ANNUAL REPORT
AUKE CREEK WEIR 2000

Operations, Fish Counts, and Historical Summaries

by

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and

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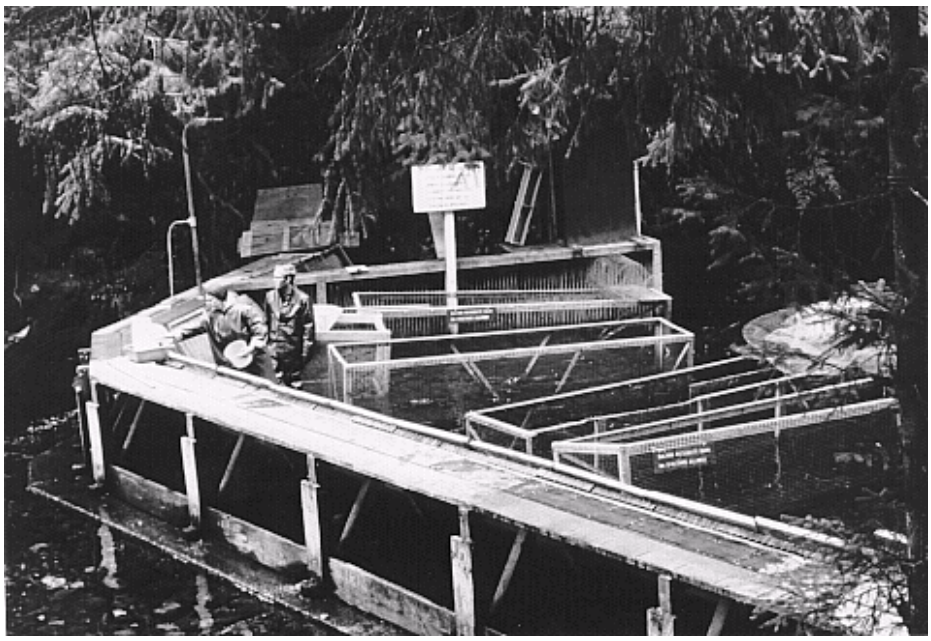

Auke Creek Weir 1974

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Annual Report Auke Creek Weir 2000

The Auke Lake system has endemic populations of pink, chum, sockeye and coho salmon, and supports populations of Dolly Varden char and cutthroat and steelhead trout. Chinook salmon have returned to Auke Creek since 1986 as a result of off-site releases of juveniles from other hatcheries. The National Marine Fisheries Service, and its' predecessor agency, U.S. Bureau of Commercial Fisheries, began salmon research at Auke Creek, 19 km north of Juneau, Alaska, in 1961. Fyke nets were used that year to estimate the production of sockeye salmon smolts from Auke Lake. Sockeye smolt counts are available for some years between 1963 and 1980, and other downstream migrant salmonids were counted after 1969 (Appendix 1). Weir counts of sockeye salmon adults at Auke Creek began in 1963; other species were included after 1966 (Appendix 2). Auke Creek has been the site of many projects on wild and enhanced fish since construction of the hatchery in 1971. Projects at Auke Creek between 1971 and 1983 operated under several cooperative agreements. A combined interagency cooperative agreement relating to Auke Creek weir was established in 1983 between the National Marine Fisheries Service (NMFS), University of Alaska-Fairbanks (UAF), and Alaska Department of Fish and Game (ADF&G). The agreement provided the mechanism to jointly fund a full-time person to assist with the operation of the fish counting weir at Auke Creek. The primary objective is to operate the weir on a daily basis and maintain the long-term data collection on migrant salmonids. The agreement was revised in December 2000, and is in effect through October 2005. Auke Creek weir usually operates from March 1 through October 31. A report of fish counts from daily weir operation, and other information related to salmonid research involving the facilities at the weir is prepared each year. The data in this report are from activities in 2000. The original data are available in the Auke Creek data file at the Auke Bay Laboratory. Data collected by investigators on specific projects are usually not included in this report, but are available from those individuals. This report also includes information on releases and returns of hatchery fish in 2000.

The downstream weir at Auke Creek was operated from March 1 through June 29 to capture pink, sockeye, chum, and coho salmon, Dolly Varden char, and cutthroat and steelhead trout leaving Auke Creek. All fish were counted and released. The first downstream migrants, pink salmon fry, were captured March 2. Coho salmon smolts and cutthroat trout were marked or tagged during the migration. Auke Lake was ice free April 2, much earlier than 1999, May 5, and earlier than average, April 18 (Figure 1, Appendix 3). Downstream weir operations ended June 29.

The upstream weir was installed June 29 to capture all upstream migrants. The weir was modified to capture small fish: specifically Dolly Varden, cutthroat trout, and chinook salmon mini-jacks. Before 1997, small fish passed through the adult weir panels and were not counted. Aluminum plates, 18"x36", with ½" x 4" horizontal slots were placed on the bottom half of the lowest weir panels to prevent passage of small fish. Small fish were captured in two trout traps attached to the upstream side of the weir. Salmon adults cannot enter the

trout traps because of the small entrances. In accordance with the annual operation plan, various personnel assisted with the counting and processing of fish at the weir. The last upstream migrant was captured November 7, the day the weir was removed. Ten pink/chum hybrids were captured in the upstream weir in 2000. Auke Lake was frozen over January 2, 2000, and December 21, 2000. Water temperature was measured daily at Auke Creek weir (Figure 2, Appendix 4).

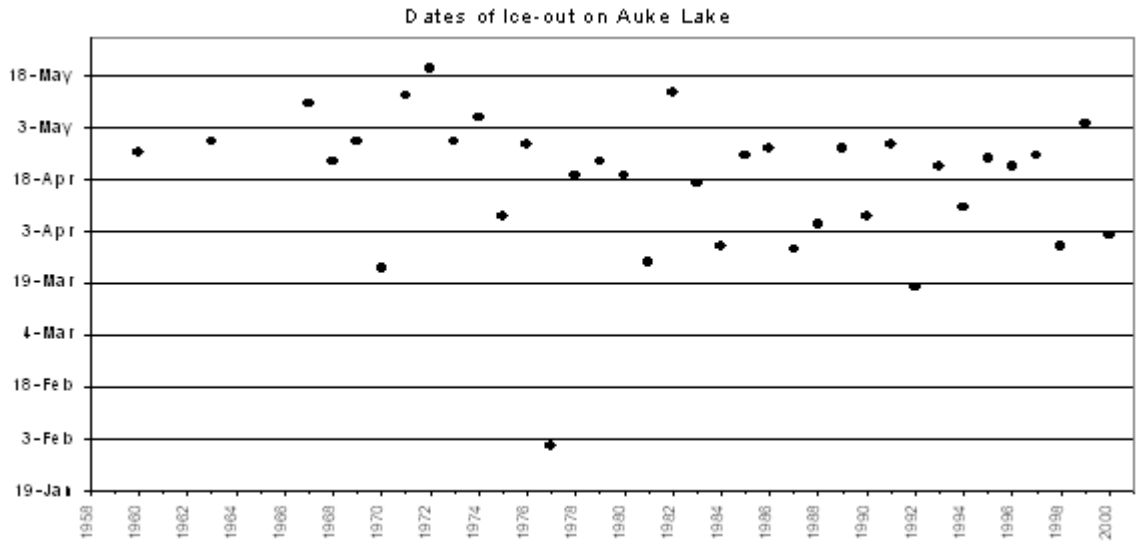

Figure 1. Dates of ice-out on Auke Lake: average is April 18.

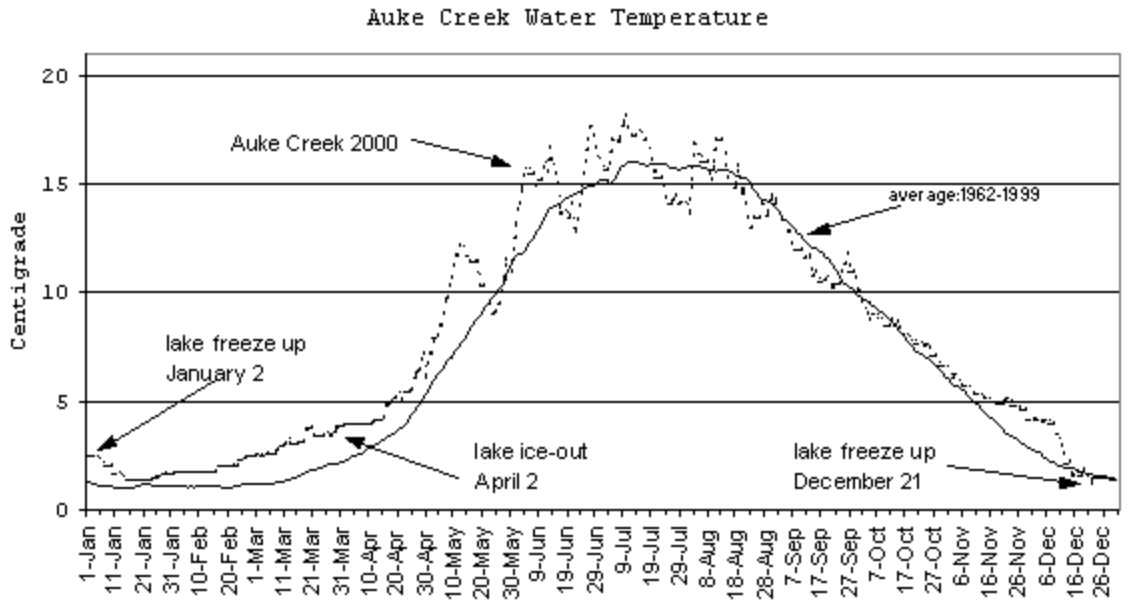

Figure 2. Dates of freeze up and ice-out on Auke Lake in 2000, and daily 2000 and 1962-99 average temperatures in Auke Creek.

Pink Salmon

Pink salmon spawn throughout the Auke Lake system in the tributaries to Auke Lake, Auke Creek, and in the intertidal area. In even- and odd-numbered years there are distinct runs of pink salmon in August and September, referred to as the early and late runs. The streambed downstream from the weir is mostly intertidal, and is mainly small boulders, broken shale, and fine gravel on bedrock. Before 1963, Auke Creek upstream from the weir was mainly bedrock, large boulders and logs, and there was probably not much area for spawning salmon. Spawning channels built in the upper reach of Auke Creek in 1963 provided about 1,000 m^2 of spawning area. A large amount of gravel has been washed out of the channels by freshets, and the upstream streambed is reverting to bedrock and large boulder substrate. There are no records on pink salmon runs in Auke Creek before the channels were built. Before the first return of hatchery fish in 1973 the runs averaged nearly 2,600.

Pink salmon fry populations were estimated at Auke Creek by hydraulic census in intertidal and freshwater areas, 1972-80, and, since 1979, by weir counts of fry leaving the freshwater area. The accuracy of hydraulic censuses of fry populations in Auke Creek is not known. The large substrate in Auke Creek makes it difficult to efficiently operate hydraulic sampling equipment, and confidence intervals of fry estimates are large. The average estimate of intertidal fry is 63,000, and average confidence interval ±29,000. The population of intertidal fry in Auke Creek was estimated by hydraulic census in 2000 at 18,200, ±12,700.

In 2000, 132,075 pink salmon fry were counted during the downstream migration from the freshwater area (Table 1). This was the highest number in seven years, and greater than average: 116,407 (Figure 3). Fewer than 2,900 fry migrated before the fourth week in

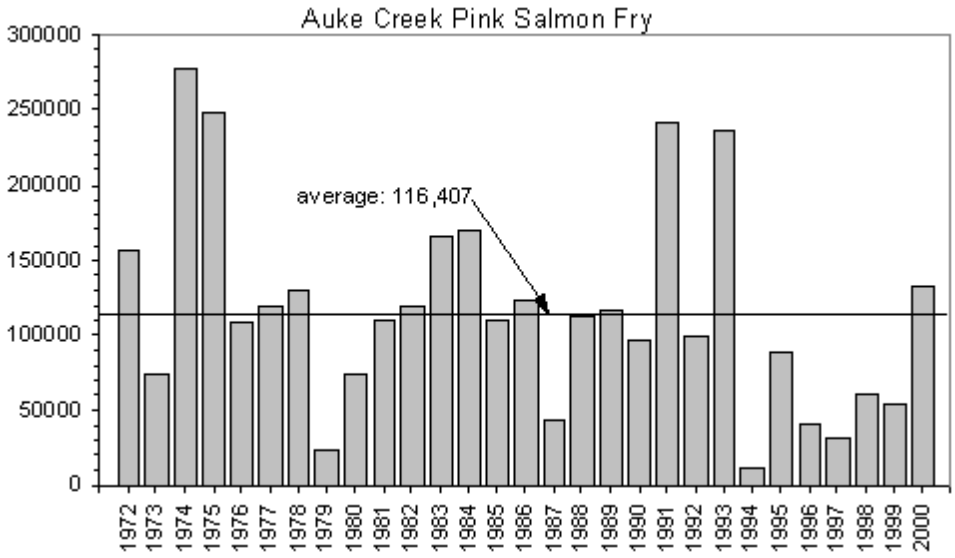

Figure 3. Number of wild pink salmon fry at Auke Creek, 1972-2000.

March. Most migrated in April, when the average daily count was about 3,700 (Figure 4, Appendix 5). The median date of downstream migration, April 14, was the fifth earliest in nearly 3 decades. The earliest median date of migration is April 1, 1998, the latest May 7, 1982, and the average April 21 (Figure 5). No wild fry were marked or tagged in 2000. A University of Alaska graduate student project resulted in the release of 40,000 marked fry from the hatchery; 20,000 adipose and left ventral mark and 20,000 adipose and right ventral mark. No hatchery fish will be released in Auke Creek when the adults return in 2001.

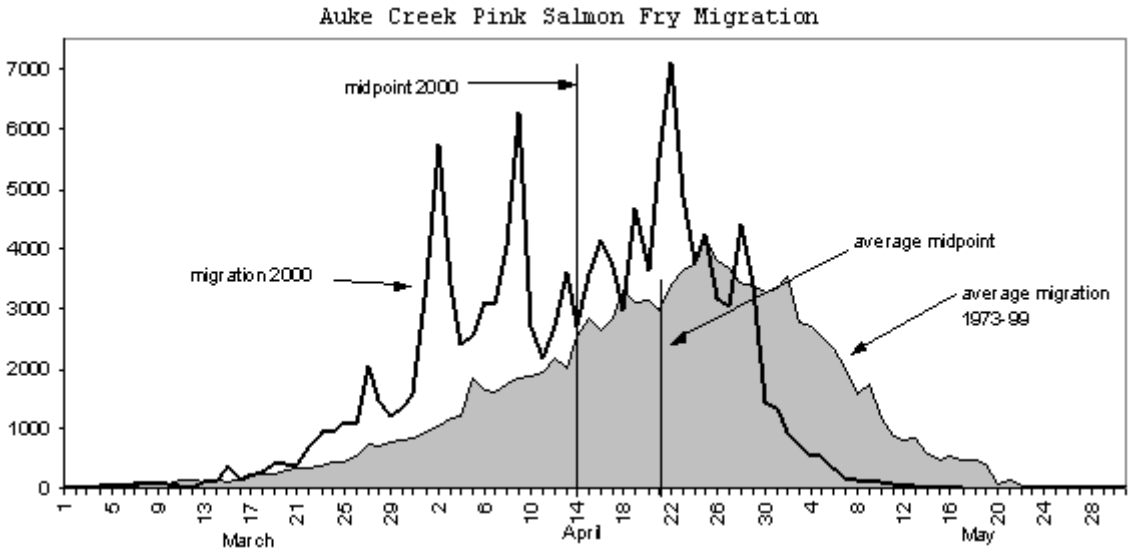

Figure 4. Daily number of pink salmon fry at Auke Creek in 2000, and the 1973-99 average.

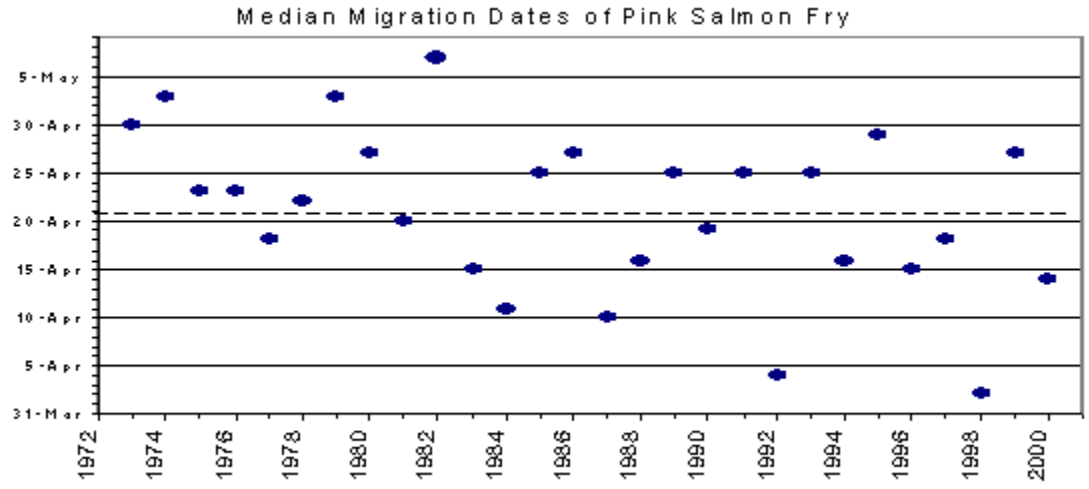

Figure 5. Median migration dates of pink salmon fry at Auke Creek, 1973-2000. The broken line is the average.

Pink salmon are the work horse of hatchery projects at Auke Creek. Hatchery-reared fry were released annually since 1971, except 1994 and 1996 (Table 1). Enhancement experiments produced most of the pink salmon leaving Auke Creek during the first decade of hatchery experience, and returning hatchery fish were released to spawn in Auke Creek through 1984 and in 1996. Various genetics projects resulted in the release of small numbers of fry beginning in the mid-1980s, and all of these fry were to have been fin marked. Fin marked adults from genetic projects are not knowingly released in Auke Creek.

Pink salmon adults were counted at Auke Creek in 1967 and 1968, and annually since 1970. In 2000, 2,491 pink salmon adults, 2,181 wild and 310 hatchery, were captured at Auke Creek weir (Figure 6). Wild fish were released to spawn in the creek, and all hatchery fish were killed for spawning or samples. University of Alaska staff spawned returning hatchery pink salmon for incubation at Auke Creek hatchery. None of the resulting fry will be released.

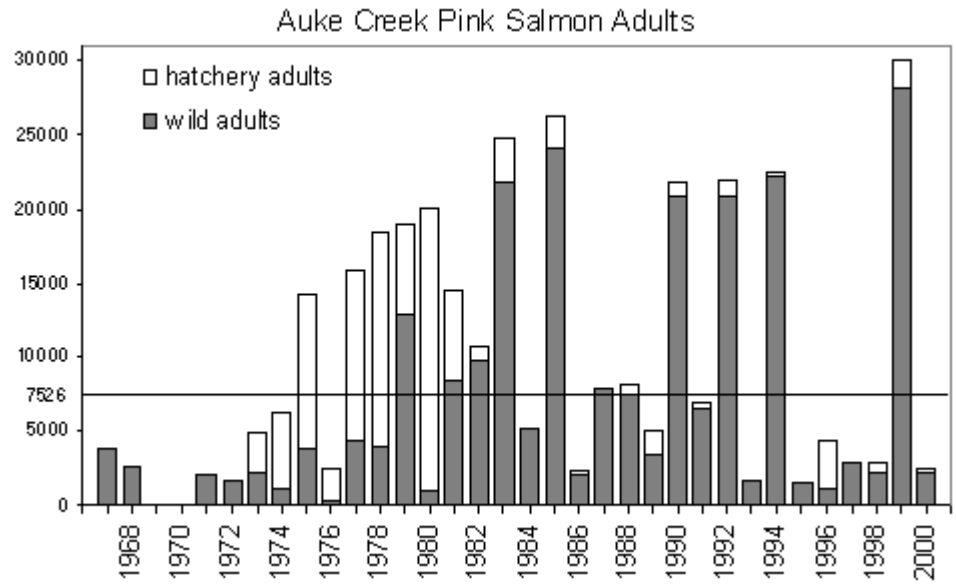

Figure 6. Wild and hatchery pink salmon at Auke Creek, 1967-68 and 1971-2000.

The 2000 run of wild fish was less than average for Auke Creek, and nearly identical to the 1998 parent brood. The average run of pink salmon is 7,526 wild fish, and 10,493 when hatchery fish are included (Table 1). Pink salmon were captured at the weir almost daily from late July through mid September (Appendix 6). Only five daily counts were greater than 100 fish. Based on the increase in the proportion of bright, silver females with loose scales, and the relative decline in numbers of fish, August 29 was considered the start of the late run (Figure 7). At that time, early run females were ready to spawn, and late run females were not. The early wild run was 1,524 fish, 838 males and 686 females, and the late run 657,

271 males and 386 females. The late run was 30% of the 2000 return, close to average for the last decade. Before 1982, the late run was often more than 75% of the return. Median dates of upstream migration during the last two decades are about 10 days earlier than before 1982 (Figure 8).

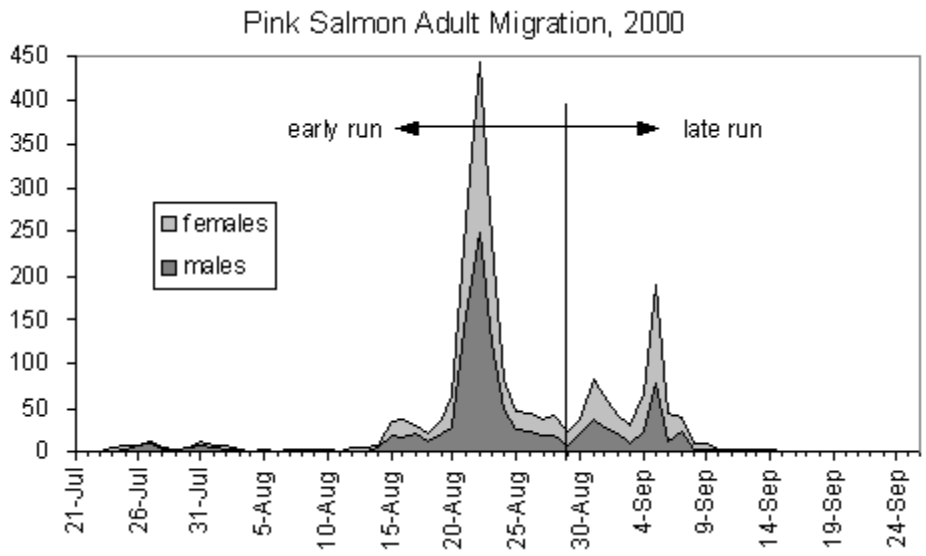

Figure 7. Upstream migration of wild Auke Creek pink salmon, 2000.

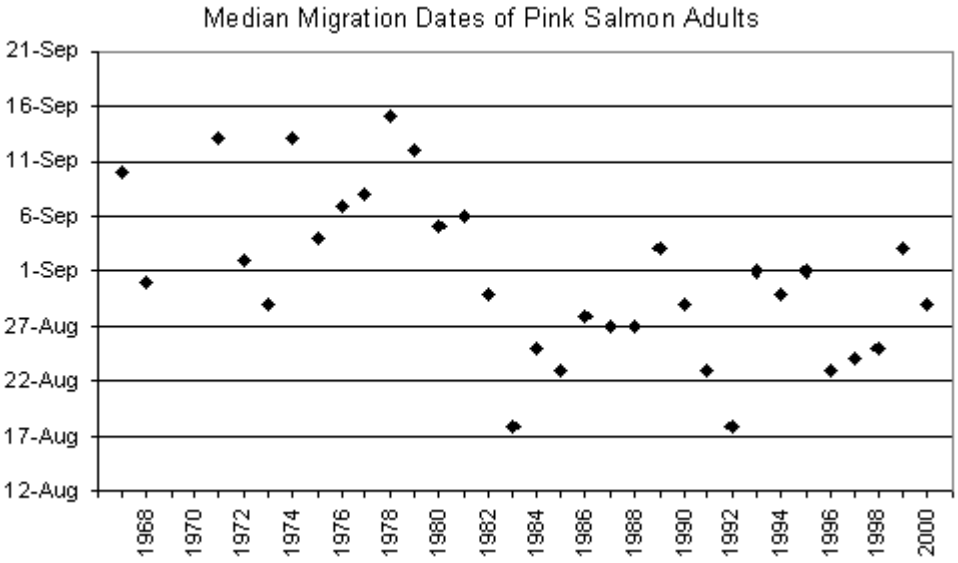

Figure 8. Median migration dates of pink salmon adults at Auke Creek.

Table 1. Number of wild and hatchery pink salmon fry and adults at Auke Creek. (n.d.= no data)

	fry			adults		
Year	wild	hatchery	total	wild	hatchery	total
1967	n.d.	0	n.d.	3,761	0	3,761
1968	n.d.	0	n.d.	2,638	0	2,638
1969	n.d.	0	n.d.	n.d.	0	n.d.
1970	n.d.	0	n.d.	n.d.	0	n.d.
1971	n.d.	0	n.d.	2,091	0	2,091
1972	157,189	186,674	343,863	1,768	0	1,768
1973	73,900	493,769	567,669	2,262	2,686	4,948
1974	277,624	1,014,338	1,291,962	1,139	5,121	6,260
1975	247,091	1,075,870	1,322,961	3,806	10,455	14,261
1976	108,195	259,837	368,032	334	2,191	2,525
1977	119,442	498,161	617,603	4,328	11,520	15,848
1978	129,714	264,216	393,930	3,972	14,438	18,410
1979	23,270	499,813	523,083	12,922	6,081	19,003
1980	74,047	177,619	251,666	924	19,264	20,188
1981	110,552	175,827	286,379	8,432	6,018	14,450
1982	119,548	134,843	254,391	9,831	827	10,658
1983	164,784	39,777	204,561	21,855	2,972	24,827
1984	169,552	98,930	268,482	5,115	156	5,271
1985	110,001	101,296	211,297	24,124	2,193	26,317
1986	123,887	5,165	129,052	2,089	216	2,305
1987	43,502	16,562	60,064	7,902	12	7,914
1988	113,061	66,376	179,437	7,574	566	8,140
1989	116,870	38,976	155,846	3,461	1,555	5,016
1990	96,651	80,014	176,665	20,983	823	21,806
1991	242,772	64,137	306,909	6,653	225	6,878
1992	98,447	29,086	127,533	20,972	1,129	22,101
1993	237,073	22,879	259,952	1,688	8	1,696
1994	11,603	0	11,603	22,167	366	22,533
1995	88,197	774,589	862,786	1,548	0	1,548
1996	41,359	0	41,359	1,155	3,219	4,374
1997	31,092	40,074	71,166	2,774	0	2,774
1998	60,785	39,834	100,619	2,267	612	2,879
1999	53,533	40,000	93,533	28,127	1,970	30,097
2000	132,075	40,000	172,075	2,181	310	2,491
mean	116,407	216,506	332,913	7,526	3,390	10,493

Sockeye Salmon

In Auke Lake sockeye salmon spawn in the larger tributaries and on submerged gravel beds in the lake. The production of wild sockeye smolts from Auke Lake was first estimated in 1961. From 1961 through 1979, smolt numbers were estimated several times, but some of the early smolt estimates are known to be incomplete. The pre-1980 smolt estimates lack continuity, and, based on the pre-1980 escapements, it is obvious there has been a significant decrease in the number of smolts since the 1960s and early 1970s. The 1961 estimate of 90,000 smolts is the highest on record, and estimates from 1962 through 1979 ranged from 8,862 to 62,389. Since 1979, the entire smolt population was counted at Auke Creek weir, and the number of wild smolts ranged from 1,719 to 33,616. Hatchery-reared sockeye fry stocked in Auke Lake in 1974-75 and 1987-89 contributed to the smolt production in subsequent years. Sockeye enhancement in the late 1980s and early 1990s included the release of under-yearling smolts that were reared in the hatchery and net pens in Auke Bay.

A total of 13,699 sockeye smolts were counted at the weir during the downstream migration in 2000. This was the lowest number of wild smolts in three years, and less than the 1980-2000 average (Table 2). The average number of wild smolts produced in Auke Lake, 1980-2000, is 16,682 (Figure 9).

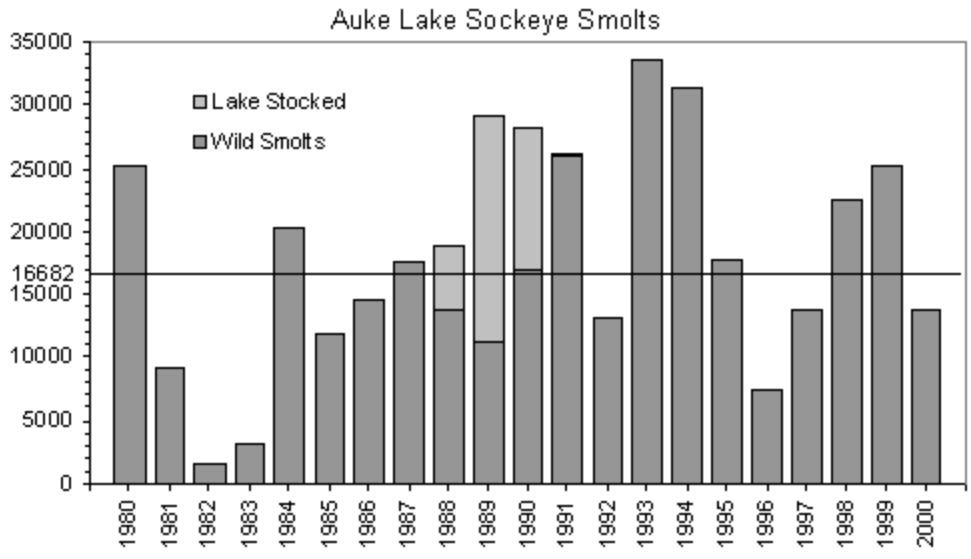

Figure 9. Wild and lake stocked sockeye salmon smolts leaving Auke Creek, 1980-2000. The horizontal line is the average for wild fish.

The downstream migration of sockeye smolts began in early May, and about 10,000 smolts migrated during the last two weeks of the month (Figure 10). The migration midpoint was May 25, 9 days earlier than in 1999. The last smolts were counted on June 29, although only 219 left the lake during the last two weeks of the month (Appendix 5). All sockeye salmon smolts in 2000 were from natural spawning in the Auke Lake system. Scale analysis revealed that 27% of the smolts were age-1, 1998 brood, 3,755 fish, and 73% age-2, 1997 brood, 9,944 fish.

In 1998 and 1999, age-1 smolts accounted for 71% and 91%, respectively, of the total migration. The 1997 brood has completed the freshwater phase of its' life history, and produced a total of 32,800 smolts. This is the highest brood year production of smolts since the 1991 brood. The 1978-97 average brood production is 17,259 smolts. No wild sockeye smolts were marked or tagged in 2000, and no hatchery fish were produced.

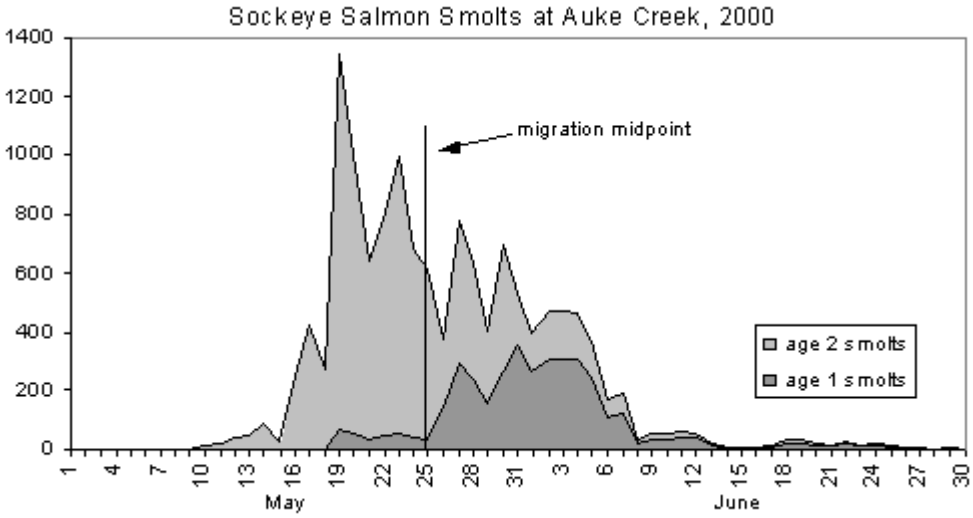

Figure 10. Daily migration of age-1 and age-2 sockeye smolts in 2000.

The 2000 sockeye smolts were some of the largest recorded leaving Auke Lake. In 2000, age-1 and -2 smolts averaged 87 and 124 mm, and 5.8 and 16 g, respectively (Figure 11). The long-term average for age-1 and -2 sockeye smolts leaving Auke Lake is 75 and 107 mm, and 3.9 and 12 g.

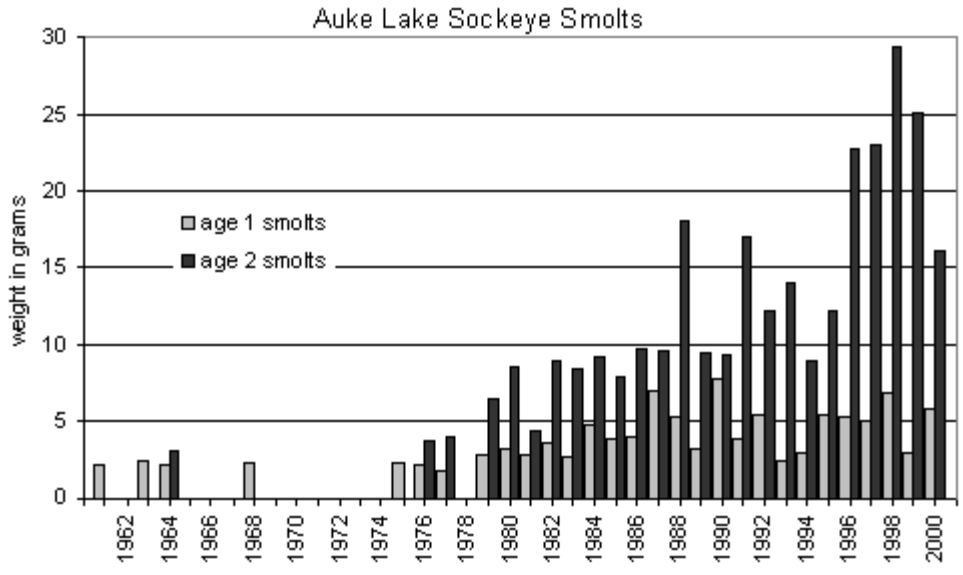

Figure 11. Average weight of sockeye smolts leaving Auke Lake, 1962-2000.

Total biomass-zooplankton models indicate Auke Lake is capable of producing about 350 kg of smolts annually. The total biomass of sockeye smolts (estimated total weight of all smolts in a migration year) from Auke Lake in 2000 was 181 kg (Figure 12). This was greater than average, 142 kg, however, only slightly greater than half of the estimated potential biomass production of sockeye smolts at Auke Lake. One measure of freshwater survival, number of smolts produced per spawner, indicates that for the last 12 brood years fewer than 10 smolts were produced per spawner in the Auke Lake system (Figure 13).

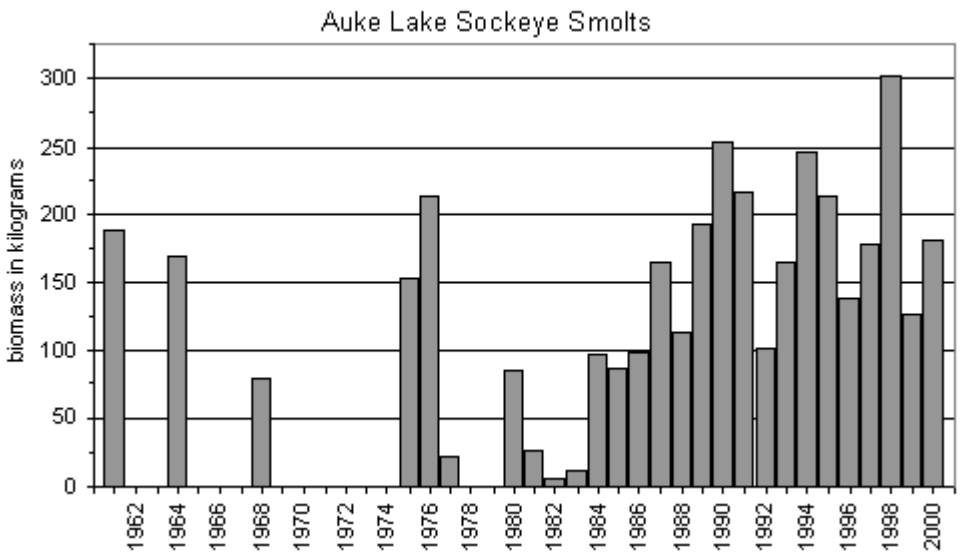

Figure 12. Total annual biomass of sockeye salmon smolts leaving Auke Lake.

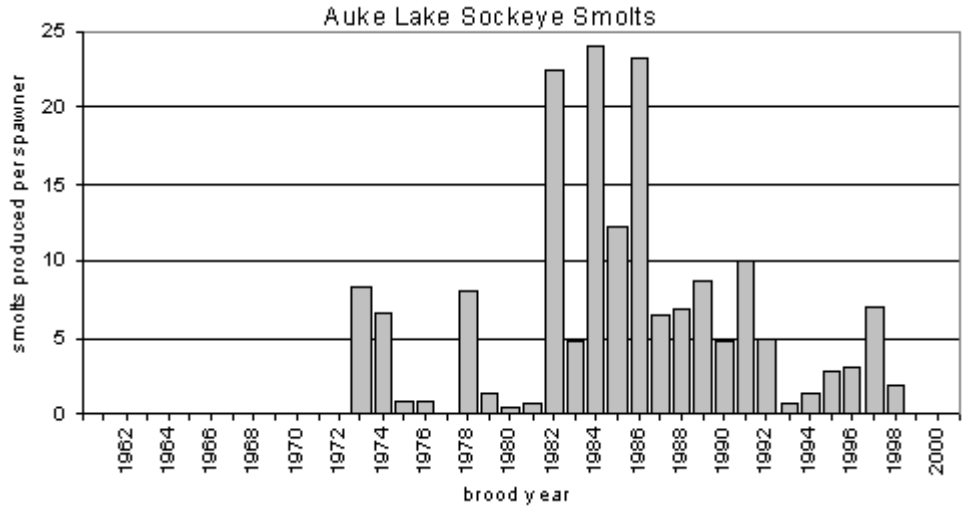

Figure 13. Number of smolts produced per spawner by brood year in the Auke Lake system. The 1998 brood has produced only age-1 smolts, and the 1999 and 2000 broods have not produced smolts yet.

Sockeye salmon adults were counted annually at Auke Creek since 1962. From 1963 through the mid-1970s sockeye escapements averaged about 7,000 adults, consistently higher than they were during the last two decades (Figure 14). During the late 1970s the escapements declined, and, since 1981, the average return of wild fish was 2,400. A sockeye enhancement program, which used Auke Creek sockeye from the 1986-91 brood years, boosted the 1990-95 escapements to Auke Creek by an average of 2,000 fish per year. No hatchery sockeye have returned to Auke Creek since the enhancement program ended in 1995.

In 2000, 2,480 adult and 33 jack sockeye salmon returned to Auke Creek, the highest adult run in 3 years, but one of the lowest in a decade (Table 2). Most sockeye adults migrated upstream in late June and July, 2,133 fish, during periods of increased stream flow. Only 347 fish migrated after July, 319 in August and 28 in September (Appendix 6). Estimated marine survival, smolt to weir recovery of adults, for returns in 2000 was 16%.

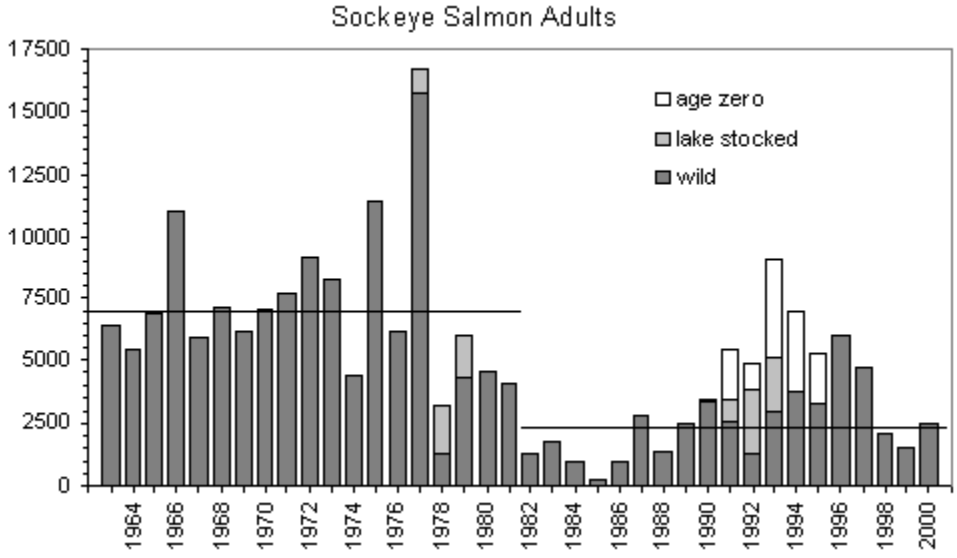

Figure 14. Wild and hatchery, age-0 and lake stocked, sockeye salmon adults at Auke Creek, 1963-2000. The horizontal lines are the averages for wild fish: 1963-81: 7,000, and 1982-2000: 2,400.

Table 2. Wild and hatchery sockeye salmon smolts and adults, at Auke Creek. (hatchery = lake stocked and age-0).

	smolts				adults			
Year	wild	stocked	age-0	total	wild	stocked	age-0	total
1961	90,000			90,000	n.d.			n.d.
1962	n.d.			n.d.	n.d.			n.d.
1963	n.d.			n.d.	6,391			6,391
1964	62,389			62,389	5,465			5,465
1965	n.d.			n.d.	6,889			6,889
1966	n.d.			n.d.	10,986			10,986
1967	n.d.			n.d.	5,909			5,909
1968	35,737			35,737	7,164			7,164
1969	n.d.			n.d.	6,131			6,131
1970	n.d.			n.d.	7,034			7,034
1971	n.d.			n.d.	7,673			7,673
1972	n.d.			n.d.	9,166			9,166
1973	n.d.			n.d.	8,259			8,259
1974	15,399			15,399	4,371			4,371
1975	59,370	10,001		69,371	11,461			11,461
1976	35,769	8,585		41,513	6,153			6,153
1977	8,862	450		9,312	15,683	1,000		16,683
1978	n.d.			8,291	1,271	1,906		3,177
1979	n.d.			n.d.	4,291	1,731		6,022
1980	25,299			25,299	4,564			4,564
1981	9,183			9,183	4,089			4,089
1982	1,619			1,719	1,334			1,334
1983	3,170			3,170	1,805			1,805
1984	20,251			20,251	975			975
1985	11,747			11,747	240			240
1986	14,500			14,500	952			952
1987	17,598			17,598	2,847			2,847
1988	13,812	4,992	36,500	55,304	1,337			1,337
1989	11,187	17,879	34,290	63,356	2,508			2,508
1990	16,983	11,280	49,949	78,212	3,295	88		3,383
1991	25,872	115	138,007	163,994	2,583	832	2,009	5,425
1992	13,248		57,077	70,325	1,267	2,541	1,045	4,853
1993	33,616			33,616	2,988	2,077	4,048	9,113
1994	32,009			32,009	3,696		3,296	6,993
1995	17,857			17,857	3,221		2,040	5,261
1996	7,069			7,069	5,995			5,995
1997	13,856			13,848	4,671			4,671
1998	22,496			22,496	2,068			2,068
1999	25,244			25,249	1,571			1,571
2000	13,699			13,699	2,480			2,480
mean[1]	16,682				4,705			5,300

[1]Mean number of wild smolts is from 1980-2000.

Chum Salmon

It is not known if chum salmon are native to Auke Creek or strays. Probably few chum salmon were ever produced in the Auke Lake system, although adults were observed in all areas, including the intertidal. The earliest count of chum salmon adults was 1967, and fry were not counted before 1977. In 1976, NMFS started chum salmon enhancement projects, and examined use of a small population for brood stock development, marine survival of juveniles, and age heritability. Hatchery chum salmon were released from 1977-84, and 1986. All hatchery fry, except in 1984, were marked by ventral fin clip, or adipose fin clip and coded wire tag. No adults were released in Auke Creek from 1976-1983; all were spawned for hatchery incubation. None spawned in the intertidal area; all fish captured there were spawned for hatchery use. Adult chum salmon, resulting from releases of Gastineau Hatchery fry at Amalga Harbor, have strayed into Auke Creek since 1993.

In 2000, 1,337 chum salmon fry were captured at Auke Creek weir, and most migrated in April, similar to pink salmon (Table 3, Appendix 5). No chum fry were produced at Auke Creek hatchery in 2000.

In 2000, 4,444 chum salmon adults entered Auke Creek (Figure 15, Table 3). Most remained in Auke Creek, although some were seen in tributaries of Auke Lake before the third week of August. Chum salmon were observed in the intertidal area, but were not counted. Most chum salmon were probably strays from the Amalga Harbor releases of Gastineau Hatchery fish. All fish were checked for marks, and none were found. Chum otoliths were collected at Auke Creek by Gastineau Hatchery personnel. Historically, Auke Creek chums migrated the last week of August and first week of September. In 2000, over 4,000 fish entered Auke Creek before mid August, and only 100 entered after the third week of August (Appendix 6). The number of chum salmon of Auke Creek origin was considered those counted after the third week of August; 100 fish.

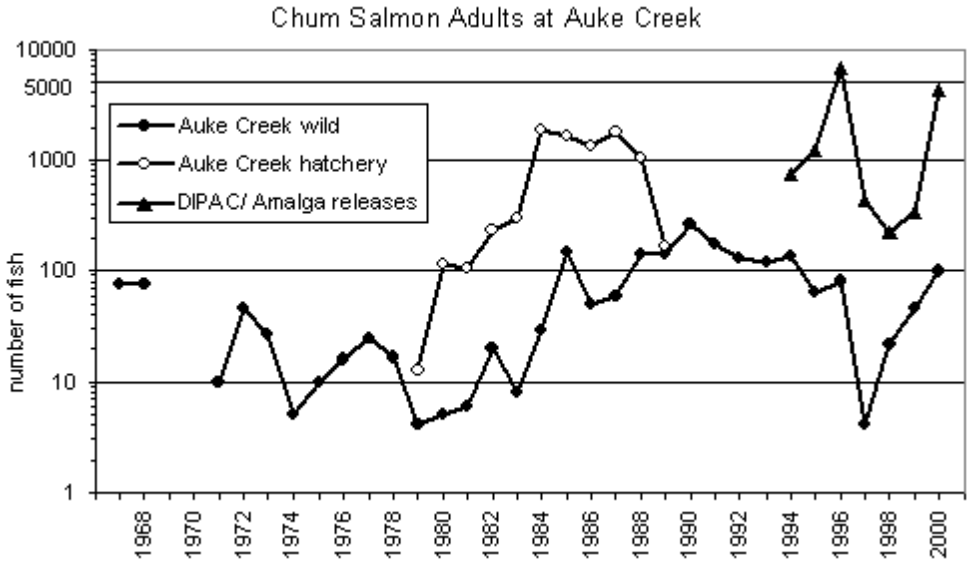

Figure 15. Chum salmon adults at Auke Creek, 1967-68, and 1971-2000

Table 3. Chum salmon fry and adults at Auke Creek.

	fry		adults			
Year	wild	Auke C. hatchery	Amalga strays	Auke C. hatchery	wild	total
1967	n.d.	0		0	78	78
1968	n.d.	0		0	76	76
1969	n.d.	0		0	n.d.	n.d.
1970	.n.d.	0		0	n.d.	n.d.
1971	n.d.	0		0	10	10
1972	n.d.	0		0	47	47
1973	n.d.	0		0	27	27
1974	n.d.	0		0	5	5
1975	n.d.	0		0	10	10
1976	n.d.	0		0	16	16
1977	0	12,195		0	24	24
1978	0	18,446		0	17	17
1979	0	20,049		13	4	17
1980	0	2,491		113	5	118
1981	0	67,236		103	6	109
1982	0	54,134		231	20	251
1983	0	41,742		302	8	310
1984	0	58,452		1,888	29	1,917
1985	7,198	0		1,704	148	1,852
1986	825	20,725		1,342	50	1,392
1987	14,039	0		1,824	60	1,884
1988	8,091	0		1,053	140	1,193
1989	13,750	0		166	138	304
1990	1,916	0		0	270	270
1991	759	0		0	174	174
1992	4,783	0		0	130	130
1993	47	0		0	121	121
1994	137	0	736	0	132	868
1995	5	0	1,262	0	65	1,327
1996	4,981	0	6,700	0	81	6,781
1997	8,307	0	444	0	4	448
1998	735	0	225	0	22	247
1999	1,269	0	340	0	46	386
2000	1,337	0	4,344	0	100	4,444
mean	4,261	32,830	2,007	794	64	777

Coho Salmon

Coho salmon spawn in the tributaries to Auke Lake and in the man-made spawning channels in Auke Creek. The total number of smolts migrating from Auke Lake was counted annually since 1979. Smolts were adipose marked and tagged with coded wires since 1975; except 1978. Coho adults were first counted in 1967, 309 fish, and annually since 1970. Before 1980, low-height weirs were used to capture salmon adults at Auke Creek. Those weirs were often under water during periods of high stream flow, and some reported pre-1980 data may be partial counts of the runs. Coho salmon were spawned for hatchery incubation in 1978, 1980-84, and 1996-7. Hatchery fish were tagged with coded wires and marked with an adipose and ventral fin clip to distinguish them from wild smolts which were marked by adipose clip and wire tag. All coho salmon jacks and adults returning from hatchery releases were killed at the weir. The summary tables and figures in this report are wild fish only.

A total of 4,891 coho salmon smolts left the Auke Lake system in 2000. The highest coho smolt count at Auke Creek was 9,951 in 1980 (Table 4, Figure 16). The average number of coho smolts, 1980 through 2000, is 6,466. In 2000 4,862 smolts were tagged with regular format coded wire tags and marked with an adipose fin clip.

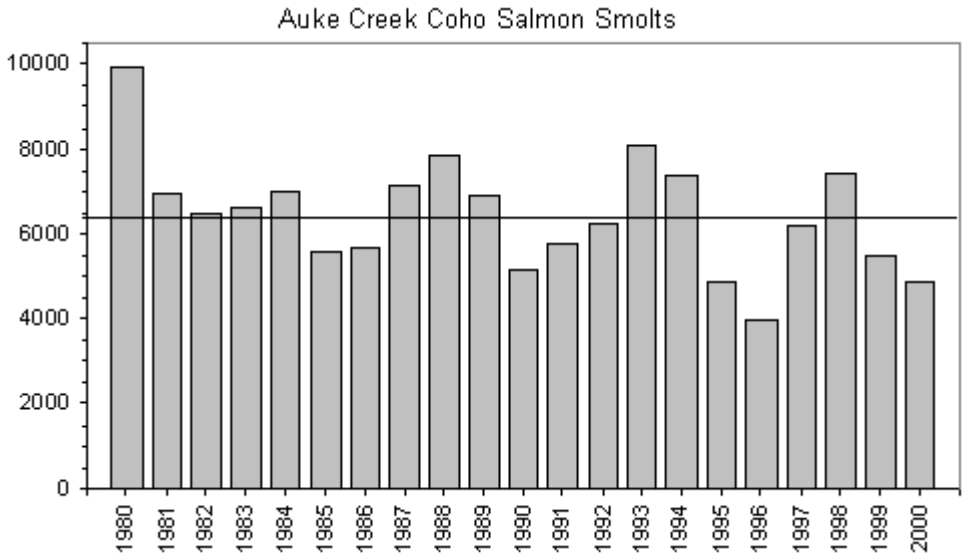

Figure 16. Number of coho salmon smolts at Auke Creek, 1980-2000. The horizontal line is the average: 6,466 smolts.

The smolt migration began during the first week of May, however, only 27 migrated by May 7. Over 3,700 smolts migrated between May 12 and 25, and the migration midpoint was May 19 (Appendix 5). The average midpoint of migration of coho smolts at Auke Creek is May 20 (Figure 17). The migration of age-2 smolts preceded that of age-1 smolts (Figure 18). The midpoints of the age-2 and -1 smolts were May 16 and May 27, respectively. Smolts were sampled throughout the

migration to collect scales for aging, and size. This showed that 1,458 were age-1 (average 108 mm), 3,433 age-2 (average 125 mm).

The coho salmon age-at-maturity study included evaluation of the production of age-1 and -2 smolts from the lake stocking of 1996 and 1997 brood fry. In 2000 all of these fish were from the 1997 brood. A total of 453 smolts were captured at the weir. These fish were identified by ventral fin clips, then given an adipose clip and tagged with group specific wire tags. All fish from this project will be killed when they return to Auke Creek.

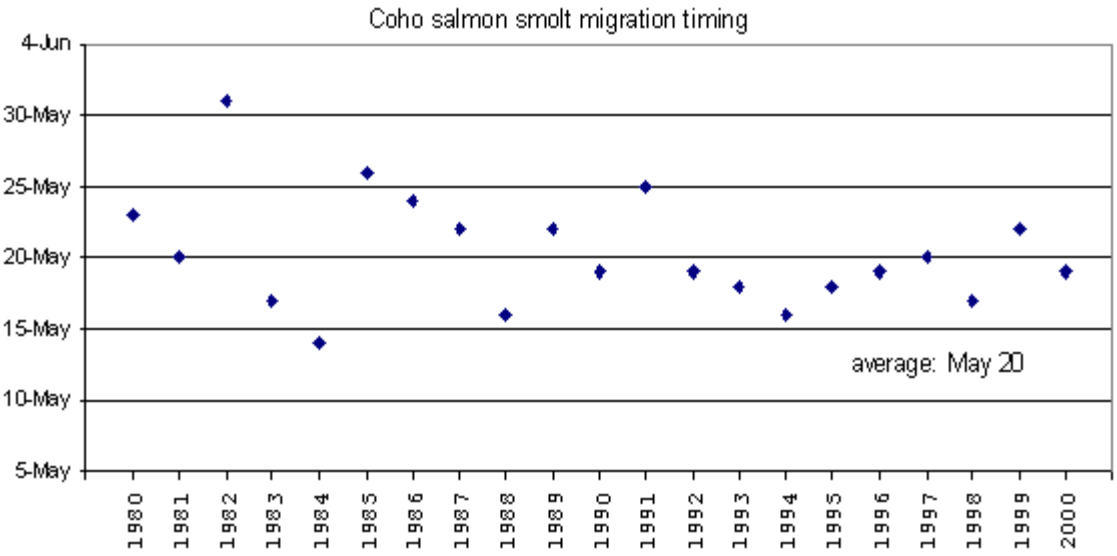

Figure 17. Median migration dates of coho smolts at Auke Creek, 1980-2000.

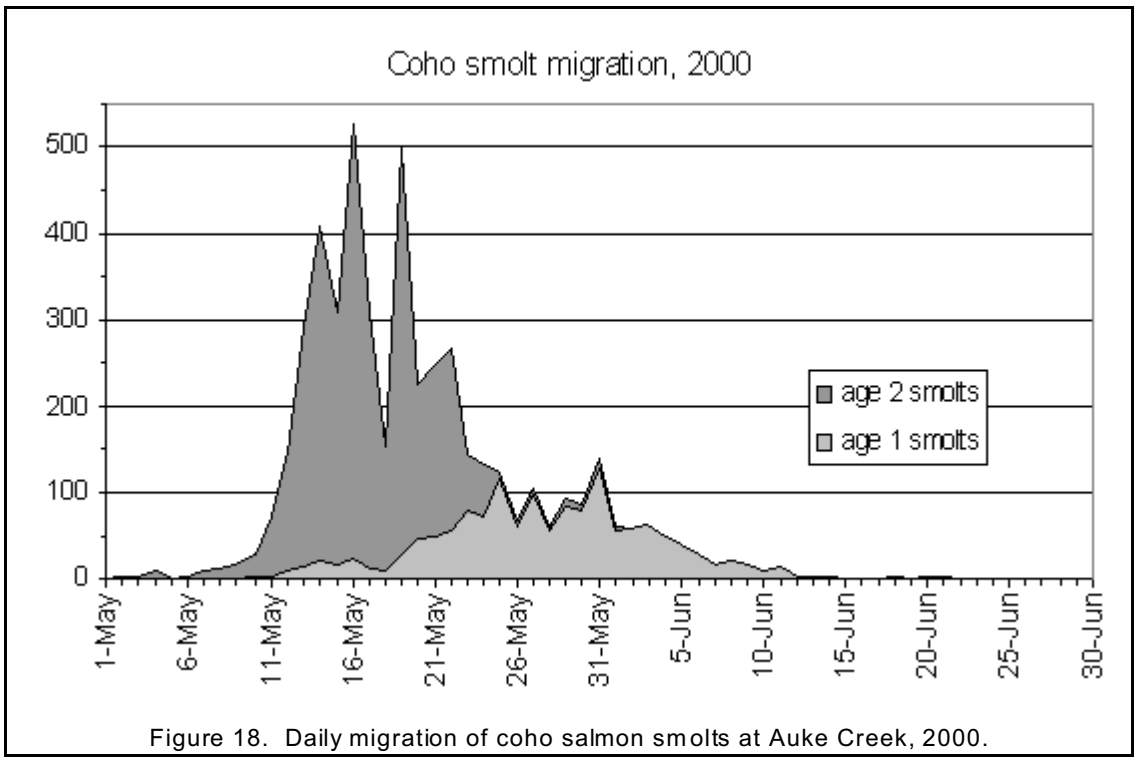

Figure 18. Daily migration of coho salmon smolts at Auke Creek, 2000.

The run of coho salmon at Auke Creek in 2000 included marked, wild jacks and adults, unmarked fish, marked jacks from Gastineau Hatchery, and marked fish from Auke Creek hatchery. The return of marked, wild coho was 206 jacks and 666 adults, both less than average (Figures 19 and 20). Most wild fish entered Auke Creek before the last week of September (Appendix 6). There were 21 unmarked jacks and 17 unmarked adults. Three adipose clipped jacks (not included in the 206 reported earlier) had wire tags from Gastineau Hatchery. We believe the unmarked jacks were also strays from Gastineau Hatchery because they were smaller than Auke Creek wild jacks (average: 250 vs. 310 mm fork length). The unmarked jacks entered the creek mainly after the first week of October, later than wild jacks. The origin of the 17 unmarked coho adults is not known. Most of these fish entered Auke Creek in early October, after the main run of marked, wild adults. A total of 17 jacks and 181 adults from the age-at-maturity project were captured at Auke Creek, and killed to recover wire tags.

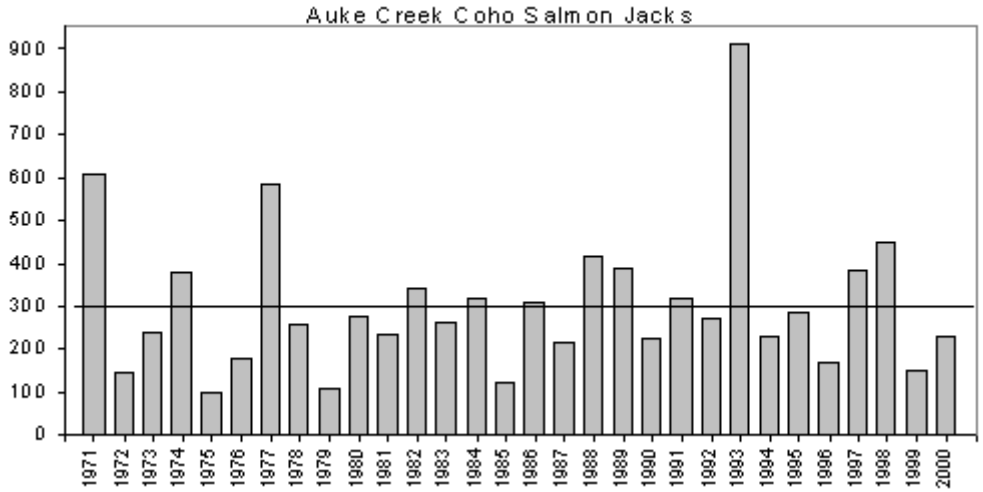

Figure 19. Number of wild coho salmon jacks at Auke Creek, 1971-2000. The horizontal line is the average: 302.

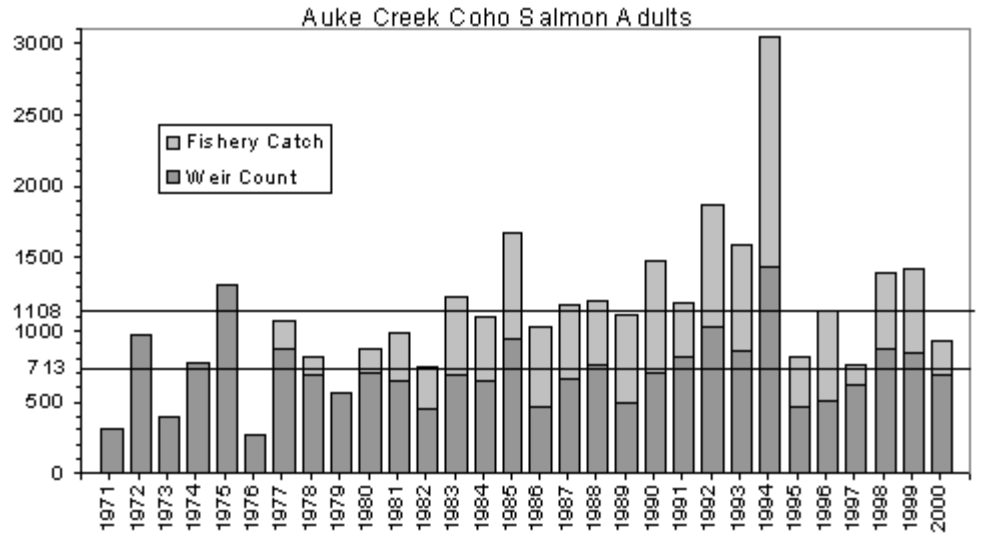

Figure 20. Weir counts and fishery catch of wild coho salmon from Auke Creek. The lower horizontal line is the average weir count, the upper line is the average return, of marked adults, weir plus fishery, 1977-78 and 1980-2000.

Harvest of coho salmon from Auke Creek is determined from recovery of wire tags in commercial and sport fishery port sampling programs. In 2000, 244 Auke Creek coho salmon adults were caught in the fishery. This was less than half the average for Auke Creek, and represents a 27% catch rate. The average harvest is 515 adults: a 44% average catch rate.

Although the numbers of wild Auke Creek coho salmon were less than average, ocean survival of Auke Creek smolts remained high. Survival of coho salmon was estimated using smolts marked at Auke Creek, and the number of marked jacks and adults at the weir and adults in the fishery. Survival is expressed as a percentage of marked smolts. Overall survival of the 1999 smolts tagged at Auke Creek was 20.7%: jacks 2.9% (returned in 1999), weir recovery of adults 13%, and fishery harvest of adults 4.8% (Figure 21). Survival of the 2000 smolts to return as jacks that year was 4.2% (Table 4).

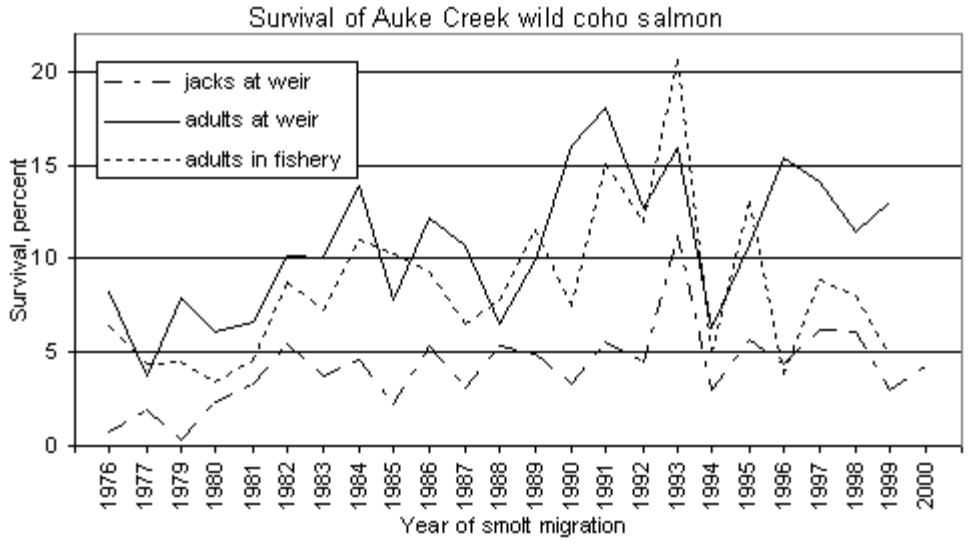

Figure 21. Ocean survival of wild coho salmon smolts from Auke Creek.

Table 4. Number of coho salmon smolts captured and released with wire tags at Auke Creek, weir recovery of jacks and adults, recovery of tagged fish at the weir and in the fishery, and ocean survival of tagged fish. Averages are for years when data are available, and percent return is for tagged smolts. Total survival is by year of smolt migration.

	smolts		weir recovery		tagged fish recovered			ocean survival, %			
year	total	tagged	jack	adult	jacks weir	adults weir	adults fishery	jacks weir	adults weir	adults fishery	total
1971	nd	0	608	308	0	0	nd	—	---	—	---
1972	nd	0	146	967	0	0	nd	—	---	—	---
1973	nd	0	238	399	0	0	nd	—	---	—	---
1974	nd	0	379	768	0	0	nd	—	---	—	---
1975	nd	0	98	1310	0	0	nd	—	---	—	---
1976[1]	nd[1]	2992	176	262	21	0	nd	0.7	---	---	---
1977[1]	nd[1]	3038	583	868	59	246	189	1.9	8.2	6.3	15.2
1978	nd	0	256	683	0	112	131	---	3.7	4.3	9.9
1979[1]	nd[1]	3872	107	566	12	0	nd	0.3	---	---	—
1980	9951	9821	276	698	226	306	170	2.3	7.9	4.4	12.6
1981	6953	6372	231	646	203	592	330	3.2	6.0	3.4	11.7
1982	6483	6245	338	447	335	417	292	5.4	6.5	4.6	14.3
1983	6634	6115	261	694	224	630	545	3.7	10.1	8.7	24.2
1984	7012	6751	315	651	304	614	444	4.5	10.0	7.3	21.0
1985	5601	5545	122	942	118	937	741	2.1	13.9	11.0	29.4
1986	5666	5502	307	454	288	429	570	5.2	7.7	10.3	20.1
1987	7166	6883	212	668	206	668	511	3.0	12.1	9.3	26.7
1988	7888	7751	412	756	406	736	445	5.2	10.7	6.5	20.2
1989	6911	6819	386	502	329	502	604	4.8	6.5	7.8	19.5
1990	5132	5020	225	697	165	678	785	3.3	9.9	11.5	26.3
1991	5764	5671	317	820	314	808	371	5.5	16.1	7.4	26.8
1992	6262	6106	271	1020	271	1020	855	4.4	18.0	15.1	38.6
1993	8103	7844	910	859	876	774	730	11.2	12.7	12.0	29.1
1994	7416	7255	229	1437	212	1253	1618	2.9	16.0	20.6	47.8
1995	4869	4798	283	460	269	455	360	5.6	6.3	5.0	14.2
1996	3962	3919	168	515	168	515	626	4.3	10.7	13.0	29.4
1997	6207	6080	381	609	376	606	148	6.2	15.5	3.8	23.5
1998	7430	7379	449	862	447	862	538	6.1	14.2	8.8	29.2
1999	5491	5123	149	845	149	845	589	2.9	11.5	8.0	25.5
2000	4891	4862	227	683	206	666	244	4.2	13.0	4.8	20.7
mean	6466		302	713			515	4.1	10.7	8.4	23.3

[1]- total smolt count not available

Dolly Varden

Auke Lake system is an important overwintering site for Dolly Varden in the Juneau area. Some spawning and rearing undoubtably occur in the system, but spawner numbers and annual production of smolts are not known. Dolly Varden migrating downstream at Auke Creek were counted in 1970, when 6,249 left the lake, and annually since 1979. Downstream migrants were marked or tagged in 1970, 1980, 1983, and 1990, and marked fish were observed in subsequent years. After 1997, fish captured at Auke Creek with missing or partially missing adipose fin were probably marked when they left Windfall Lake, or, were naturally occurring lost fins.

The downstream migration of 5,254 Dolly Varden at Auke Creek in 2000 was the lowest in seven years at Auke Creek, and less than average: 6,379 (Figure 22). The number of downstream migrant Dolly Varden has decreased annually since 1994 (Table 5). The downstream migration began in late March, however, only 9 fish left Auke Lake that month. Daily counts never exceeded 80 fish until April 29, and most fish migrated in May (Appendix 5). The midpoint of the migration was May 6, about one week earlier than in 1999. Dolly Varden were sampled daily throughout the migration by measuring the length of every tenth fish. The larger fish migrate earlier, and the average length decreases from about 350 to 150 mm over the course of the migration (Figure 23). Overall, the average size of downstream migrants was 259 mm. All fish were checked for marks or tags; 6 had a missing or partially missing adipose fin.

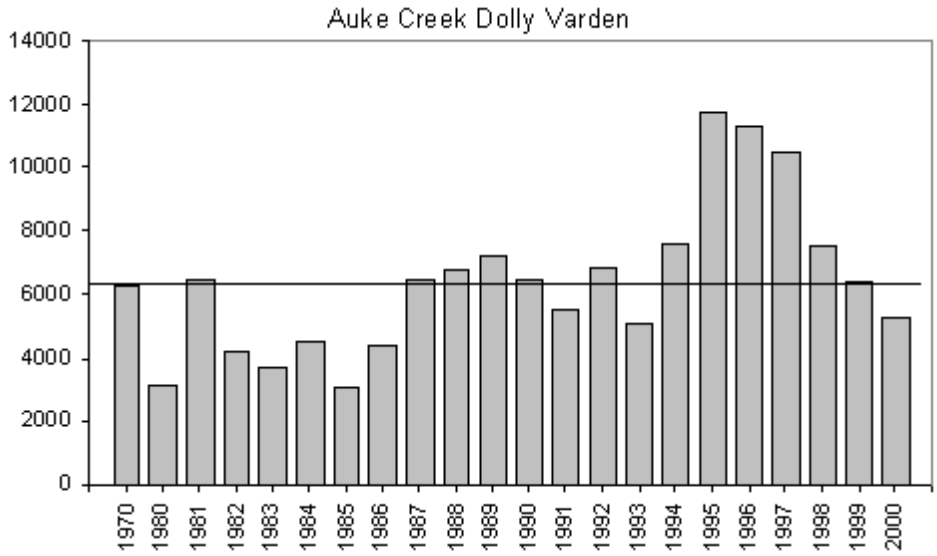

Figure 22. Number of downstream migrant Dolly Varden at Auke Creek. The horizontal line is the average run: 6,379.

Serious attempts to count upstream migrants began in 1997. A total of 3,665 Dolly Varden were captured in the upstream traps in 2000. This is the lowest count of upstream migrants on record, and the runs are in a decreasing mode. The 1997-99 counts were 5,705, 4,993, and 4,709 fish, respectively. The migration began July 29, and the last fish was captured November 7 (Appendix 6, Figure 24). Upstream movement of Dolly Varden was negatively associated with high temperatures and the number of chum salmon in the creek, and positively associated with increased stream flow during the entire migration period.

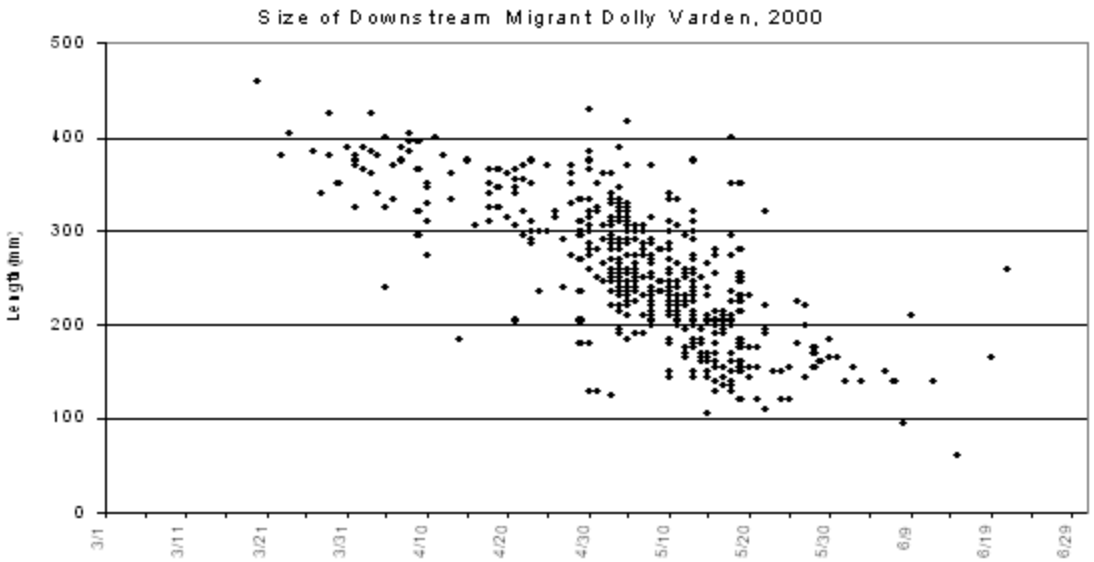

Figure 23. Fork lengths of Dolly Varden sampled at Auke Creek, 2000.

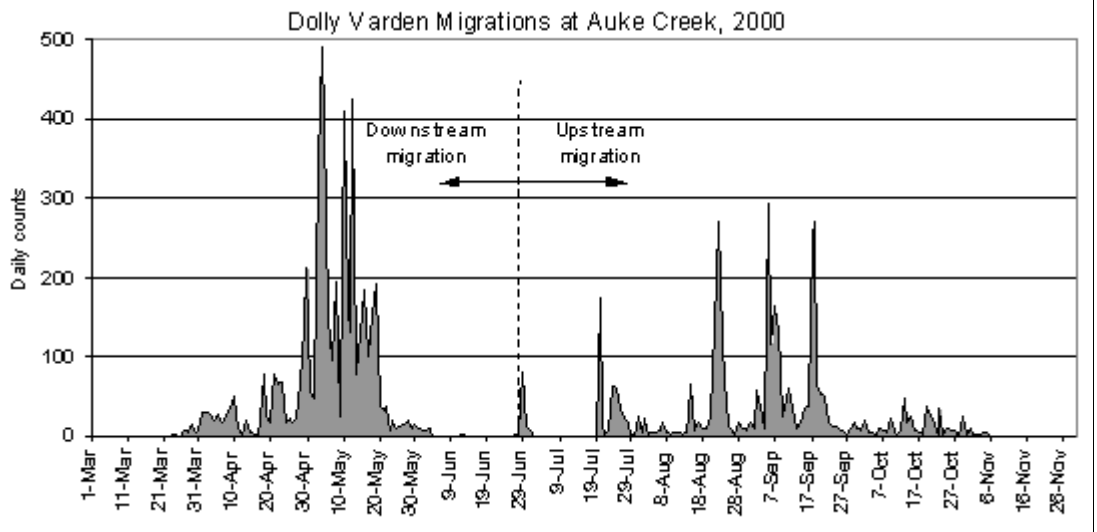

Figure 24. Daily number of Dolly Varden in the migrations at Auke Creek, 2000.

Table 5. Number of downstream migrant Dolly Varden at Auke Creek, 1970, and 1980-2000. (mortalities at the weir = mort)

year	total	unmarked	marked	mort
1970[1]	6,249	0	6,007	242
1980[1]	3,132	92	2,928	112
1981	6,461	5,776	685	0
1982	4,172	3,929	222	21
1983[1]	3,718	2,131	1,587	0
1984	4,512	4,229	283	0
1985	3,052	3,006	46	0
1986	4,351	4,351	0	0
1987	6,444	6,420	2	21
1988	6,770	6,770	0	0
1989	7,230	7,155	2	73
1990[1]	6,426	2,318	4,107	0
1991	5,559	4,631	881	47
1992	6,839	6,715	110	14
1993	5,075	5,064	7	4
1994	7,604	7,600	4	0
1995	11,728	11,728	0	0
1996	11,323	11,323	0	0
1997	10,506	10,506	0	0
1998[2]	7,532	7,440	70	22
1999[2]	6,393	6,377	16	0
2000[2]	5,254	5,248	6	0
mean	6,379			

[1] Years Dolly Varden were marked and\or tagged at Auke Creek

[2] Marked Dolly Varden recovered but not marked at Auke Creek

Cutthroat and Steelhead trout

Little was known of the life history of cutthroat trout in the Auke Lake system before the start of meaningful tagging programs in 1994 and lake population estimates in 1998. It is apparent that Auke Lake cutthroat trout have the most complex life history of any fish in the system. Recent, continuing studies at Auke Creek and Auke Lake have produced world-class information on these fish. Anecdotal information indicates that the pre-1960 population of cutthroat trout in Auke Lake was larger than it is now. Cutthroat trout have been counted during the downstream migration since 1979, and during upstream migration since 1996. Mature fish migrating downstream were spawned in 1981-2, 1985-6, and 1991 and 1993 for hatchery incubation. The resulting progeny were fin marked and stocked in Auke Lake. Lake stocked, hatchery fish were observed in downstream migrations since 1982 (Table 6).

In 2000, a total of 250 cutthroat trout were counted during the downstream migration. This included 249 wild and 1 hatchery fish (Table 6). The number of downstream migrant cutthroat trout at Auke Creek have been in a decreasing mode since 1993; and the 2000 count is less than the average of 260 (Figure 25).

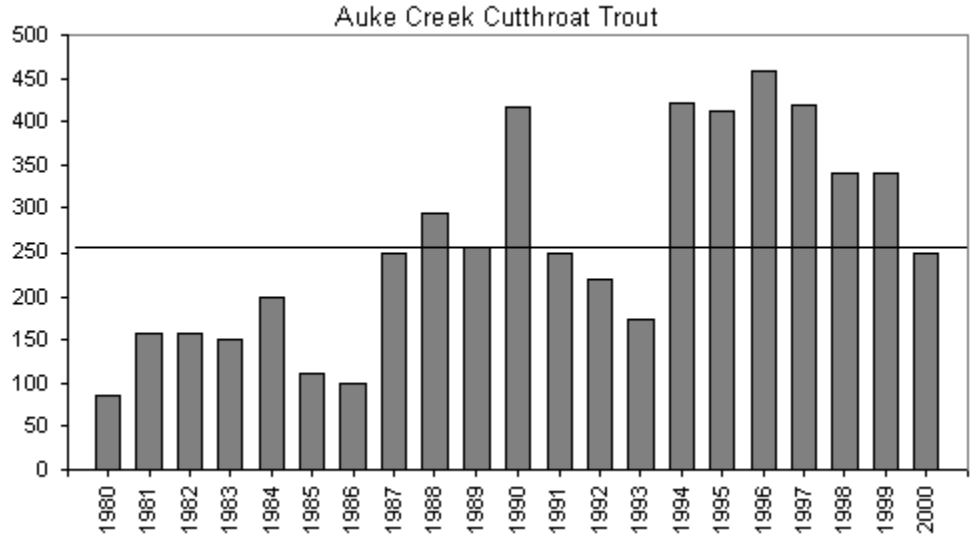

Figure 25. Downstream migrant wild cutthroat trout at Auke Creek, 1980-2000. The horizontal line is the average: 260.

In the downstream migration, the first cutthroat was captured March 20, and the last was captured June 29 (Appendix 5). The midpoint of downstream migration was May 18 (Figure 26). All cutthroat were examined for a missing adipose fin, visible implant tags posterior to the eye or in the skin covering the anal fin rays, and dye marks on the ventral, pectoral or anal fins. Fish missing the adipose fin were checked electronically for a passive integrated transponder (PIT) tag. A total of 147 cutthroat trout were missing their adipose fin when they left Auke Lake this year, 103 were not marked. All fish missing the adipose fin in 2000 had a PIT tag. The marked fish included 111 wild and 1 lake stocked fish that were tagged

before 2000, and 35 that were tagged in Auke Lake during the lake population project in spring 2000. Of the 103 unmarked fish, 100 were marked by excision of the adipose fin, and tagged with an individually numbered PIT tag, then released. Three unmarked fish were released without a mark or tag. All cutthroat trout were measured for length at time of downstream migration. The larger fish migrated earlier than smaller ones, and the average weekly size during the migration decreased from about 350 mm to about 225 mm (Figure 27). Overall, the average length of wild fish was 275 mm.

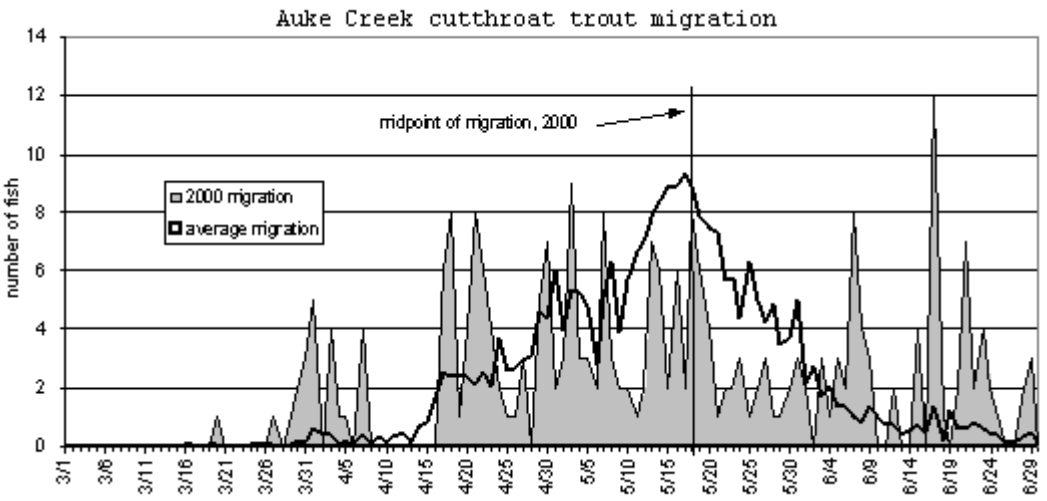

Figure 26. Average and 2000 downstream migration timing of wild cutthroat trout at Auke Creek. The average migration is for 1980 through 1999.

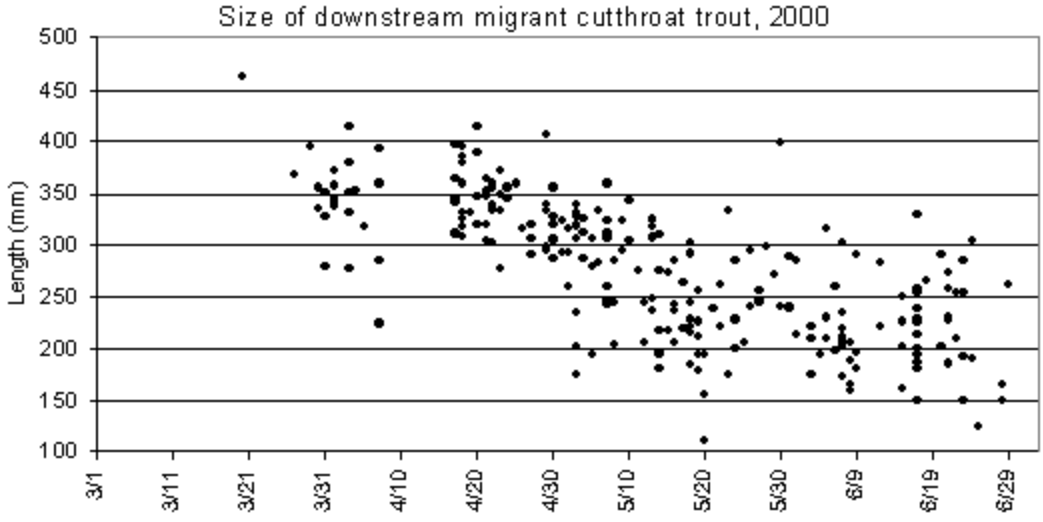

Figure 27. Size of wild cutthroat trout at Auke Creek, 2000.

All upstream migrant cutthroat in 2000, 105, were examined for adipose clips and visible implant and PIT tags before release upstream. This was the lowest number of upstream migrant cutthroat on record. The 1997-99 counts were 467, 361, and 205, respectively. No cutthroat migrated upstream in August, 39 did so in September, 61 were in October, and 5 in November (Appendix 6). In 2000, 37 cutthroat trout captured during upstream migration were adipose marked and had a PIT tag, and 68 were unmarked. One PIT tagged fish that returned to Auke Creek in 2000 had migrated downstream in 1999, and did not return that year, but overwintered elsewhere. Marine residence, seasonal growth, and growth rate between down- and upstream migration in 2000 were determined from PIT tagged fish. On average, marine residence of cutthroat trout was 145 days (range 12-193 days). Average seasonal growth was 42 mm (range 8-90 mm)(Figures 28 and 29). Average growth rate was 0.31 mm/day (range 0.06-0.67 mm/day).

Six steelhead trout were counted in the downstream trap, and 4 in the upstream trap. Steelhead migrated downstream between May 8-18, and upstream between October 2-6. Lengths ranged from 165-200 mm.

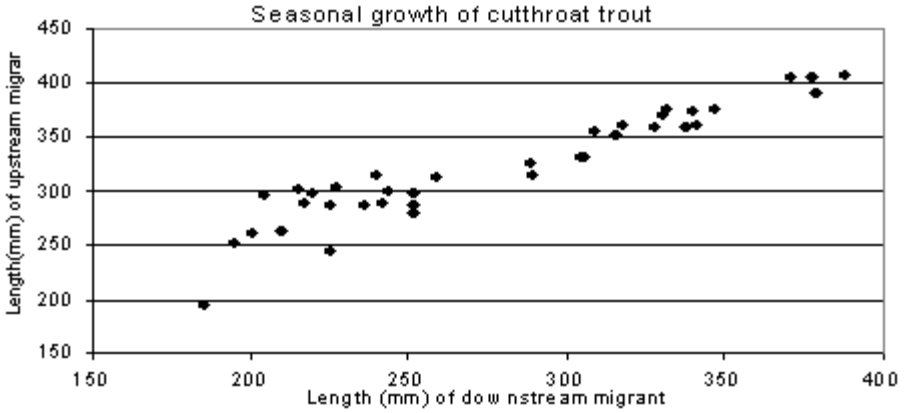

Figure 28. Size of individually tagged cutthroat trout at downstream and upstream migration at Auke Creek, 2000.

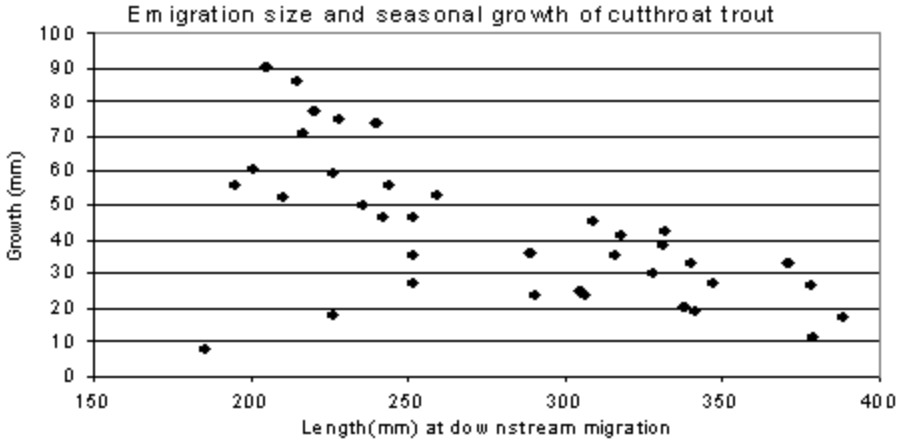

Figure 29. Relation of size at emigration and seasonal growth of cutthroat trout at Auke Creek, 2000.

Table 6. Number of downstream migrant wild and hatchery cutthroat trout at Auke Creek.

year	wild	hatchery	total
1980	85	n.a.	85
1981	157	n.a.	157
1982	157	n.a.	157
1983	150	78	228
1984	198	104	302
1985	112	49	161
1986	99	39	138
1987	251	691	942
1988	294	396	690
1989	258	152	410
1990	417	89	506
1991	250	23	273
1992	219	7	226
1993	174	16	190
1994	422	9	431
1995	412	58	470
1996	459	140	599
1997	418	82	500
1998	340	34	374
1999	340	11	351
2000	249	1	250
mean	260	110	354

n.a.= no hatchery fish produced before 1983

Chinook Salmon

Chinook salmon are not native to the Auke Lake system. Chinook captured at Auke Creek are hatchery fish from releases of juveniles in the Juneau area, including Auke Bay near the mouth of Auke Creek. These releases began as a 3-year cooperative study in 1986 to examine survival and homing and straying of hatchery chinook. The original study plan and fish transport permit required that all chinook be killed when they entered Auke Creek. This was to prevent the possible chinook-sockeye disease interactions, particularly infectious hematopoietic necrosis virus. The project continues under an arrangement between Sport Fish Division, ADF&G, and Gastineau Hatchery.

At Auke Creek, chinook have been captured at the weir since 1986, and classified as mini-jacks or adults, based on body size and ocean residence. Mini-jacks are males, generally ≤ 250 mm fork length, that mature and return to fresh water the same year they were released as smolts. Adults are ≥400 mm and remain at large for one year or more. At the weir, chinook are killed and examined for a missing adipose fin. The heads from all marked fish are sent to the ADF&G tag lab.

A total of 392 chinook salmon were captured at Auke Creek in 2000, including 15 mini-jacks and 377 adults (1-ocean or older) (Table 7). The number of chinook adults was the third highest at Auke Creek (Figure 30). Chinook adults entered Auke Creek in response to increased stream flow, mostly during the last week of July and first and last weeks of August (Appendix 6). Heads from 36 marked adults, were sent to the ADF&G tag lab. No marked mini-jacks were captured at Auke Creek this year. All chinook were offered to local charities.

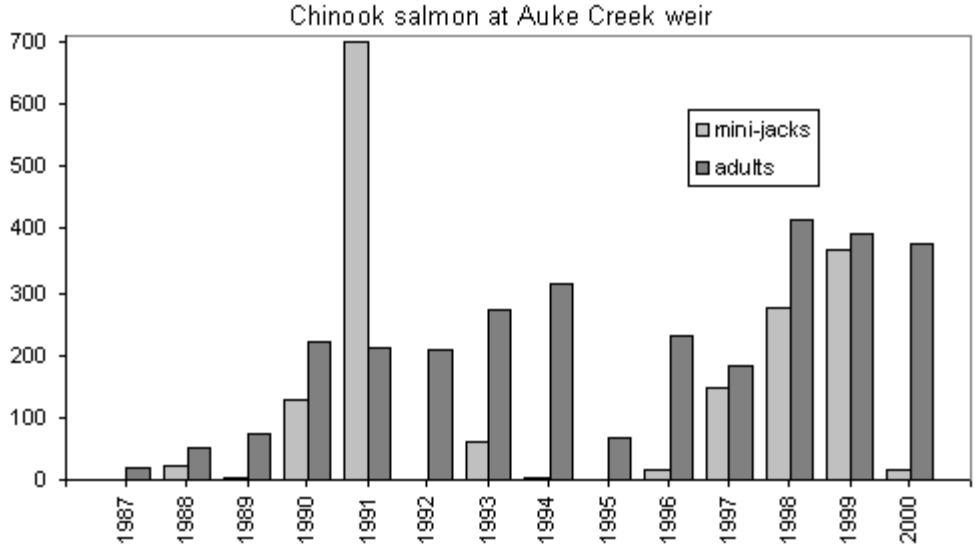

Figure 30. Number of chinook mini-jacks and adults at Auke Creek, 1987-2000.

Table 7. Number of adipose marked and unmarked chinook salmon at Auke Creek, 1987-2000.

	mini-jacks			adults		
year	marked	unmarked	total	marked	unmarked	total
1987	0	0	0	19	0	19
1988	15	6	21	50	0	50
1989	0	4	4	53	21	74
1990	36	91	127	132	89	221
1991	239	460	699	96	117	213
1992	0	1	1	52	158	210
1993	22	40	62	62	210	272
1994	1	1	2	91	223	314
1995	0	1	1	20	49	69
1996	1	15	16	87	143	230
1997	23	126	149	42	141	183
1998	45	231	276	69	347	416
1999	41	326	367	49	343	392
2000	0	15	15	36	341	377
mean	30	94	124	61	156	217

APPENDICES

Appendix 1. Downstream migrant wild salmonids at Auke Creek, 1961-2000. The sockeye average is 1980-2000. (-- = no data)

Year	Sockeye Salmon Smolts	Pink Salmon Fry	Chum Salmon Fry	Coho Salmon Smolts	Dolly Varden	Cut-throat Trout
1961	90,000	--	--	--	--	--
1964	62,389	--	--	--	--	--
1965	--	--	--	--	--	--
1966	--	--	--	--	--	--
1967	--	--	--	--	--	--
1968	35,737	--	--	--	--	--
1969	--	--	--	--	--	--
1970	--	--	--	--	6,249	--
1971	--	--	--	--	--	--
1972	--	157,189	--	--	--	--
1973	--	73,900	--	--	--	--
1974	15,399	277,624	--	--	--	--
1975	59,370	247,091	--	--	--	--
1976	35,769	108,195	--	--	--	--
1977	8,862	119,442	0	--	--	--
1978	--	129,714	0	--	--	--
1979	--	23,270	0	--	--	-
1980	25,299	74,047	0	9,951	3,132	85
1981	9,183	110,552	0	6,953	6,461	157
1982	1,619	119,548	0	6,483	4,172	157
1983	3,170	164,784	0	6,634	3,718	150
1984	20,251	169,552	0	7,012	4,512	198
1985	11,747	110,001	7,198	5,601	3,052	112
1986	14,500	123,887	825	5,666	4,351	99
1987	17,598	43,502	14,039	7,166	6,444	251
1988	13,812	113,061	8,091	7,888	6,770	294
1989	11,187	116,870	13,750	6,911	7,230	258
1990	16,983	96,651	1,916	5,132	6,426	417
1991	25,872	242,772	759	5,764	5,559	250
1992	13,248	98,447	4,783	6,262	6,839	219
1993	33,616	237,073	47	8,103	5,075	174
1994	32,009	11,603	137	7,416	7,604	422
1995	17,857	88,197	5	4,869	11,728	412
1996	7,069	41,359	4,981	3,963	11,323	459
1997	13,856	31,092	8,307	6,207	10,506	418
1998	22,496	60,785	735	7,430	7,532	336
1999	25,244	53,533	1,269	5,491	6,393	340
2000	13,699	132,075	1,337	4,891	5,254	249
average	16,682	116,407	4,261	6,466	6,379	260

Appendix 2. Salmon adults captured at Auke Creek weir. Hatchery fish are included: sockeye 1977-79, 1989-95; pink 1973-94, 1996, 1998-2000; chum 1979-91, 1994-2000; chinook in all years.

Year	Sockeye	Pink	Chum	Coho	Chinook
1963	6,391				
1964	5,465				
1965	6,889				
1966	10,986				
1967	5,909	3,761	78		
1968	7,164	2,638	76		
1969	6,131				
1970	7,034				
1971	7,673	2,090	10	308	
1972	9,166	1,768	47	967	
1973	8,259	4,948	27	399	
1974	4,371	6,260	5	768	
1975	11,461	14,261	10	1,310	
1976	6,153	2,525	16	262	
1977	16,683	15,848	24	868	
1978	3,177	18,410	17	683	
1979	6,022	19,003	13	566	
1980	4,564	20,187	118	698	
1981	4,089	14,450	109	646	
1982	1,334	10,658	251	447	
1983	1,805	24,827	310	694	
1984	975	5,271	1,927	651	
1985	240	26,317	1,852	942	
1986	952	2,305	1,392	454	
1987	2,827	7,914	1,884	668	19
1988	1,337	8,140	1,093	756	50
1989	2,508	5,016	304	502	74
1990	3,383	21,806	270	697	221
1991	5,425	6,878	174	820	213
1992	4,853	22,101	130	1,020	210
1993	9,113	1,696	121	859	272
1994	6,993	22,533	868	1,437	314
1995	5,261	1,548	1,327	460	69
1996	5,995	4,374	6,781	515	230
1997	4,671	2,774	444	609	183
1998	2,068	2,879	247	862	416
1999	1,571	30,097	386	845	392
2000	2,480	2,491	4,444	683	377
average	5,299	10,493	774	713	217

Appendix 3. Dates of ice-out on Auke Lake.

year	date
1960	April 26
1961	
1962	
1963	April 29
1964	
1965	
1966	
1967	May 11
1968	April 23
1969	April 30
1970	March 24
1971	May 13
1972	May 20
1973	April 30
1974	May 7
1975	April 8
1976	April 28
1977	February 1
1978	April 20
1979	April 24
1980	April 19
1981	March 26
1982	May 14
1983	April 18
1984	March 29
1985	April 26
1986	April 28
1987	March 30
1988	April 5
1989	April 28
1990	April 8
1991	April 29
1992	March 18
1993	April 23
1994	April 11
1995	April 25
1996	April 22
1997	April 26
1998	March 31
1999	May 5
2000	April 2
average	April 18

Appendix 4. Daily water temperatures at Auke Creek, 2000.

day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2.5	1.8	2.6	4.0	7.2	13.2	15.8	13.7	14.2	9.6	6.2	4.2
2	2.5	1.8	2.6	4.0	7.2	14.0	15.6	15.1	13.5	9.3	6.1	4.3
3	2.5	1.8	2.5	4.0	7.9	14.8	15.6	16.8	13.4	9.0	6.2	4.2
4	2.5	1.8	2.6	4.0	8.0	15.7	15.9	16.4	13.4	8.7	6.0	4.1
5	2.4	1.8	2.7	4.0	8.5	15.7	17.0	16.3	12.8	9.0	5.9	4.2
6	2.2	1.8	2.7	4.0	9.0	15.5	17.0	16.1	12.8	9.0	5.8	4.2
7	2.0	1.8	2.6	4.0	9.8	15.4	16.9	16.0	12.0	8.8	5.8	4.1
8	2.0	1.8	2.8	4.0	9.8	14.9	17.1	16.0	12.0	8.8	5.8	4.0
9	2.0	1.8	3.0	4.0	10.7	15.1	17.8	15.1	12.0	8.5	5.5	3.5
10	2.0	1.8	3.0	4.0	11.2	15.1	18.1	16.0	12.0	8.5	5.4	3.3
11	1.8	1.8	3.1	4.1	11.7	16.0	17.3	17.0	11.6	8.5	5.4	3.0
12	1.7	1.8	3.3	4.2	12.2	15.5	17.2	17.0	11.8	8.7	5.4	2.6
13	1.6	1.8	3.2	4.2	12.2	16.6	17.2	17.0	11.6	8.5	5.3	2.1
14	1.4	1.8	3.2	4.2	11.7	15.9	17.5	16.4	10.8	8.6	5.2	2.2
15	1.4	1.8	3.1	4.3	11.5	15.4	17.4	15.0	11.0	8.4	5.2	1.6
16	1.4	2.0	3.2	4.9	11.4	15.0	17.0	15.0	10.7	8.1	5.0	1.8
17	1.4	2.0	3.2	5.0	11.4	13.7	17.0	14.8	10.5	8.1	5.0	1.6
18	1.4	2.0	3.7	5.2	11.4	13.7	16.6	15.0	10.6	8.0	5.0	1.6
19	1.4	2.0	3.8	5.2	10.3	13.5	16.1	15.8	10.8	7.8	5.0	1.9
20	1.4	2.0	3.8	5.5	10.3	14.0	15.2	14.5	10.4	7.8	4.9	1.6
21	1.4	2.0	3.5	5.1	10.0	13.0	15.2	14.0	10.2	7.7	5.1	1.4
22	1.4	2.1	3.5	5.5	9.5	12.8	15.2	13.0	10.5	7.6	5.2	1.2
23	1.4	2.0	3.4	5.5	9.0	13.9	14.9	13.0	10.4	7.5	5.0	1.6
24	1.5	2.3	3.4	5.6	9.1	14.9	14.0	13.5	11.0	7.6	4.9	1.5
25	1.5	2.4	3.6	5.6	9.5	16.0	14.0	13.5	11.3	7.4	4.8	1.5
26	1.6	2.5	3.5	6.3	9.5	17.0	14.2	13.5	11.8	7.2	4.7	1.5
27	1.7	2.5	3.4	6.4	10.7	17.7	14.4	14.0	11.1	7.1	4.7	1.5
28	1.7	2.5	3.6	6.9	11.5	17.2	14.0	13.6	11.0	6.8	4.6	1.5
29	1.8	2.5	3.8	7.2	11.2	16.3	14.1	13.7	10.7	6.7	4.2	1.5
30	1.7		4.0	6.1	11.0	16.2	14.1	14.4	10.1	6.6	4.3	1.5
31	1.7		3.9		12.0		14.0	14.0		6.6		1.6

Appendix 5. Monthly totals and daily counts of downstream migrant wild salmonids at Auke Creek, 2000.

	Pink fry	Coho smolts	Sockeye smolts	Chum fry	Dolly Varden	Cut-throat	Steel-head
March	15,252	0	0	413	39	8	0
April	111,712	0	0	918	1,194	71	0
May	5,111	4,487	10,695	6	3,990	102	4
June	0	404	3,004	0	31	68	2
total	132,075	4,891	13,699	1,337	5,254	249	6
Mar 1	0			0			
2	6			0			
3	8			0			
4	40			0			
5	22			0			
6	34			5			
7	59			1			
8	46			2			
9	71			1			
10	70			6			
11	34			0			
12	14			1			
13	106			1			
14	123			6			
15	381			13			
16	145			6			
17	222			6			
18	285			17			
19	400			17			
20	408			11	1	1	
21	366			14			
22	675			10			
23	947			22	1		
24	935			13	2		
25	1098			27			
26	1076			22			
27	2062			21	6	1	
28	1468			76	5		
29	1236			32	13	1	
30	1346			31	5	2	
31	1569			52	6	3	
Apr 1	3482			144	29	5	
2	5759			102	29	0	
3	3402			37	28	4	
4	2429			51	20	1	
5	2536			42	28	1	
6	3111			82	18	0	
7	3092			92	21	4	
8	4026			72	29	0	
9	6263			41	34	0	
10	2711			18	50	0	
11	2184			27	8	0	
12	2730			11	2	0	
13	3609			49	21	0	
14	2722			14	5	0	
15	3592			23	2	0	
16	4127			9	1	0	
17	3719			14	47	6	
18	2984			8	76	8	
19	4675			17	26	1	
20	3653			14	15	4	
21	5500			8	76	8	
22	7098			5	65	6	
23	4857			12	68	4	
24	3768			6	19	2	
25	4251			6	22	1	

	Pink fry	Coho smolts	Sockeye smolts	Chum fry	Dolly Varden	Cut-throat	Steel-head
Apr 26	3188			3	19	1	
27	3046			3	22	3	
28	4401			3	67	0	
29	3358			5	135	5	
30	1439			0	212	7	
May 1	1333	1	1	2	57	2	
2	939	2		2	48	3	
3	745	2	1	2	345	9	
4	539	10	1	0	491	3	
5	545	1	0		398	3	
6	327	3	0		149	2	
7	187	8	2		96	8	
8	153	12	1		195	3	
9	115	17	3		26	2	
10	110	30	11		410	2	1
11	51	71	22		161	1	
12	37	146	39		131	2	
13	18	291	48		425	7	
14	8	409	89		77	6	
15	3	308	23		129	2	
16	1	528	253		184	6	
17	0	307	422		100	2	
18		154	274		153	8	
19		498	1341		193	6	1
20		226	1002		38	4	1
21		248	640		32	1	
22		267	808		39	2	1
23		143	996		7	2	
24		133	686		20	3	
25		124	611		10	1	
26		66	375		11	2	
27		105	777		14	3	
28		61	632		21	1	
29		91	404		8	1	
30		86	698		14	2	
31		139	535		8	3	
June 1		61	400		6	2	
2		59	467		6		
3		63	468		8	3	
4		50	463			1	
5		39	372			3	
6		29	167		1	2	
7		16	186		1	8	
8		21	31		1	4	1
9		17	51		1	3	
10		9	49				
11		13	59				
12		3	55		2	2	
13		4	17				
14		3	4				
15			9		1	4	
16		1	5				
17		1	11			12	1
18		3	33		0	1	
19		1	31		1	0	
20		3	18		0	2	
21		4	15		1	7	
22		0	25		0	2	
23		1	15		0	4	
24		1	20		0	2	
25		0	11		0	1	
26		0	8		0	0	
27		1	5		2	0	
28		1	3		0	2	
29		0	6		0	3	
total	132,075	4,891	13,699	1,337	5,254	249	6

Appendix 6. Monthly totals and daily counts of upstream migrant salmonids at Auke Creek, 2000. Hatchery pink, chum, and chinook salmon are included.

		Sockeye adults	Pink adults	Chum adults	Coho adults	Chinook adults	Dolly Varden	Cut-throat	Steel-head
June		262	0	0	0	0	92	0	0
July		1,871	60	2,586	0	105	430	0	0
August		319	1,886	1,858	0	240	911	0	0
Sept.		28	545	0	647	32	1,844	39	0
Oct.		0	0	0	36	0	369	61	4
Nov.		0	0	0	0	0	0	5	0
total		2,480	2,491	4,444	683	377	3,665	105	4
June	29	173					80		
	30	89					12		
July	1	9					0		
	2	21					0		
	3	0					0		
	4	67					0		
	5	0					0		
	6	101					0		
	7	0					0		
	8	0					0		
	9	0					0		
	10	0					0		
	11	0					0		
	12	0					0		
	13	0					0		
	14	0					0		
	15	0					0		
	16	0					0		
	17	0					0		
	18	0					0		
	19	0		0			0		
	20	1,011	0	16		0	174		
	21	307	1	29		3	19		
	22	75	0	28		0	3		
	23	95	1	43		1	6		
	24	102	4	169		16	63		
	25	41	7	297		18	61		
	26	17	9	398		14	35		
	27	9	13	336		28	23		
	28	4	4	329		0	18		
	29	3	3	205		3	2		
	30	3	5	220		16	0		
	31	6	13	516		6	26		
Aug.	1	2	7	289		14	5		
	2	17	8	155		20	23		
	3	7	3	161		5	3		
	4	4	0	181		11	4		
	5	3	2	77		5	4		
	6	0	1	88		3	7		
	7	3	3	95		0	15		
	8	0	2	115		0	5		
	9	1	2	147		3	2		
	10	0	3	76		2	4		
	11	0	1	24		0	4		
	12	1	4	50		0	2		

	Sockeye adults	Pink adults	Chum adults	Coho adults	Chinook adults	Dolly Varden	Cut-throat	Steel-head
Aug. 13	0	5	46		1	4		
14	3	8	46		0	25		
15	16	46	134		19	65		
16	26	47	30		10	7		
17	9	37	20		0	19		
18	0	26	11		5	8		
19	2	50	7		4	8		
20	5	76	6		6	25		
21	94	322	31		50	136		
22	82	496	16		17	269		
23	31	275	21		29	121		
24	7	102	14		12	71		
25	0	56	9		3	14		
26	0	50	4		7	10		
27	0	41	1		10	2		
28	3	47	0		1	15		
29	0	27	3		0	10		
30	2	46	1		0	7		
31	1	93	0		3	17		
Sept. 1	5	68			1	10		
2	1	45			13	57		
3	1	33			6	38		
4	1	74			2	8		
5	8	200			4	291		
6	7	44			3	116		
7	2	41		1	0	163		
8	0	10		0	2	133		
9	0	10		0	1	25		
10	1	3		0	0	33		
11	0	4		2		59		
12	0	3		2		33		
13	0	3		44		10		
14	0	2		78		17		
15	0	2		71		35		
16	0	0		50		39		
17	2	1		91		253		
18	0	1		120		269	0	
19		0		68		66	2	
20		1		20		52	4	
21		0		10		49	0	
22				11		15	9	
23				11		11	5	
24				13		12	0	
25				11		7	3	
26				4		5	2	
27				5		3	3	
28				6		9	11	
29				18		18	0	
30				11		8	0	
Oct. 1				4		6	0	0
2				3		20	10	1
3				0		4	2	0
4				2		4	3	1
5				1		1	0	0

	Sockeye adults	Pink adults	Chum adults	Coho adults	Chinook adults	Dolly Varden	Cut-throat	Steel-head
Oct. 6				5		10	14	2
7				7		7	2	0
8				6		4	1	
9				5		22	2	
10				0		6	0	
11				0		3	1	
12				1		7	2	
13				1		48	8	
14				0		16	1	
15				1		24	3	
16				0		6	2	
17						5	0	
18						2	0	
19						38	1	
20						27	4	
21						14	1	
22						0	0	
23						34	2	
24						2	0	
25						10	0	
26						6	0	
27						6	1	
28						1	0	
29						25	1	
30						3	0	
31						8	0	
Nov. 1						3	0	
2						3	2	
3						2	2	
4						5	0	
5						4	0	
6						1	0	
7						1	1	
total	2,480	2,491	4,444	683	377	3,665	105	4