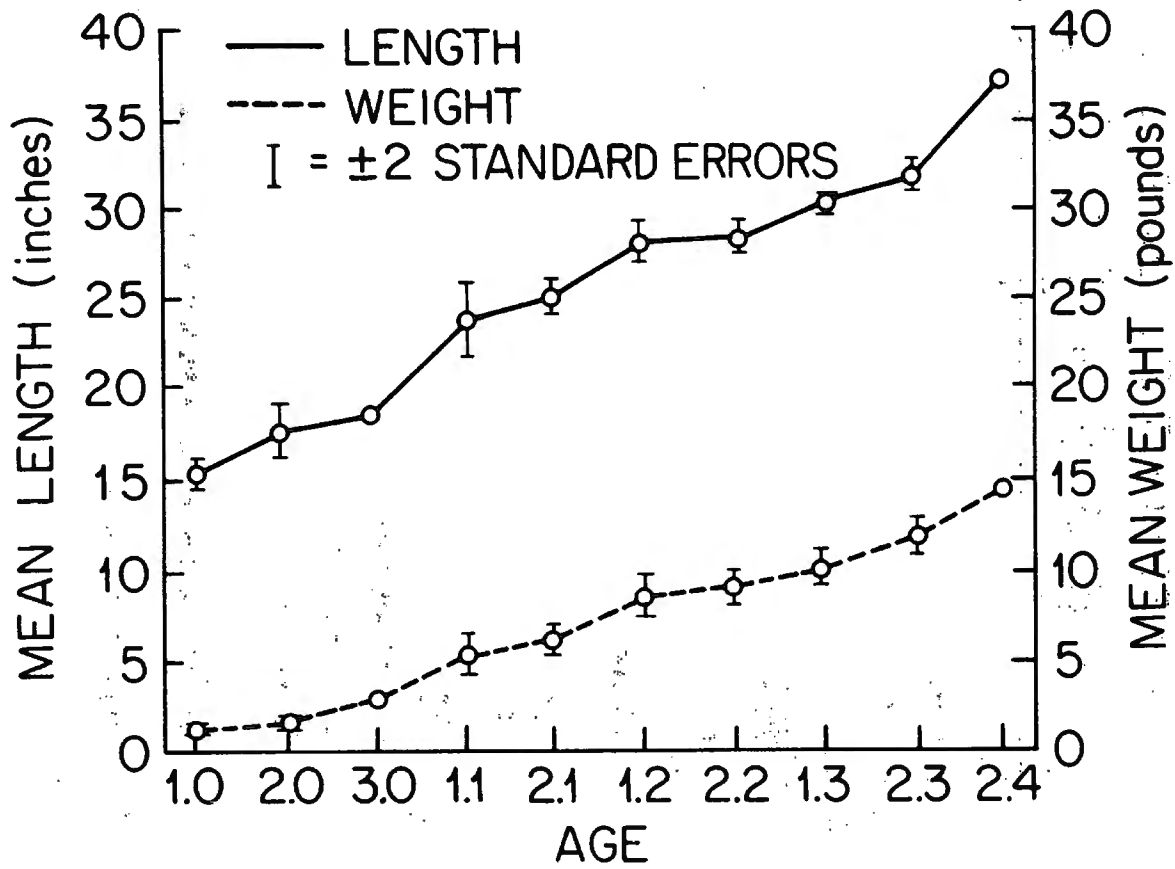


Figure 9. Mean total length (inches) and round weight (pounds) of steelhead, by age, at the Little Manistee River weir, fall 1984.

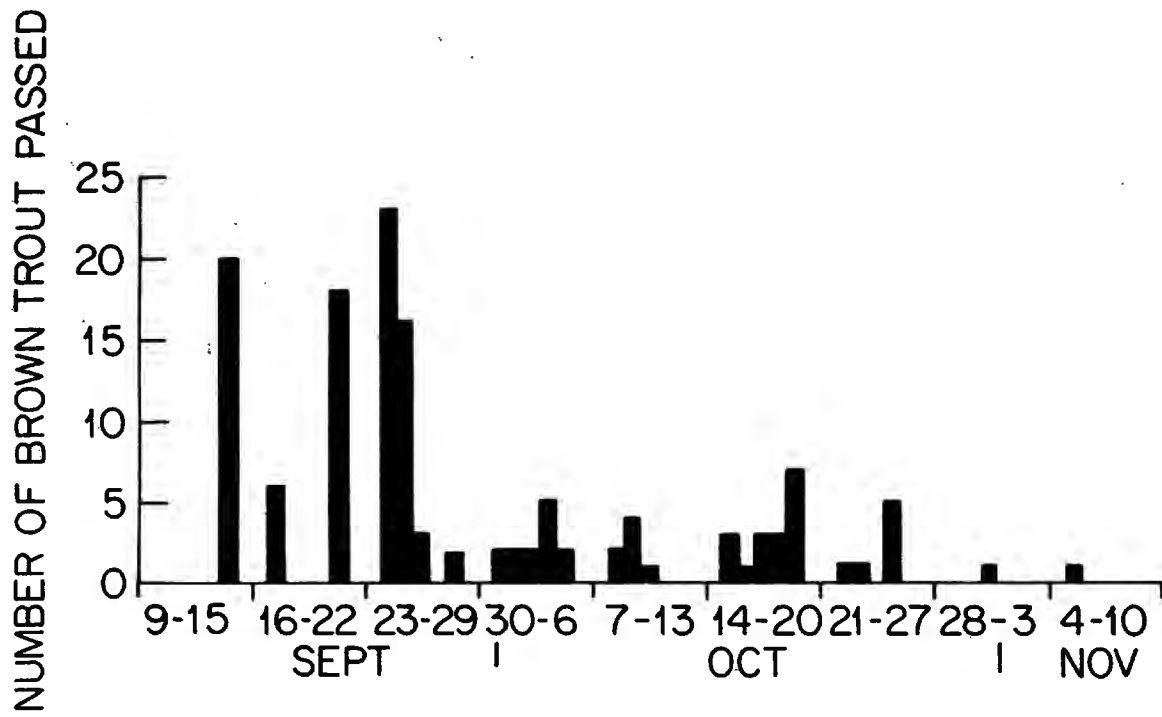


Figure 10. Periodicity of brown trout passed at the Little Manistee River weir, fall 1984.

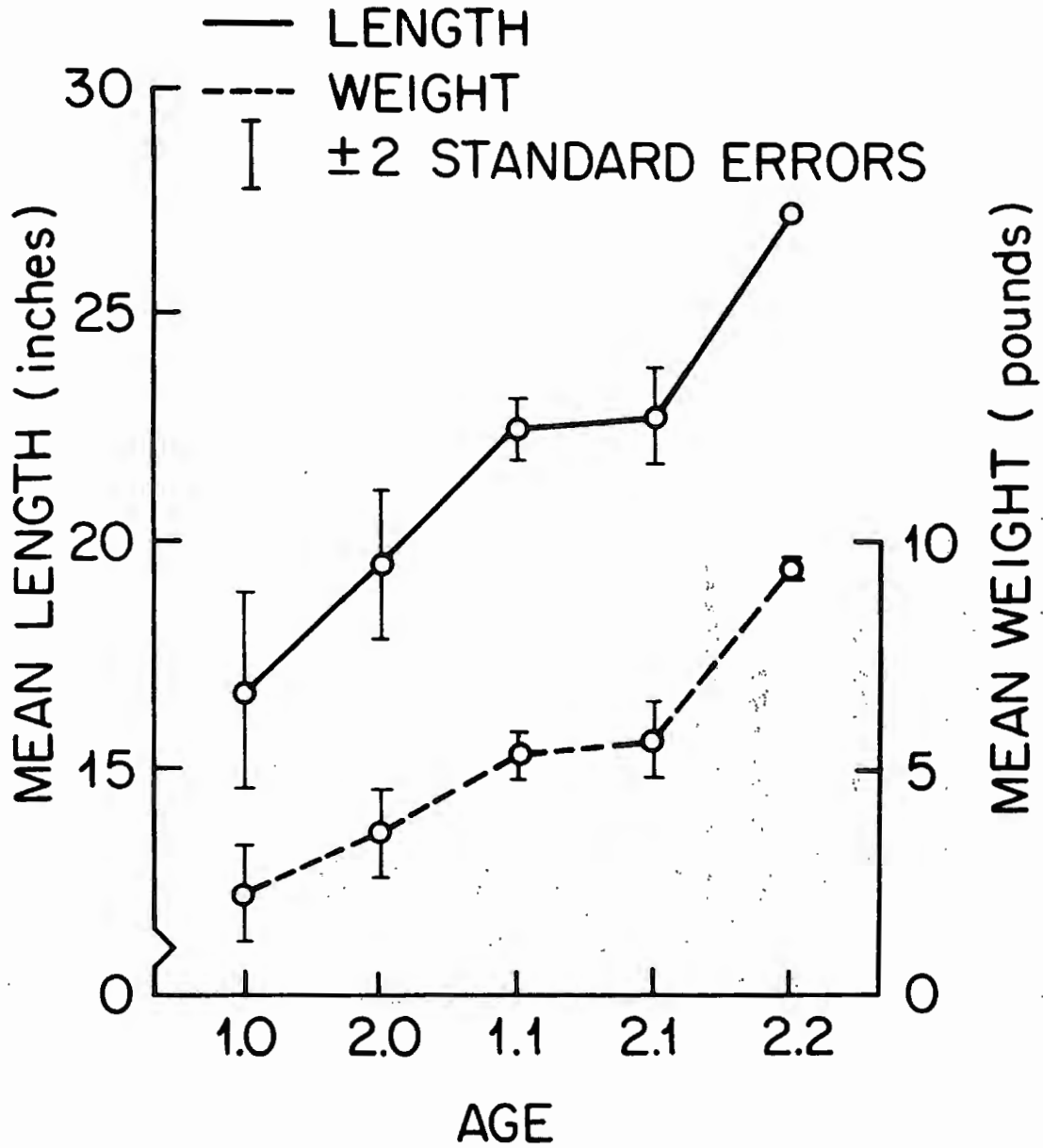


Figure 11. Mean total length (inches) and round weight (pounds) of brown trout, by age, at the Little Manistee River weir, fall 1984.

Table 1. Planting history of anadromous salmonids in the Little Manistee River since 1967. Age of fish at planting: spring fingerling (SF), fall fingerling (FF), and yearling (Y).

Planting year	Salmon			Trout
	Chinook (All SF)	Coho (All Y)	Atlantic (All Y)	Steelhead
1967	590,830	433,215	—	—
1968	321,912	148,365	—	—
1969	300,000	700,002	—	—
1970	308,900	550,012	—	—
1971	301,868	91,674	—	—
1972	300,908	150,067	—	—
1973	356,140	165,714	—	—
1974	402,330	150,067	—	100,188(FF)
1975	300,144	200,601	—	—
1976	301,300	400,282	—	—
1977	250,200	358,832	7,497	—
1978	400,028	302,980	15,000	—
1979	603,098	675,000	—	—
1980	550,272	400,158	—	—
1981	500,204	202,815	19,529	93,673(FF) 30,700(Y)
1982	600,294	200,000	25,030	100,000(FF) 30,000(Y)
1983	677,250	429,612	—	16,428(Y)
1984	805,773	500,066	—	5,079(Y) ¹ 5,000(Y) ² 4,817(Y) ³
Total	7,871,451	6,059,462	67,056	293,861(FF) 92,024(Y)
Average	437,303	336,637	16,764	97,954(FF) 23,006(Y)

¹Siletz River strain of summer steelhead

²Rogue River strain of summer steelhead.

³Umpqua River strain of summer steelhead.

Table 2. Number of chinook salmon harvested, by age, at the Little Manistee River weir, 1968-84. Weight (pounds) is in parentheses.

Year	Age ¹				Mortalities ³	Total
	0.1	0.2	0.3	Adult ²		
1968	9,597	0	0	—	1,633	11,230
1969	5,175	18,693	0	—	2,420	26,288
1970	4,670	11,100	18,420	—	0	34,190
1971	2,885	11,913	6,415	—	—	21,213
1972	1,900	—	—	23,094	—	24,994
1973	1,153	—	—	15,323	—	16,476
1974	1,938	—	—	21,412	806	24,156
1975	762	—	—	27,106	1,360	29,228
1976	2,738	12,560	805	—	56	16,159
1977	—	—	—	—	—	11,136
1978	—	—	—	—	—	20,230
1979	—	—	—	—	—	22,925
1980	1,891	6,620	7,250	—	—	15,761
	—	—	—	—	—	(234,366)
1981	—	—	—	—	—	11,811
	—	—	—	—	—	(188,939)
1982	2,077	—	—	12,281	—	14,358
	—	—	—	—	—	(165,412)
1983	8,865	17,637	12,857	—	—	39,359
	—	—	—	—	—	(534,595)
1984	5,914	18,342	8,376	—	—	32,632
	—	—	—	—	—	(436,057)

¹See footnote on page 1 about aging.

²Ages 0.2 and 0.3 combined.

³Mortalities are included under age group headings in some years.

Table 3. Numbers, and in parentheses percent, of chinook and coho salmon in the 1967-68 and 1981 year classes returning to the Little Manistee River weir at ages 0.1 to 0.3.

Year class	Number stocked	Age ¹			Total
		0.1	0.2	0.3	
<u>Chinook</u>					
1967	590,830	11,230 (1.9)	20,588 (3.5)	18,420 (3.1)	50,238 (8.5)
1968	321,912	5,700 (1.8)	11,100 (3.4)	6,415 (2.0)	23,215 (7.2)
1981	500,204	2,077 (0.4)	17,637 (3.5)	8,376 (1.7)	28,090 (5.6)
<u>Coho</u>					
Year class	Number stocked	Age		Total	
		1.0	1.1		
1967	148,365	501 (0.3)	22,306 (15.0)	22,807 (15.4)	
1968	700,002	2,880 (0.4)	105,006 (15.0)	107,886 (15.4)	
1981	200,000	873 (0.4)	24,264 (12.1)	25,137 (12.5)	

¹See footnote on page 1 about aging.

Table 4. Mean total length (L, in inches) and weight (W, in pounds) of chinook and coho salmon harvested at the Little Manistee weir, 1968-84. (For chinook in 1972-75 and 1982, lengths and weights shown under age 0.2 are for ages 0.2 and 0.3 combined.)

Year	Chinook, age ¹						Coho, age ²			
	0.1		0.2		0.3		1.0		1.1	
	L	W	L	W	L	W	L	W	L	W
1968	25.2	5.8	—	—	—	—	—	—	28.1	8.7
1969	24.9	6.0	34.2	15.9	—	—	—	—	—	8.9
1970	24.7	6.3	34.7	16.6	39.8	23.0	—	—	—	8.0
1971	—	5.2	—	15.0	—	22.7	—	—	—	8.7
1972	22.6	4.3	35.6	17.7	—	—	—	—	26.3	6.5
1973	22.4	4.4	36.0	17.8	—	—	—	—	24.5	5.8
1974	22.5	4.4	34.9	16.7	—	—	14.9	1.2	25.7	6.1
1975	24.2	6.4	37.1	20.2	—	—	15.0	1.4	26.6	7.3
1976	29.0	9.5	37.5	20.9	41.7	29.2	15.7	1.5	25.7	6.4
1977	23.4	4.6	34.6	15.0	38.1	20.1	14.3	1.2	25.5	5.5
1978	25.0	5.8	30.3	10.1	35.0	15.5	15.1	1.4	25.2	5.6
1979	26.5	7.4	34.6	15.1	35.7	16.9	15.2	1.6	23.5	4.9
1980	22.2	4.5	34.3	15.4	36.4	19.3	16.3	1.7	26.9	6.9
1981	—	—	—	—	—	—	—	—	—	—
1982	20.2	3.0	35.3	14.5	—	—	15.7	1.6	25.6	6.1
1983	22.0	4.4	33.6	14.0	37.0	19.3	15.9	1.9	26.4	7.0
1984	24.3	5.2	34.3	13.4	38.3	18.9	16.2	1.8	24.7	5.7

¹ Ages of chinook prior to 1977 were determined from length-frequency distributions; in 1977-80 and 1983-84, from scale samples and length-frequency distributions. See footnote on page 1.

² Ages of coho in 1980 were determined from a length-frequency distribution.

Table 5. Number of coho salmon harvested, by age, at the Little Manistee River weir, 1968-84. Weight (pounds) is in parentheses.

Year	Age		Mortalities ¹	Total
	1.0	1.1		
1968	490	58,422	1,336	60,248
1969	2,831	21,925	430	25,186
1970	3,300	102,100	3,000	108,400
1971	—	—	—	59,123
1972	—	—	—	2,314
1973	—	—	—	11,872
1974	939	4,928	262	6,129
1975	470	14,633	760	15,863
1976	978	23,480	47	24,505
1977	—	—	—	25,255
1978	—	—	—	23,696
1979	—	—	—	27,925
1980	900	49,104	—	50,004
	—	—	—	(353,043)
1981	—	—	—	(96,733)
1982	873	17,585	—	18,458
	—	—	—	(110,745)
1983	2,704	24,264	—	26,968
	—	—	—	(175,157)
1984	218	33,764	—	33,982
	—	—	—	(192,071)

¹Mortalities are included under age group headings in some years.

Table 6. Number and mean length (L, in inches) and weight (W, in pounds) of steelhead (ages combined) reaching the Little Manistee River weir in fall 1968–84.

Year	Number				Mean	
	Passed	Transferred	Mortalities	Total	L	W
1968	1,297	0	25	1,322	25.1	7.3
1969	2,987	0	56	3,043	25.6	7.8
1970	7,322	0	89	7,411	—	8.7
1971	7,523	0	99	7,622	—	8.8
1972	3,515	0	46	3,561	27.4	9.3
1973	421	1,478 ¹	27	1,926	24.3	6.5
1974	2,270	1,200 ¹	18	3,838	26.4	7.3
1975	4,722	1,300 ¹	99	6,121	26.7	8.0
1976	503	45	30	578	26.8	7.6
1977	2,031	—	—	2,013	26.7	6.8
1978	320	—	—	320	—	—
1979	640	—	—	640	25.6	6.7
1980	1,111	—	—	1,111	25.6	7.0
1981	849	—	—	849	—	—
1982	347	—	—	347	25.2	6.9
1983	3,100	—	—	3,100	24.3	6.8
1984	1,830	—	79	1,909	26.0	7.1

¹Transferred to Big Manistee and Pine rivers.

Table 7. Number and mean length (L, in inches) and weight (W, in pounds) of brown trout passed at the Little Manistee River weir, 1968-84.

Year	Number			Mean	
	Passed	Mortalities	Total	L	W
1968	28	—	28	—	—
1969	36	—	36	—	—
1970	123	—	123	—	5.6
1971	69	—	69	—	—
1972	5	—	5	—	—
1973	45	3	48	—	—
1974	159	2	161	19.4	3.4
1975	238	0	238	21.8	5.0
1976	104	2	106	22.9	5.8
1977	98	—	98	19.3	3.5
1978	51	—	51	—	—
1979	100	—	100	23.4	6.8
1980	28	—	28	18.6	3.4
1981	101	—	101	—	—
1982	62	—	62	21.4	4.9
1983	43	—	43	22.4	6.0
1984	134	7	141	22.4	5.3

Table 8. Summary of harvest, mortalities, and total run of chinook salmon, by age and sex, at the Little Manistee River weir in 1984. Weight of stripped females was recalculated into round weight, therefore, the total weight of chinook does not correspond with weight shipped to Tempotech Industries.

Week beginning	Male		Female		Total	
	Number	Pounds	Number	Pounds	Number	Pounds
Age 0.1						
9/09	52	281	—	—	52	281
9/16	79	434	—	—	79	434
9/23	2,059	11,324	—	—	2,059	11,324
9/30	1,480	7,548	—	—	1,480	7,548
10/07	781	3,358	—	—	781	3,358
10/14	1,280	6,784	85	680	1,365	7,464
10/21	77	370	—	—	77	370
10/28	18	86	—	—	18	86
11/04	3	14	—	—	3	14
Total (Percent)	5,829 (17.9)	30,199 (6.9)	85 (0.2)	680 (0.2)	5,914 (18.1)	30,879 (7.1)
Age 0.2						
9/09	104	1,477	110	1,540	214	3,017
9/16	308	1,352	308	3,819	616	5,171
9/23	1,995	25,935	1,673	22,418	3,668	48,353
9/30	1,415	18,536	1,994	27,916	3,409	46,452
10/07	1,614	20,982	1,926	25,808	3,540	46,790
10/14	1,536	21,658	2,900	40,310	4,436	61,968
10/21	879	12,042	1,070	15,622	1,949	27,664
10/28	202	2,767	246	3,592	448	6,359
11/04	28	384	34	496	62	880
Total (Percent)	8,081 (24.8)	105,133 (24.1)	10,261 (31.4)	141,521 (32.5)	18,342 (56.2)	246,654 (56.6)
Age 0.3						
9/09	23	430	35	620	58	1,050
9/16	70	1,204	114	1,870	184	3,074
9/23	386	7,141	322	5,699	708	12,840
9/30	386	6,794	1,158	21,423	1,544	28,217
10/07	364	6,916	521	10,264	885	17,180
10/14	853	15,780	1,877	35,100	2,730	50,880
10/21	573	11,288	1,223	24,588	1,796	35,876
10/28	132	2,600	282	5,668	414	8,268
11/04	18	355	39	784	57	1,139
Total (Percent)	2,805 (8.6)	52,508 (12.0)	5,571 (17.1)	106,016 (24.3)	8,376 (25.7)	158,524 (36.3)

Table 9. Mean total length (inches) and weight (pounds) of chinook salmon, by age and sex, harvested at the Little Manistee River weir in 1984. Standard error of mean ($S_{\bar{x}}$) in parentheses.

Week beginning	Measurement	Age					
		0.1		0.2		0.3	
		Male	Female	Male	Female	Male	Female
9/09	Length	24.2 (0.726)	—	35.6 (0.393)	34.7 (0.273)	39.1 (0.828)	37.0 (0.303)
	Weight	5.4 (0.355)	—	14.2 (0.547)	14.0 (0.414)	18.7 (1.170)	17.7 (0.569)
9/16	Length	25.2 (0.970)	—	34.8 (0.371)	33.4 (0.273)	37.9 (0.282)	36.8 (0.542)
	Weight	5.5 (0.432)	—	13.0 (0.430)	12.4 (0.374)	17.2 (0.862)	16.4 (0.904)
9/23	Length	24.6 (0.523)	—	34.6 (0.405)	34.4 (0.300)	38.7 (0.130)	36.9 (0.494)
	Weight	5.5 (0.328)	—	13.0 (0.471)	13.4 (0.414)	18.5 (0.516)	17.7 (1.057)
9/30	Length	24.1 (0.545)	—	34.9 (0.442)	34.6 (0.310)	38.5 (0.317)	37.2 (0.407)
	Weight	5.1 (0.327)	—	13.1 (0.457)	14.0 (0.395)	17.6 (0.717)	18.5 (0.621)
10/07	Length	22.9 (0.426)	—	34.7 (0.502)	34.4 (0.312)	39.1 (0.796)	38.0 (0.660)
	Weight	4.3 (0.192)	—	13.0 (0.479)	13.4 (0.388)	19.0 (1.323)	19.7 (1.052)
10/14	Length	24.6 (0.814)	28.8	35.0 (0.469)	34.9 (0.414)	39.9 (0.495)	38.0 (0.298)
	Weight	5.3 (0.514)	8.0	14.1 (0.810)	13.9 (0.456)	18.5 (0.720)	18.7 (0.572)
10/21	Length	23.8 (0.250)	—	35.7 (0.416)	34.4 (0.391)	39.6 (0.488)	38.0 (0.317)
	Weight	4.8 (0.050)	—	13.7 (0.519)	14.6 (0.481)	19.7 (0.791)	20.1 (0.499)
Weighted seasonal mean	Length	24.2 (0.583)	28.8	33.9 (0.433)	34.6 (0.347)	39.3 (0.455)	37.7 (0.376)
	Weight	5.2 (0.347)	8.0	13.0 (0.527)	13.8 (0.425)	18.7 (0.795)	19.0 (0.642)
Sexes combined	Length	24.3 (0.574)		34.3 (0.385)		38.3 (0.402)	
	Weight	5.2 (0.342)		13.4 (0.470)		18.9 (0.693)	

Table 10. Percent lamprey scarring of anadromous salmonids captured at the Little Manistee River harvest weir, 1968-84.

Year	Salmon		Trout	
	Chinook	Coho	Steelhead	Brown
1968	3.7	4.3	6.0	—
1969	4.7	2.5	0.9	—
1970	4.0	1.0	2.0	—
1971	2.8	1.5	0.0	—
1972	—	0.4	—	—
1973	0.7	0.0	0.0	—
1974	0.8	0.9	0.0	0.0
1975	1.0	0.4	0.3	0.0
1976	0.0	0.0	0.0	tr
1977	0.0	0.0	0.0	0.0
1978	—	—	—	—
1979	—	—	—	—
1980	0.3	0.2	0.0	0.0
1981	—	—	—	—
1982	0.0	0.0	0.0	0.0
1983	0.1	0.0	0.0	0.0
1984	0.1	0.1	0.0	0.0

Table 11. Summary of the chinook egg-take operation at the Little Manistee River weir, 1984.

Date	Number of females stripped	Number of eggs collected	Percent eye-up	Destination
9/26	264	946,880	69.7	Platte River
9/28	262	1,041,480	80.9	Platte River
10/01	217	879,470	75.1	Platte River
10/02	266	1,064,624	68.6	Platte River
10/03	517	2,291,256	70.1	Platte River
10/04	553	2,291,256	67.9	Platte River
10/05	411	1,735,800	59.5	Platte River
10/08	186	890,390	73.3	Platte River
10/09	195	811,785	—	Indiana
10/10	20	112,000	—	Pennsylvania
10/10	221	1,103,208	—	Illinois
10/11	216	1,103,784	—	Illinois
10/12	192	943,600	—	New York
10/15	193	817,600	—	New York
10/16	216	1,008,000	—	North Dakota (Garrison Dam)
10/17	266	1,243,200	—	South Dakota (Blue Dog and Gavins Point)
10/18	217	1,008,000	—	North Dakota (Garrison Dam)
10/19	426	1,960,000	—	New York
10/22	218	980,000	—	New York
10/23	291	1,442,000	—	Illinois
10/24	219	1,043,720	72.7	Platte River
10/25	156	775,600	—	Minnesota
Total	5,722	25,493,653	—	
In-state	—	12,184,876	—	
Out-of-state	—	13,308,777	—	

Table 12. Fecundity of age-0.2 and age-0.3 chinook salmon collected at the Little Manistee River weir, fall 1984. Eggs collected via air injection and number estimated with a von Bayer trough.

Age	Number	Mean			
		Length (inches)	Weight (pounds)	Number of eggs	Eggs per quart
0.2	13	34.5	14.2	5,725	2,901
0.3	12	37.8	19.1	6,412	2,772
Ages combined	25	36.1	16.6	6,055	2,841

Table 13. Summary of coho salmon harvested, by age and sex, at the Little Manistee River weir, 1984.

Week beginning	Age 1.0		Age 1.1					
	Male		Male		Female		Total	
	Num- ber	Weight	Num- ber	Weight	Num- ber	Weight	Num- ber	Weight
9/09	—	—	745	4,917	688	3,784	1,433	8,701
9/16	63	101	3,353	19,783	2,910	16,005	6,263	35,788
9/23	74	141	3,497	19,583	3,869	20,893	7,366	40,476
9/30	81	146	2,827	16,962	5,169	28,430	7,966	45,392
10/07	—	—	1,060	6,042	1,295	6,993	2,355	13,035
10/14	—	—	1,746	10,301	4,075	23,228	5,821	33,529
10/21	—	—	672	3,965	1,248	7,238	1,920	11,203
10/28	—	—	117	690	216	1,253	333	1,943
11/04	—	—	97	572	180	1,044	277	1,616
Total	218	388	14,114	82,815	19,650	108,868	33,764	191,683
(Percent)	(0.6)	(0.2)	(41.6)	(43.1)	(57.8)	(56.7)	(99.4)	(99.8)

Table 14. Mean length (inches) and weight (pounds) of coho salmon, by age and sex, harvested at the Little Manistee River weir, 1984. Standard error of the mean is in parentheses.

Week beginning	Measurement	Age		
		1.0	1.1	
		Male	Male	Female
9/09	Length	—	26.8 (0.240)	24.6 (0.217)
	Weight	—	6.6 (0.178)	5.5 (0.147)
9/16	Length	15.4	25.8 (0.298)	24.6 (0.189)
	Weight	1.6	5.9 (0.182)	5.5 (0.127)
9/23	Length	16.5	25.5 (0.215)	24.5 (0.158)
	Weight	1.9	5.6 (0.159)	5.4 (0.125)
9/30	Length	16.7	26.1 (0.253)	24.7 (0.171)
	Weight	1.8	6.0 (0.195)	5.5 (0.116)
10/07	Length	—	26.0 (0.189)	25.0 (0.147)
	Weight	—	5.7 (0.124)	5.4 (0.100)
10/14	Length	—	26.1 (0.241)	25.2 (0.158)
	Weight	—	5.9 (0.189)	5.7 (0.109)
10/21	Length	—	26.0 (0.282)	25.2 (0.142)
	Weight	—	5.9 (0.216)	5.8 (0.110)
Weighted seasonal mean by sex	Length	16.2	24.7 (0.249)	24.8 (0.166)
	Weight	1.8	5.9 (0.177)	5.5 (0.117)
Weighted seasonal mean, sexes combined	Length		24.7 (0.201)	
	Weight		5.7 (0.142)	

Table 15. Summary of number and weight (pounds, in parentheses) of steelhead, by age and sex, passed upstream at the Little Manistee River weir, fall 1984.

Week beginning	Age								
	1.0			2.0			3.0		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
9/09	5 (6)	—	5 (6)	5 (8)	—	5 (8)	—	—	—
9/16	7 (8)	1 (1)	8 (9)	8 (15)	2 (4)	10 (19)	—	—	—
9/23	15 (19)	1 (1)	16 (20)	21 (44)	—	21 (44)	1 (3)	—	1 (3)
9/30	4 (5)	—	4 (5)	20 (38)	—	20 (38)	—	—	—
10/07	4 (6)	—	4 (6)	11 (23)	2 (5)	13 (28)	—	—	—
10/14	11 (20)	—	11 (20)	34 (78)	—	34 (78)	—	—	—
10/21	3 (6)	—	3 (6)	17 (36)	—	17 (36)	—	—	—
10/28	4 (8)	—	4 (8)	23 (48)	—	23 (48)	—	—	—
11/4	2 (4)	—	2 (4)	9 (19)	—	9 (19)	—	—	—
Total	55 (82)	2 (2)	57 (84)	148 (309)	4 (9)	152 (318)	1 (3)	0 (0)	1 (3)
Percent of run									
Number	2.9	0.1	3.0	7.8	0.2	8.0	0.1	0.0	0.1
Weight	0.6	0.0	0.6	2.3	0.1	2.4	0.0	0.0	0.0

Table 15. Continued:

Week beginning	Age								
	1.1			2.1			1.2		
	Male	Fe- male	Total	Male	Fe- male	Total	Male	Fe- male	Total
9/09	— —	1 (5)	1 (5)	3 (16)	3 (17)	6 (33)	— —	8 (65)	8 (65)
9/16	2 (8)	1 (7)	3 (15)	5 (30)	17 (94)	22 (124)	5 (40)	5 (39)	10 (79)
9/23	3 (14)	3 (13)	6 (27)	19 (93)	24 (132)	43 (225)	4 (32)	4 (36)	8 (68)
9/30	4 (24)	4 (20)	8 (44)	27 (173)	38 (217)	65 (390)	5 (48)	9 (70)	14 (118)
10/07	8 (46)	3 (20)	11 (66)	35 (200)	23 (145)	58 (345)	8 (71)	8 (73)	16 (144)
10/14	15 (66)	4 (28)	19 (94)	69 (428)	69 (407)	138 (835)	15 (120)	11 (88)	26 (208)
10/21	3 (18)	— —	3 (18)	67 (422)	44 (286)	111 (708)	30 (240)	10 (69)	40 (309)
10/28	4 (24)	— —	4 (24)	89 (561)	58 (377)	147 (938)	40 (352)	14 (97)	54 (449)
11/04	2 (12)	— —	2 (12)	37 (233)	24 (156)	61 (389)	17 (150)	6 (41)	23 (191)
Total	41 (212)	16 (93)	57 (305)	351 (2,156)	300 (1,831)	651 (3,987)	124 (1,053)	75 (578)	199 (1,631)
Percent of run									
Number	2.1	0.8	3.0	18.4	15.7	34.1	6.5	3.9	10.4
Weight	1.6	0.7	2.3	16.0	13.5	29.5	7.8	4.3	12.1

Table 15. Continued:

Week beginning	Age								
	2.2			1.3			2.3		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
9/09	10 (87)	12 (95)	22 (182)	—	1 (10)	1 (10)	1 (10)	1 (11)	2 (21)
9/16	10 (78)	17 (139)	27 (217)	3 (32)	—	3 (32)	4 (46)	—	4 (46)
9/23	19 (158)	15 (123)	34 (281)	—	—	—	4 (40)	—	4 (40)
9/30	27 (240)	29 (250)	56 (490)	—	—	—	2 (22)	—	2 (22)
10/07	18 (158)	23 (193)	41 (351)	4 (44)	—	4 (44)	3 (37)	—	3 (37)
10/14	80 (712)	53 (445)	133 (1,157)	4 (30)	—	4 (30)	15 (162)	—	15 (162)
10/21	74 (666)	57 (490)	131 (1,156)	—	—	—	17 (196)	3 (42)	20 (238)
10/28	98 (882)	76 (654)	174 (1,536)	—	—	—	23 (264)	4 (56)	27 (320)
11/04	41 (369)	31 (267)	72 (636)	—	—	—	9 (104)	2 (28)	11 (132)
Total	377 (3,350)	313 (2,656)	690 (6,006)	11 (106)	1 (10)	12 (116)	78 (881)	10 (137)	88 (1,018)
Percent of run									
Number	19.7	16.4	36.1	0.6	0.1	0.6	4.1	0.5	4.6
Weight	24.8	19.7	44.5	0.8	0.1	0.9	6.5	1.0	7.5

Table 15. Continued:

Week beginning	Age 2.4		
	Male	Female	Total
9/09	—	—	—
9/16	—	—	—
9/23	—	—	—
9/30	—	—	—
10/07	2 (28)	—	2 (28)
10/14	—	—	—
10/21	—	—	—
10/28	—	—	—
11/04	—	—	—
Total	2 (28)	0 (0)	2 (28)
<u>Percent of run</u>			
Number	0.1	0.0	0.1
Weight	0.2	0.0	0.2

Table 16. Summary of mean length (inches) and weight (pounds) of steelhead, by age and sex, passed upstream at the Little Manistee River weir, fall 1984. Standard error of the mean is in parentheses. No age-3.0 or age-2.4 females were sampled.

Week beginning	Measurement	Age						
		1.0		2.0		3.0	1.1	
		Male	Female	Male	Female	Male	Male	Female
9/09	Length	14.5 (0.195)	—	15.1 (0.680)	—	—	—	24.4
	Weight	1.3 (0.074)	—	1.5 (0.166)	—	—	—	5.0
9/16	Length	14.4 (0.358)	13.5	16.6 (0.270)	17.1 (0.300)	—	21.7 (0.850)	26.9
	Weight	1.1 (0.108)	0.8	1.9 (0.108)	1.9 (0.100)	—	3.9 (0.350)	7.1
9/23	Length	14.9 (0.327)	14.1	17.0 (0.366)	—	18.1	23.0 (0.250)	22.1 (0.600)
	Weight	1.3 (0.110)	1.1	2.1 (0.185)	—	3.3	4.8 (0.100)	4.2 (0.550)
9/30	Length	14.5 (0.300)	—	16.6 (0.401)	—	—	24.6 (1.100)	23.6 (0.650)
	Weight	1.2 —	—	1.9 (0.142)	—	—	5.9 (0.400)	5.0 (0.300)
10/07	Length	15.6 (0.384)	—	17.0 (0.332)	17.0	—	24.1 (0.695)	25.6 (2.400)
	Weight	1.5 (0.145)	—	2.1 (0.129)	2.4	—	5.8 (0.592)	6.8 (1.050)
10/14	Length	15.8 (0.669)	—	17.5 (0.156)	—	—	22.2 (2.182)	25.7
	Weight	1.8 (0.300)	—	2.3 (0.119)	—	—	4.4 (1.039)	7.0
10/21	Length	16.4 —	—	18.7 (1.780)	—	—	25.1	—
	Weight	1.9 —	—	2.1 (0.114)	—	—	5.9	—
Weighted seasonal mean	Length	15.2 (0.336)	13.8	17.5 (0.794)	17.0 (0.150)	18.1	23.5 (1.101)	24.5 (0.725)
	Weight	1.5 (0.121)	1.0	2.1 (0.132)	2.2 (0.050)	3.3	5.2 (0.559)	5.8 (0.375)
Sexes combined	Length	15.2 (0.324)		17.5 (0.776)			23.8 (0.995)	
	Weight	1.5 (0.117)		2.1 (0.129)			5.3 (0.507)	

Table 16. Continued:

Week beginning	Measure- ment	Age					
		2.1		1.2		2.2	
		Male	Female	Male	Female	Male	Female
9/09	Length	23.7 (1.405)	24.3 (1.422)	—	27.2 (0.324)	29.5 (0.365)	27.6 (0.460)
	Weight	5.3 (1.058)	5.7 (0.902)	—	8.1 (0.241)	8.7 (0.389)	7.9 (0.346)
9/16	Length	25.2 (0.202)	24.7 (0.312)	28.4 (0.643)	28.1 (0.520)	28.1 (0.536)	28.2 (0.270)
	Weight	6.1 (0.213)	5.5 (0.222)	8.0 (0.452)	7.7 (0.331)	7.8 (0.386)	8.2 (0.251)
9/23	Length	22.9 (0.420)	24.1 (0.274)	29.1 (0.260)	28.8 (0.617)	28.8 (0.332)	28.1 (0.367)
	Weight	4.9 (0.306)	5.5 (0.222)	7.9 (0.666)	9.1 (0.633)	8.3 (0.317)	8.2 (0.261)
9/30	Length	25.8 (0.387)	24.5 (0.304)	29.3 (0.726)	25.6 (1.664)	29.7 (0.317)	28.8 (0.296)
	Weight	6.4 (0.239)	5.7 (0.218)	9.6 (1.290)	7.8 (0.333)	8.9 (0.235)	8.6 (0.270)
10/07	Length	23.9 (0.415)	24.7 (0.337)	28.6 (0.551)	29.1 (0.540)	29.3 (0.366)	28.3 (0.339)
	Weight	5.7 (0.254)	6.3 (0.244)	8.9 (0.717)	9.1 (0.658)	8.8 (0.307)	8.4 (0.319)
10/14	Length	24.9 (0.626)	24.8 (0.264)	27.6 (0.307)	27.1 (0.536)	29.3 (0.321)	28.0 (0.659)
	Weight	6.2 (0.250)	5.9 (0.148)	8.0 (0.460)	8.0 (0.318)	8.9 (0.250)	8.4 (0.284)
10/21	Length	25.6 (0.356)	25.3 (0.220)	29.2 (0.371)	27.0 (0.467)	29.1 (0.283)	28.5 (0.301)
	Weight	6.3 (0.282)	6.5 (0.153)	8.8 (0.445)	6.9 (0.549)	9.0 (0.232)	8.6 (0.291)
Weighted seasonal mean	Length	25.1 (0.428)	24.9 (0.271)	28.5 (0.381)	27.3 (0.625)	29.2 (0.308)	27.8 (0.372)
	Weight	6.1 (0.276)	6.1 (0.184)	8.5 (0.509)	7.7 (0.464)	8.9 (0.252)	8.5 (0.288)
Sexes combined	Length	25.0 (0.356)		28.1 (0.473)		28.5 (0.337)	
	Weight	6.1 (0.238)		8.2 (0.492)		8.7 (0.269)	

Table 16. Continued:

Week beginning	Measurement	Age				Male
		1.3		2.3		
		Male	Female	Male	Female	
9/09	Length	—	32.3	31.1	32.0	—
	Weight	—	9.7	9.6	11.3	—
9/16	Length	31.3 (0.586)	—	32.2 (0.359)	—	—
	Weight	10.7 (0.504)	—	11.6 (0.705)	—	—
9/23	Length	—	—	32.2 (0.987)	—	—
	Weight	—	—	10.1 (1.507)	—	—
9/30	Length	—	—	32.1	—	—
	Weight	—	—	10.9	—	—
10/07	Length	31.4 (0.265)	—	33.0 (0.200)	—	37.3
	Weight	11.1 (0.649)	—	12.3 (1.750)	—	14.1
10/14	Length	28.3	—	31.1 (0.312)	—	—
	Weight	7.4	—	10.8 (0.316)	—	—
10/21	Length	—	—	32.2 (0.423)	31.1	—
	Weight	—	—	11.5 (0.338)	10.0	—
Weighted seasonal mean	Length	30.1 (0.256)	32.3	32.0 (0.402)	33.7	37.3
	Weight	9.6 (0.373)	9.7	11.3 (0.454)	13.8	14.1
Sexes combined	Length	30.3 (0.234)		32.2 (0.357)		
	Weight	9.6 (0.342)		11.6 (0.402)		

Table 17. Summary of number and weight (in parentheses) of brown trout, by age and sex, collected at the Little Manistee River weir, fall 1984. All but seven fish were passed upstream.

Week beginning	Age								
	1.0			2.0			1.1		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
9/09	—	1 (4)	1 (4)	—	—	—	—	1 (4)	1 (4)
9/16	—	—	—	—	4 (13)	4 (13)	1 (7)	1 (6)	2 (13)
9/23	2 (5)	2 (4)	4 (9)	—	3 (13)	3 (13)	4 (21)	2 (11)	6 (32)
9/30	1 (1)	—	1 (1)	2 (4)	—	2 (4)	1 (6)	1 (5)	2 (11)
10/07	—	—	—	—	—	—	—	3 (18)	3 (18)
10/14	—	1 (1)	1 (1)	—	—	—	1 (4)	2 (7)	3 (11)
10/21	—	—	—	—	1 (5)	1 (5)	3 (14)	1 (5)	4 (19)
10/28	—	—	—	—	—	—	—	—	—
11/04	—	—	—	—	—	—	—	—	—
Total	3 (6)	4 (9)	7 (15)	2 (4)	8 (31)	10 (35)	10 (52)	11 (56)	21 (108)
Percent of run									
Number	2.1	2.9	5.0	1.4	5.7	7.1	7.1	7.8	14.9
Weight	0.8	1.2	2.0	0.5	4.2	4.7	6.9	7.5	14.4

Table 17. Continued:

Week beginning	2.1			2.2		
	Male	Female	Total	Male	Female	Total
9/09	11 (69)	8 (44)	19 (113)	—	—	—
9/16	12 (72)	6 (34)	18 (106)	—	—	—
9/23	23 (143)	6 (34)	29 (177)	2 (19)	—	2 (19)
9/30	6 (34)	4 (18)	10 (52)	—	—	—
10/07	4 (23)	—	4 (23)	—	—	—
10/14	10 (43)	5 (25)	15 (68)	—	—	—
10/21	1 (6)	2 (7)	3 (13)	1 (9)	—	1 (9)
10/28	1 (6)	—	1 (6)	—	—	—
11/04	1 (6)	—	1 (6)	—	—	—
Total	69 (402)	31 (162)	100 (564)	3 (28)	0 (0)	3 (28)
Percent of run						
Number	48.9	22.0	70.9	2.1	0.0	2.1
Weight	53.6	21.6	75.2	3.7	0.0	3.7

Table 18. Summary of mean length (inches) and weight (pounds) of brown trout, by age and sex, collected at the Little Manistee River weir, fall 1984. No age-2.2 females were collected. Standard error of the mean is in parentheses.

Week beginning	Measure- ment	Age					
		1.0		2.0		1.1	
		Male	Female	Male	Female	Male	Female
9/09	Length	—	21.1	—	—	—	27.1
	Weight	—	4.0	—	—	—	4.2
9/16	Length	—	—	—	19.4	24.5	22.2
	Weight	—	—	—	(0.966) 3.3	6.9	5.5
9/23	Length	18.1	16.6	—	20.7	22.5	22.3
	Weight	(1.500) 2.4	(2.250) 2.1	—	(0.418) 4.3	(0.749) 5.3	(0.250) 5.7
9/30	Length	13.1	—	17.5	—	23.8	21.4
	Weight	—	—	(1.400) 1.9	—	6.5	5.4
10/07	Length	—	—	—	—	—	22.5
	Weight	—	—	—	—	—	(0.203) 5.9
10/14	Length	—	13.0	—	—	20.2	20.0
	Weight	—	0.9	—	—	4.0	(0.300) 3.5
10/21	Length	—	—	—	22.0	22.6	21.0
	Weight	—	—	—	—	(0.318) 4.8	4.9
Weighted seasonal mean	Length	16.4	16.8	17.5	20.2	22.6	22.2
	Weight	(1.00) 2.0	(1.125) 2.3	(1.400) 1.9	(0.640) 3.9	(0.395) 5.3	(0.155) 5.1
Sexes combined	Length	16.7		19.7		22.4	
	Weight	(1.071) 2.2		(0.792) 3.5		(0.269) 5.2	
		(0.528)		(0.389)		(0.220)	

Table 18. Continued:

Week beginning	Measurement	Age		
		2.1		2.2
		Male	Female	Male
9/09	Length	24.3 (0.235)	22.9 (0.225)	—
	Weight	6.3 (0.182)	5.5 (0.369)	—
9/16	Length	23.0 (0.485)	22.6 (0.586)	—
	Weight	6.0 (0.424)	5.6 (0.435)	—
9/23	Length	23.5 (0.304)	23.2 (0.433)	27.4 (0.050)
	Weight	6.2 (0.280)	5.7 (0.394)	9.5 (0.200)
9/30	Length	22.5 (0.588)	20.4 (0.551)	—
	Weight	5.7 (0.396)	4.6 (0.534)	—
10/07	Length	23.5 (0.229)	—	—
	Weight	5.8 (0.269)	—	—
10/14	Length	21.8 (1.020)	22.7 (0.468)	—
	Weight	4.3 (0.469)	5.0 (0.577)	—
10/21	Length	22.7 —	20.7 (3.150)	27.0 —
	Weight	6.0 —	4.3 (2.050)	9.4 —
Weighted seasonal mean	Length	23.2 (0.448)	22.4 (0.604)	27.3 (0.033)
	Weight	5.8 (0.323)	5.3 (0.550)	9.5 (0.133)
Sexes combined	Length	22.9 (0.498)		
	Weight	5.6 (0.395)		