AUKE CREEK WEIR
2001 ANNUAL REPORT

Operations, Fish Counts, and Historical Summaries

by

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Auke Creek spawning channels during extreme low water, July 3, 1968

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Auke Creek Weir 2001 Annual Report

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 1987 as a result of off-site releases of juveniles from other hatcheries. In 1961, the U.S. Bureau of Commercial Fisheries, predecessor of the National Marine Fisheries Service, began salmon research at Auke Creek, 19 km north of Juneau, Alaska. Fyke nets were used that year to estimate the production of sockeye salmon smolts from Auke Lake. Downstream migrant sockeye smolt counts are available for some years between 1961 and 1980, and continually since 1980. Pink salmon fry populations in Auke Creek were estimated annually, 1972-79, and counted at Auke Creek weir since 1980. Dolly Varden and cutthroat trout were counted in 1970, and all downstream migrants were counted since 1980 (Appendix 1). Weir counts of sockeye salmon adults at Auke Creek began in 1963; pink and chum salmon were counted 1967-68, and all fish were counted since 1971 (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. An 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 2001. 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 includes information on releases and returns of hatchery fish in 2001.

The downstream weir at Auke Creek was operated from March 1 through June 29 and captured 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 and chum salmon fry, were captured March 2. Coho salmon smolts and cutthroat trout were marked or tagged during the migration. Mild winter temperatures delayed the freeze-up of Auke Lake. The lake surface was frozen from December 21-28, 2000, and did not freeze again until February 11, 2001. Auke Lake was ice free April 6, earlier than the average date, April 18 (Figure 1, Appendix 3).

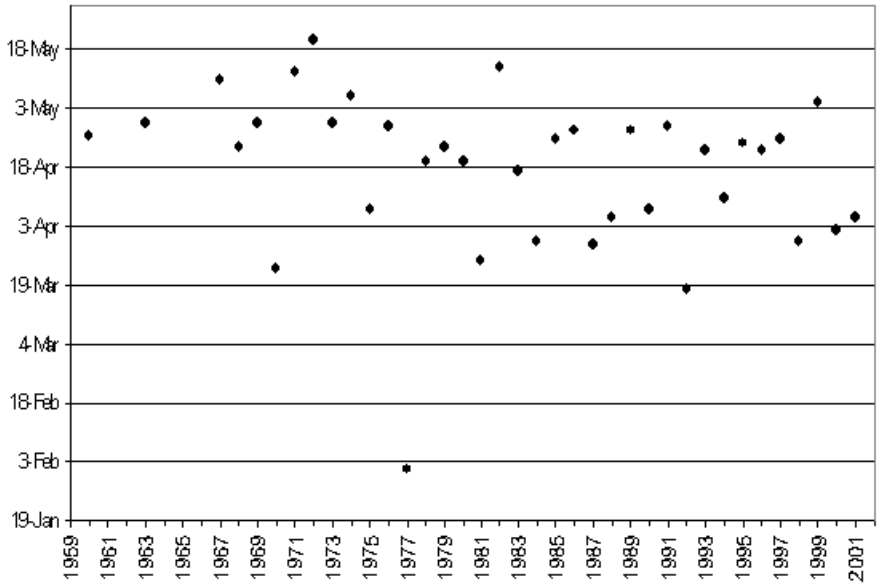

Figure 1. Dates of ice-out on Auke Lake, the average is April 18.

The upstream weir was installed June 29 to capture all immigrants. 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, 0.3 x 46 x 91 cm, with 1.3 x 10 cm 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. Weir operations ceased October 31, and the weir was removed from operation. Five pink/chum hybrids were captured in the upstream weir in 2001. Auke Lake was frozen over by November 28, 2001. Water temperature was measured daily at the weir site (Figure 2, Appendix 4).

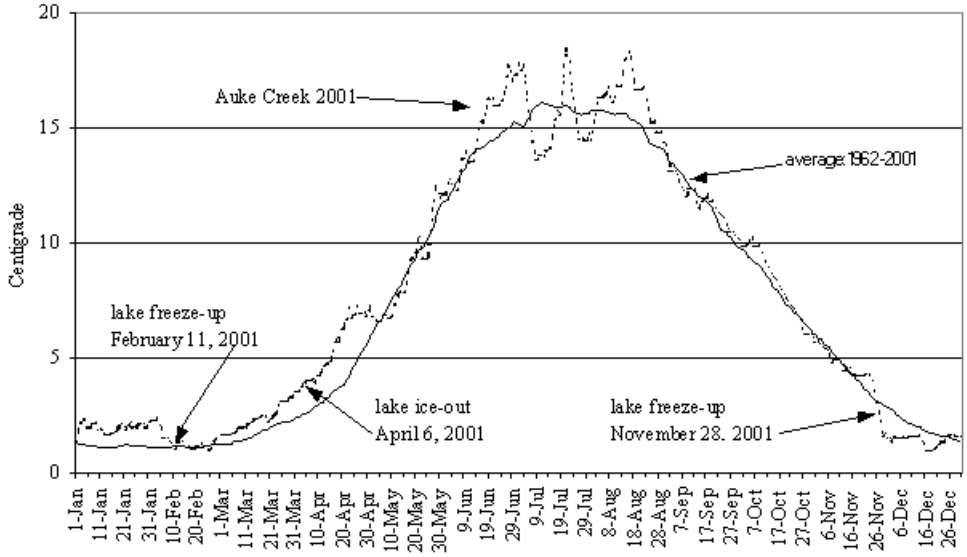

Figure 2. Daily and average water temperatures in Auke Creek, and dates of freeze-up and ice-out on Auke Lake.

Pink Salmon

Pink salmon spawn throughout the Auke Lake system, mainly in Auke Creek and tributaries to Auke Lake, and in the intertidal area downstream from the weir site. 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. Before 1963, Auke Creek upstream from the weir was mainly small rock and boulder substrate on bedrock, and there was probably limited 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. The original streambed substrate was removed down to bedrock before the channels were built. The spawning channels were a series of 20x20cm timbers bolted together to form dams about 1 m high. The timbers were buttressed from the downstream side by concrete-filled sandbags. Each dam was filled with washed rock, mostly 5-10cm cobbles, purchased locally. A large amount of the cobbles have been washed out of the channels by freshets, and the upstream streambed is reverting to bedrock and large cobble substrate. The streambed downstream from the weir is intertidal, and is mainly boulders, broken shale, and smaller gravel on bedrock. There are no annual counts of pink salmon runs in Auke Creek before the channels were built. Before the first return of hatchery pink salmon in 1973, the wild runs averaged nearly 2,600 fish.

Pink salmon fry populations were estimated in Auke Creek since 1972. Hydraulic censuses in the freshwater and intertidal areas provided estimates through 1980. Weir counts of fry leaving the freshwater area began in 1980, and the intertidal estimates were discontinued. The accuracy of hydraulic censuses of fry populations in Auke Creek is not known. The cobble and boulder substrate in Auke Creek makes it difficult to efficiently operate hydraulic sampling equipment, and the confidence intervals of fry estimates are large. The hydraulic censuses showed the average estimates and confidence intervals of freshwater and intertidal populations were 137,000 ± 60,000, and 63,000 ± 29,000 fry, respectively. Average fry production in the freshwater area, 1972-2001, is 114,577.

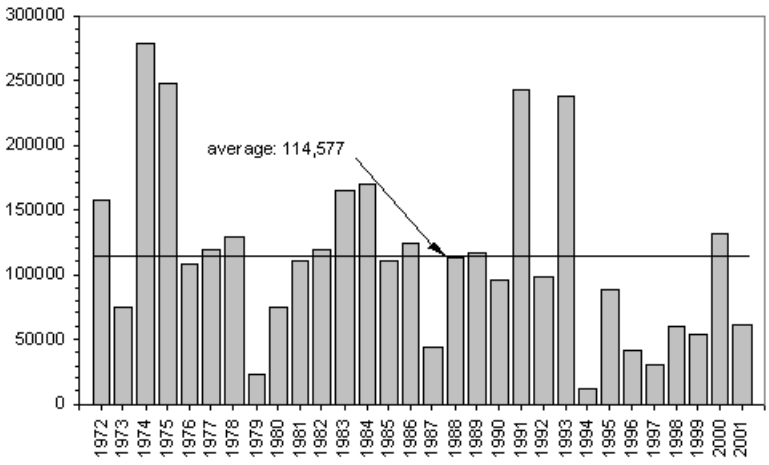

Figure 3. Number of wild pink salmon fry, Auke Creek, 1972-2001.

In 2001, 61,504 pink salmon fry were counted during the downstream migration from the freshwater area (Table 1). This was less than in 2000, and about one-half the average (Figure 3). Over 12,000 fry, about 20% of the 2001 population, migrated in March. Most fry migrated in April, when the average daily count was about 1,600 (Figure 4, Appendix 5). Daily fry counts decreased in late April, and only 18 fry were captured in May. The median date of the 2001 downstream migration, April 9, was the third 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 2001. A University of Alaska graduate student project produced fry for laboratory studies, and none were knowingly released in Auke Creek in 2001.

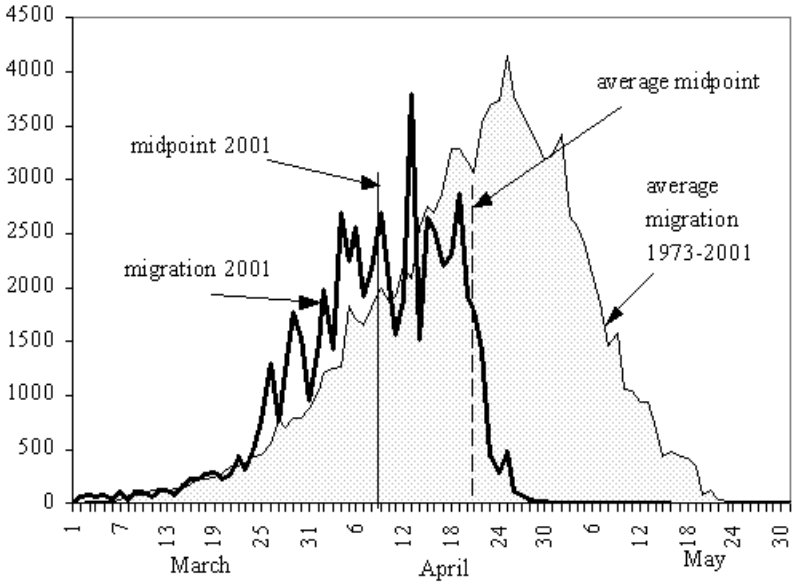

Figure 4. Daily migration of pink salmon fry at Auke Creek, 2001, and the long-term average.

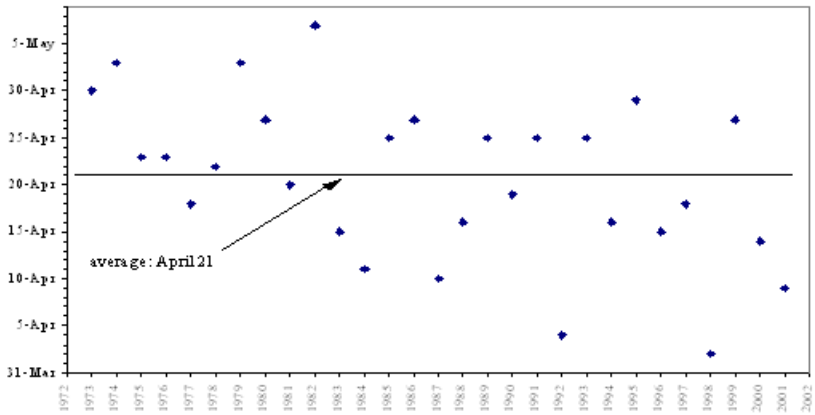

Figure 5. Median migration dates of pink salmon fry at Auke Creek, 1973-2001.

Pink salmon are the work horse of hatchery projects at Auke Creek. Hatchery-reared fry were released annually since 1972, except 1994, 1996, and 2001 (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. Pink salmon adults from genetic projects were not knowingly released in Auke Creek.

Pink salmon adults were counted at Auke Creek in 1967 and 1968, and annually since 1971. In 2001, 8,323 pink salmon adults, 7,857 wild and 466 hatchery, were captured at Auke Creek weir (Figure 6). Wild fish were released to spawn in the creek, and all hatchery

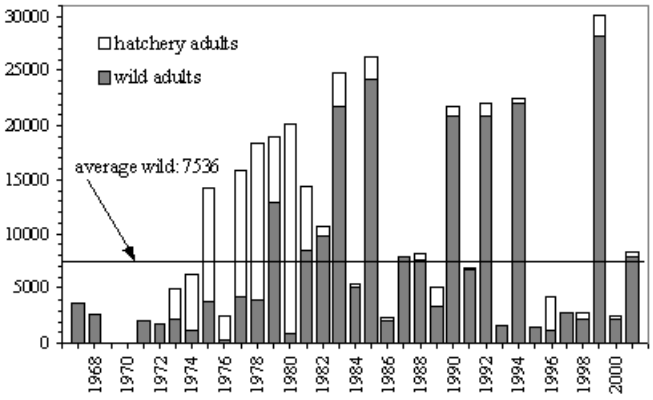

Figure 6. Wild and hatchery pink salmon at Auke Creek, 1967-68 and 1971-2001.

fish were killed for spawning or samples. University of Alaska staff spawned returning hatchery pink salmon to provide fry for laboratory experiments. No hatchery fry will be released.

The 2001 run of wild fish was slightly greater than average for Auke Creek, and about one-fourth of the 1999 parent brood. The average run at Auke Creek is 7,536 wild pink salmon, and 10,427 when hatchery fish are included (Table 1). The average hatchery return is 3,533, although the average over the last two decades is 1,244. In 2001, pink salmon were

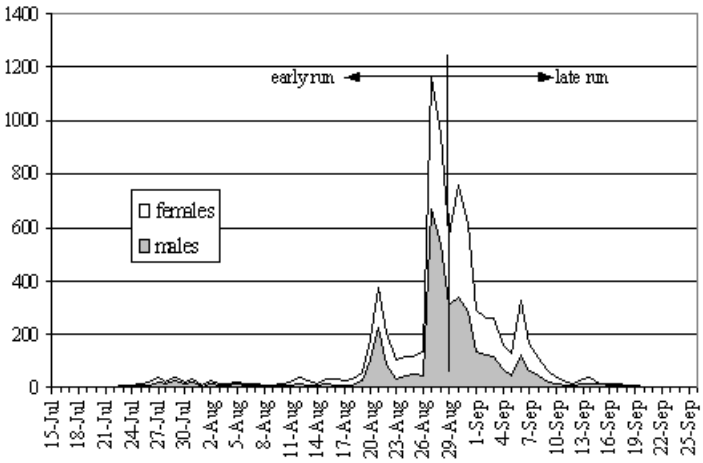

Figure 7. Upstream migration of wild Auke Creek pink salmon adults, 2001.

captured at the weir from late July through mid September (Appendix 6). Most of the fish, 6,085, entered Auke Creek during August, and 2,037 entered in September. The hatchery fish were late-run stock, and began upstream migration during high stream flow on August 28. Based on the increase in the proportion of bright, silver females with loose scales, 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 3,949 fish, 2,046 males and 1,903 females, and the late run 3,909 fish, 1,749 males and 2,160 females. The late run was 50% of the 2001 return, greater than the average of 38% over the last two decades. Before 1982, the late run averaged 70% of the return. Median dates of entire upstream migration during the last two decades are about 10 days earlier than before 1982 (Figure 8).

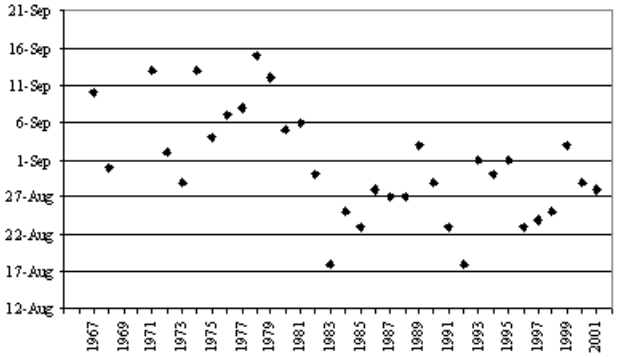

Figure 8. Median migration dates of pink salmon adults at Auke Creek..

Table 1. Number of wild and hatchery pink salmon fry and adults at Auke Creek.

	pink salmon fry			pink salmon adults		
Year	wild	hatchery	total	wild	hatchery	total
1967				3,761		3,761
1968				2,638		2,638
1969						
1970						
1971				2,091		2,091
1972	157,189	186,674	343,863	1,768		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		11,603	22,167	366	22,533
1995	88,197	774,589	862,786	1,548		1,548
1996	41,359		41,359	1,155	3,219	4,374
1997	31,092	40,074	71,166	2,774		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
2001	61,504		61,504	7,857	466	8,323
mean	114,577	232,543	323,866	7,536	3,533	10,427

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 from Auke Lake was first estimated in 1961 at 90,000 smolts. 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 smolt estimate is the highest on record, and estimates from 1962 through 1979 ranged from 8,862 to 62,389. Since 1980, the entire smolt population was counted at Auke Creek weir, and the number of wild smolts ranged from 1,619 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 in net pens in Auke Bay.

A total of 21,428 sockeye smolts were counted at the weir during the downstream migration in 2001. This was greater than the 1980-2001 average, and higher than in 2000 (Table 2). The average number of wild smolts produced in Auke Lake, 1980-2001, is 16,897 (Figure 9).

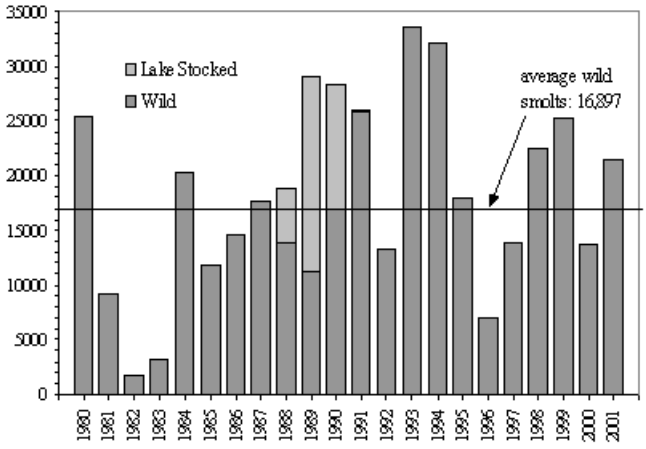

Figure 9. Wild and lake stocked sockeye salmon smolts leaving Auke Creek.

The downstream migration of sockeye smolts began in early May, and about 17,000 smolts migrated during the last two weeks of the month (Figure 10). The migration midpoint was May 27, 2 days later than in 2000. The last smolts were counted on June 29, although fewer than 200

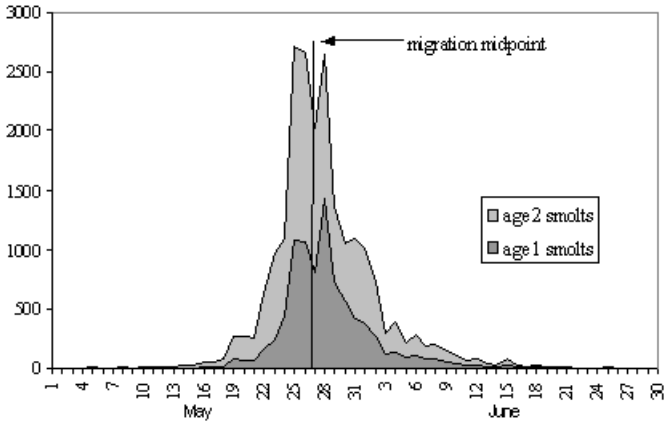

Figure 10. Daily migration of age-1 and -2 sockeye salmon smolts at Auke Creek, 2001.

left the lake during the last two weeks of the month (Appendix 5). All sockeye salmon smolts in 2001 were from natural spawning in the Auke Lake system. Scale analysis revealed that 41% of the smolts were age-1, 1999 brood, 8,754 fish, and 59% age-2, 1998 brood, 12,674 fish. In 1999 and 2000, age-1 smolts accounted for 91% and 27%, respectively, of the total migrations. The 1998 brood has completed the freshwater phase of its' life history, and produced a total of 16,429 smolts. Smolt production from the 1998 brood was only slightly less than the average production over the last two decades. The 1978-98 average brood production is 17,195 smolts. No wild sockeye smolts were marked or tagged in 2001, and no hatchery fish were produced.

The sizes of age-1 and -2 sockeye smolts leaving Auke Lake in 2001 were quite different. Age-1 smolts averaged 77 mm and 3.9 gm, and age-2 smolts were 131 mm and 19.6 g (Figure11). The long-term average for age-1 and -2 sockeye leaving Auke Lake is 75 and 107 mm, and 3.8 and 12.3 g, respectively.

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 2001 was 283 kg. This was the second highest biomass of Auke Lake smolts for years that data are available (Figure 12). The 2001 smolt biomass is nearly double the average of 146 kg, mainly because of the high number of large age-2 smolts. One measure of freshwater survival, the number of smolts produced per spawner, indicates that for Auke Lake sockeye during the last 20 brood years only 4 broods produced more than 10 smolts per spawner (Figure 13). The 1998 brood produced a total of 7.9 smolts per spawner. The average over the last 20 broods is 8.0 smolts. The 1999 brood has produced 5.6 age-1 smolts per spawner; and that production is expected to increase with the 2002 smolt migration.

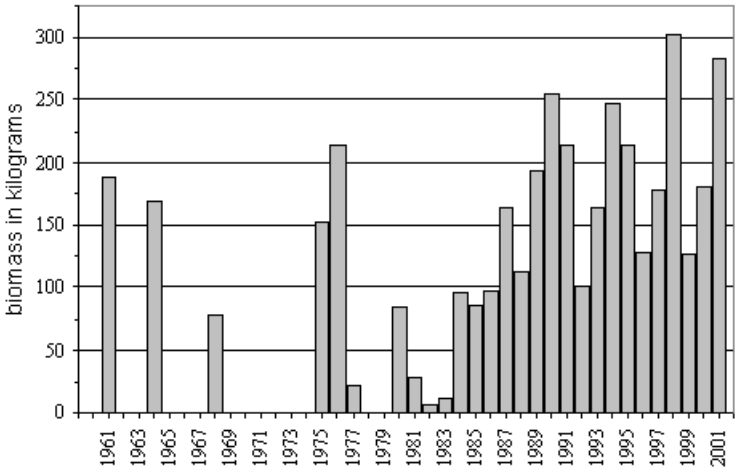

Figure 12. Total annual biomass of sockeye salmon smolts leaving Auke Lake.

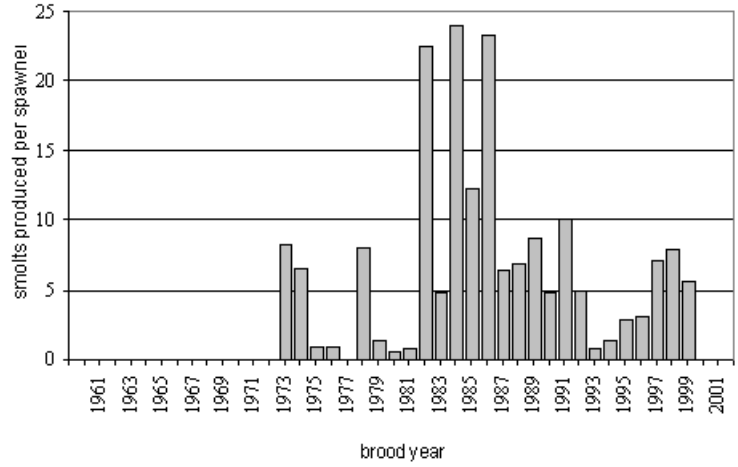

Figure 13. Number of smolts produced per spawner by brood year in the Auke Lake system. The 1999 brood has produced only age-1 smolts, and the 2000-01 broods have not produced any smolts yet.

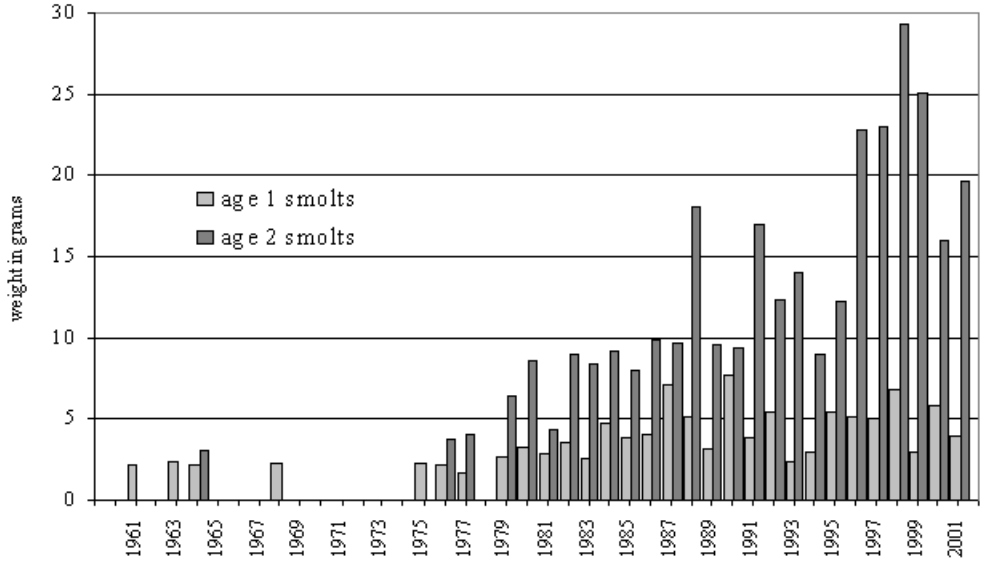

Figure 11. Average weight of sockeye smolts leaving Auke Lake,1962-2001.

Sockeye salmon adults were counted annually at Auke Creek since 1963. 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 1982, the average return of wild fish was about 2,500. Sockeye enhancement research at Auke Creek hatchery, which used Auke Lake sockeye from the 1973-74 and 1986-91 broods, boosted subsequent escapements. Progeny from enhancement programs produced 4,600 and 18,000 adult sockeye to the Auke Creek escapements in 1977-80 and 1990-95, respectively. No hatchery sockeye have returned to Auke Creek since the enhancement program ended in 1995.

In 2001, 3,963 adult and 46 jack sockeye salmon returned to Auke Creek (Table 2). This was the third highest wild run in 20 years, but less than the historical average for all years, 4,686 fish. Most sockeye adults migrated upstream in July, 3,483 fish, during periods of increased stream flow. Only 412 fish migrated after July, 267 in August and 145 in September (Appendix 6). Estimated marine survival, smolt to weir recovery of adults, for 2001 returns was 17%.

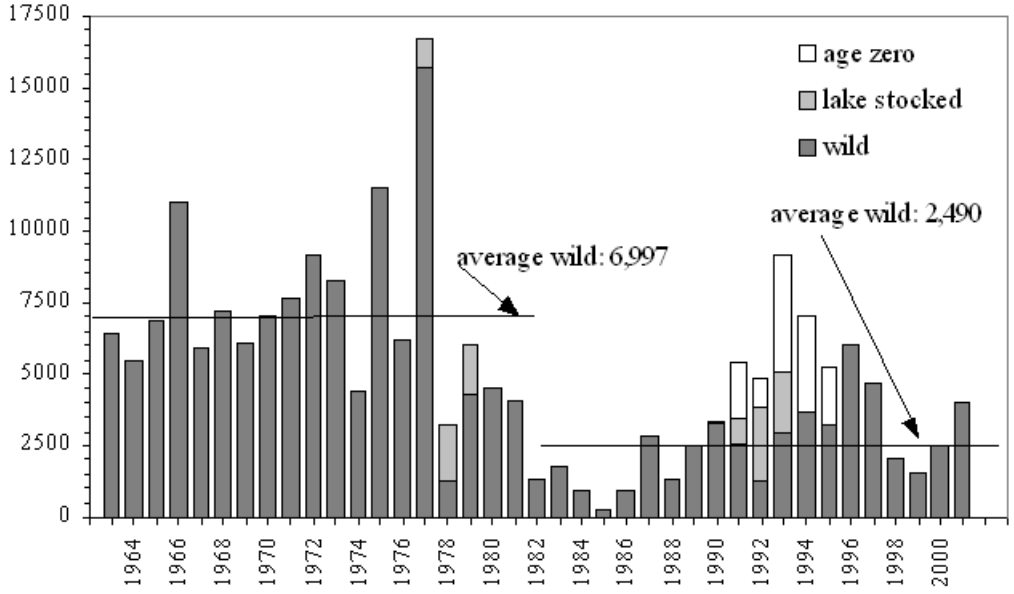

Figure 14. Wild and hatchery, age-0 and lake stocked, sockeye salmon adults at Auke Creek, 1963-2001.

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				
1962								
1963					6,391			6,391
1964	62,389			62,389	5,465			5,465
1965					6,889			6,889
1966					10,986			10,986
1967					5,909			5,909
1968	35,737			35,737	7,164			7,164
1969					6,131			6,131
1970					7,034			7,034
1971					7,673			7,673
1972					9,166			9,166
1973					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				8,291	1,271	1,906		3,177
1979					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			1,619	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
2001	21,428			21,428	3,963			3,963
mean[1]	16,897				4,686			5,266

[1]Mean number of wild smolts is from 1980-2001.

Chum Salmon

It is not known if chum salmon are native to Auke Creek or were originally strays from other local systems. Probably few chum salmon were ever produced in the Auke Lake system, although adults were observed in all spawning areas, including the intertidal. The first year chum salmon adults were counted at Auke Creek was 1967, and they were not counted in 1969-70. The average run to Auke Creek before NMFS hatchery experiments was 20 adults. 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 fry 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, and none spawned in the intertidal area. In those years all chums were spawned for hatchery incubation. Chum salmon adults, resulting from releases of Gastineau Hatchery fry at Amalga Harbor, have strayed into Auke Creek since 1994 (Figure 15). Chum salmon fry were observed during the 1972-76 downstream migrations, but were not counted. No fry were produced from natural spawning in Auke Creek from 1977-84.

All chum salmon captured at Auke Creek weir in 2001, 23,372 fry and 588 adults, were counted and released (Table 3). Most fry migrated in March, slightly earlier than the pink salmon (Appendix 5). Most adults were probably strays from the Amalga Harbor releases of Gastineau Hatchery fish. Before 1994, chum salmon in Auke Creek migrated after mid August, often during the last week of August and first week of September. In 2001, 562 fish entered Auke Creek before mid August; only 26 after that (Appendix 6). The number of chum salmon adults of Auke Creek origin was considered those counted after August 15. Chum salmon adults were observed in the intertidal area in 2001, but were not counted.

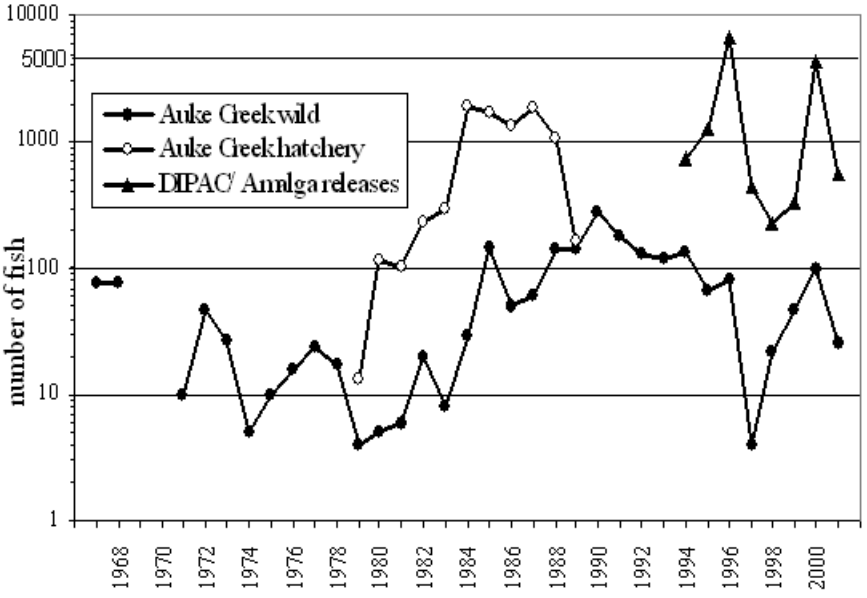

Figure 15. Chum salmon adults at Auke Creek, 1967-68, and 1971-2001.

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					78	78
1968					76	76
1969						
1970						
1971					10	10
1972					47	47
1973					27	27
1974					5	5
1975					10	10
1976					16	16
1977	0	12,195			24	24
1978	0	18,446			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			1,704	148	1,852
1986	825	20,725		1,342	50	1,392
1987	14,039			1,824	60	1,884
1988	8,091			1,053	140	1,193
1989	13,750			166	138	304
1990	1,916				270	270
1991	759				174	174
1992	4,783				130	130
1993	47				121	121
1994	137		736		132	868
1995	5		1,262		65	1,327
1996	4,981		6,700		81	6,781
1997	8,307		444		4	448
1998	735		225		22	247
1999	1,269		340		46	386
2000	1,337		4,344		100	4,444
2001	23,372		562		26	588
mean	5,385	32,830	1,827	794	63	771

Coho Salmon

Coho salmon spawn in the tributaries to Auke Lake and in the spawning channels in Auke Creek. The total number of smolts migrating from Auke Lake was counted annually since 1980. Since 1976, all coho smolts were adipose fin clipped and tagged with wire tags (no smolts were tagged in 1978). Coho adults were first counted in 1967, 308 fish, and annually since 1971. 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 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 tables and figures in this report are wild fish only.

A total of 5,742 coho salmon smolts left the Auke Lake system in 2001. 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 2001, is 6,433. In 2001, 5,687 smolts were tagged with coded wire tags and marked with an adipose fin clip.

The smolt migration began during the first week of May, however, only 52 migrated by May 7. Over 4,600 smolts migrated between May 15 and 29, and the migration midpoint was May 22 (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 by about one week (Figure 18). The midpoints of the age-2 and -1 smolts were May 21 and May 27, respectively. Smolts were sampled throughout the migration for fork lengths and scales. This showed that 1,762 were age-1 (average 102 mm), and 3,980 age-2 (average 122 mm). There were no hatchery-reared smolts in 2001.

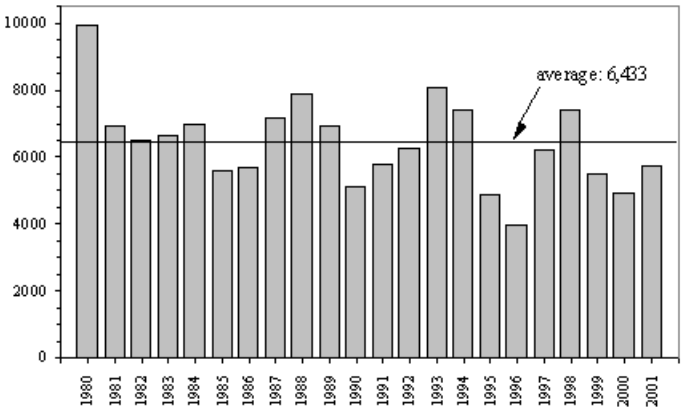

Figure 16. Number of coho salmon smolts at Auke Creek, 1980-2001.

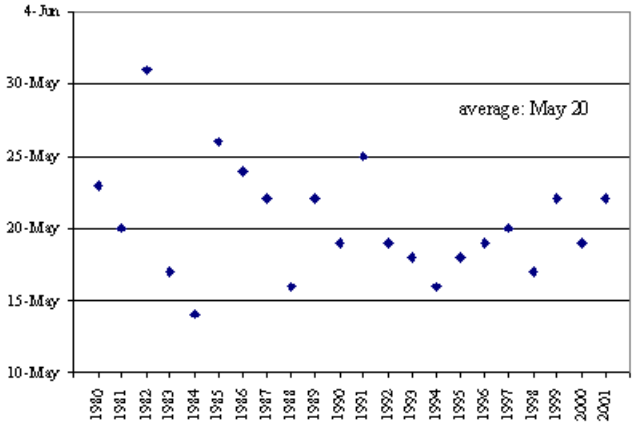

Figure 17. Median migration dates of coho salmon smolts at Auke Creek, 1980-2001.

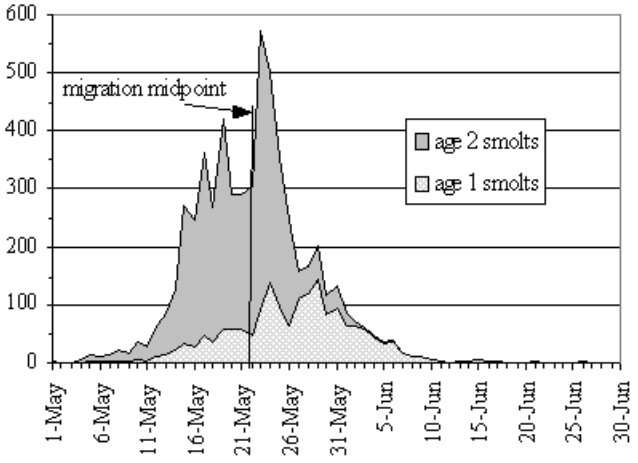

Figure 18. Daily migration of coho salmon smolts at Auke Creek, 2001.

The run of coho salmon at Auke Creek in 2001 included marked, wild jacks and adults, unmarked fish, marked jacks from Gastineau Hatchery, and marked adults from Auke Creek hatchery. The return of marked, wild coho was 142 jacks and 842 adults (Figures 19 and 20). Weir recovery of jacks was less than average, and that of adults greater. Most wild fish entered Auke Creek before the end of September (Appendix 6). There were 11 unmarked jacks and 23 unmarked adults. One adipose clipped jack (not included in the 142 reported earlier) had a wire tag from Gastineau Hatchery. We believe the unmarked jacks were also strays from Gastineau Hatchery because they were smaller than Auke Creek wild jacks (average: 230 vs. 350 mm fork length). The unmarked jacks entered the creek mainly after the first week of October, later than known wild jacks. The origin of the 23 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 33 adults from the age-at-maturity project were captured at Auke Creek, and killed to recover wire tags.

Harvest of coho salmon from Auke Creek is determined from recovery of wire tags in commercial and sport fishery port sampling programs. In 2001, 506 Auke Creek coho salmon adults were caught in the fishery. This was close to the average for Auke Creek, and represents a 37% catch rate. The average harvest is 514 adults, and the average catch rate is 43%.

The number of wild Auke Creek coho salmon adults in 2001 was above average, and ocean survival of Auke Creek smolts was the third highest on record. 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 2000 smolts tagged at Auke Creek was 32%: jacks 4.2% (returned in 2000), weir recovery of adults 17.3%, and fishery harvest of adults 10.4% (Figure 21). Survival of the 2001 smolts to return as jacks was 2.5% (Table 4).

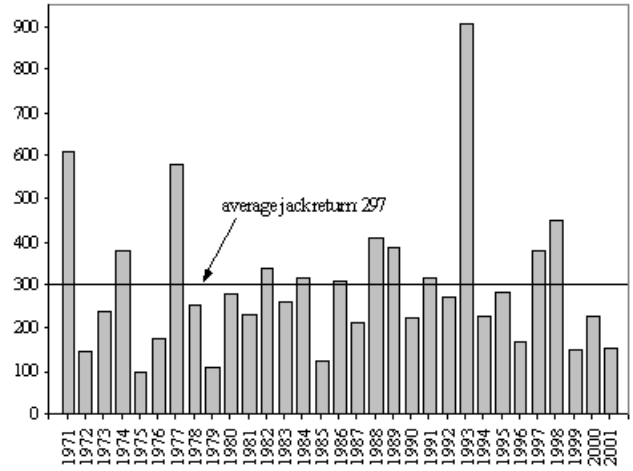

Figure 19. Auke Creek coho salmon jacks, 1971-2001.

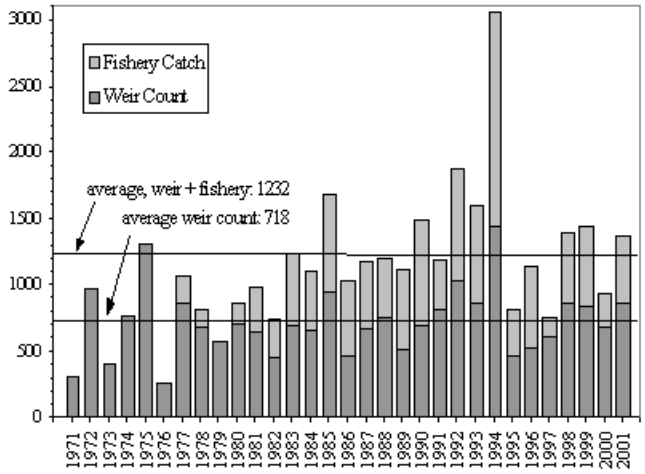

Figure 20. Weir counts and fishery catch of wild coho salmon from Auke Creek. Averages are for years data are available.

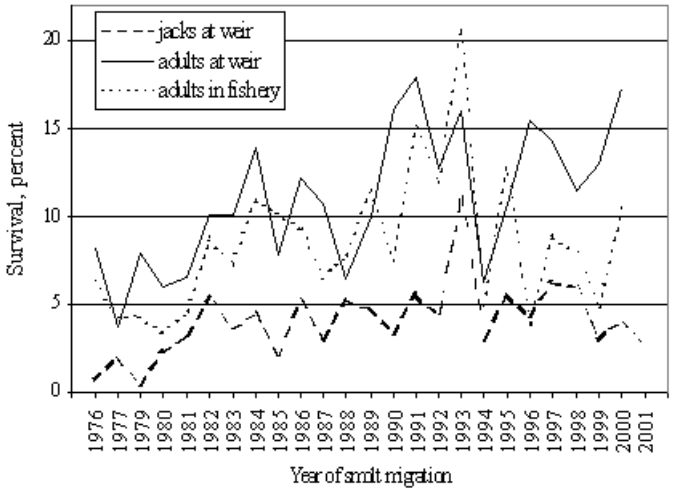

Figure 21. Ocean survival of coho salmon smolts from Auke Creek.

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

	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			608	308							
1972			146	967							
1973			238	399							
1974			379	768							
1975			98	1310							
1976[1]		2992	176	262	21			0.7			
1977[1]		3038	583	868	59	246	189	1.9	8.2	6.3	15.2
1978			256	683		112	131		3.7	4.3	9.9
1979[1]		3872	107	566	12			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
2001	5742	5687	153	865	142	842	506	2.5	17.3	10.4	32.0
mean	6433		297	718			514	4.1	11.0	8.5	23.7

[1]- total smolt count not available

Dolly Varden

Auke Lake is an important over-wintering site for Dolly Varden in the Juneau area. Some spawning and rearing undoubtably occur in the system, but spawner numbers and annual smolt production are not known. Dolly Varden migrating downstream at Auke Creek were counted in 1970, 6,249 fish, and annually since 1980. 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 7,356 Dolly Varden at Auke Creek in 2001 was the highest in three years at Auke Creek, and greater than average: 6,421 (Figure 22, Table 5). In some years, downstream migration begins in March, however, only 15 fish left Auke Lake that month in 2001. Daily counts never exceeded 70 fish until mid April, and most fish migrated in May (Appendix 5). The midpoint of the migration was May 12, about one week later than in 2000. The average midpoint for all years is May 7. Dolly Varden were sampled daily throughout the migration by measuring the length of every tenth fish. Larger fish migrate earlier, and average length decreased weekly from about 350 to 175 mm during the main part of the migration (Figure 23). Overall, the average size of downstream migrants was 250 mm. All fish were checked for marks or tags. None were found.

Serious attempts to count immigrant Dolly Varden began in 1997. The average number of Dolly Varden migrating upstream at Auke Creek, 1997-2001, is 4,664 (Table 5). In 2001, 4,249 were captured in the upstream traps. The migration began July 6, and the last fish was captured October 31 (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.

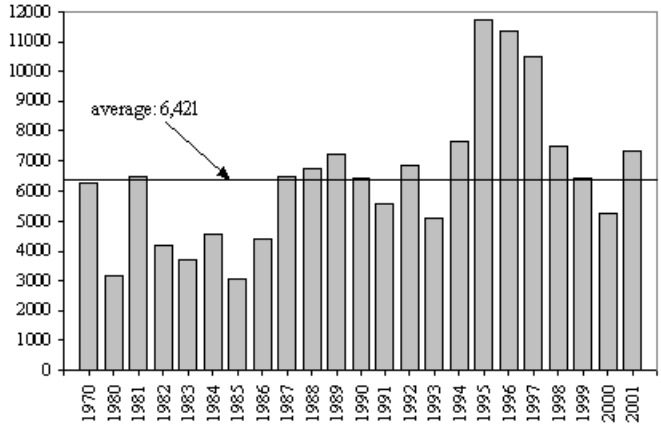

Figure 22. Downstream migrant Dolly Varden at Auke Creek.

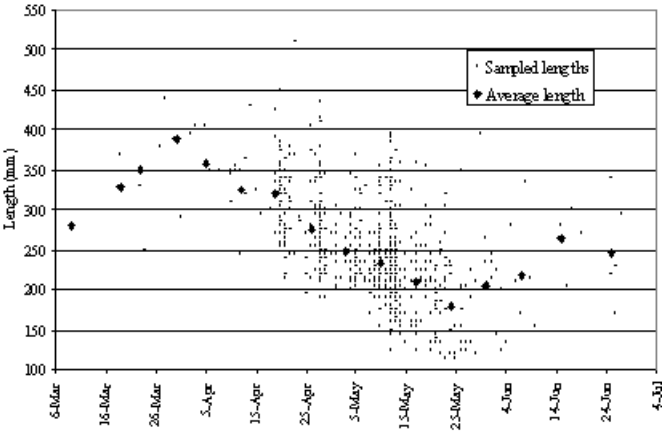

Figure 23. Fork lengths, daily samples and weekly averages, of Dolly Varden at Auke Creek, 2001.

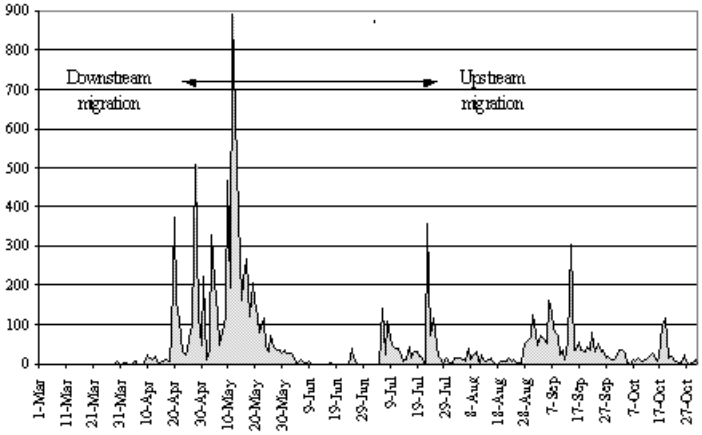

Figure 24. Migration of Dolly Varden at Auke Creek, 2001.

Table 5. Number of migrant Dolly Varden at Auke Creek, 1970, and 1980-2001.(weir mortalities = mort)

	downstream migration				upstream
year	total	unmarked	marked	mort	total
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	5,705
1998[2]	7,532	7,440	70	22	4,993
1999[2]	6,393	6,377	16	0	4,709
2000[2]	5,254	5,248	6	0	3,665
2001	7,356	7,356	0	0	4,249
mean	6,421				4,664

[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 suggests the pre-1960 population of cutthroat trout in Auke Lake was larger than it is now. Downstream migrant cutthroat trout have been counted since 1980. Upstream migrants were counted since 1997. 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, and hatchery fish were observed in subsequent migrations (Table 6).

In 2001, a total of 337 cutthroat trout were counted during the downstream migration. The average number of wild cutthroat in the downstream migrations, 1970-2001, is 256 (Figure 25, Table 6). In the 2001 downstream migration, the first cutthroat was captured April 3, and the last was captured June 27 (Appendix 5). The midpoint of downstream migration was May 20 (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 140 cutthroat trout were missing their adipose fin when they left Auke Lake, and 197 were not fin marked, indicating they had never received a PIT tag during studies at Auke Creek or Lake. All downstream migrants missing the adipose fin in 2001 had a PIT tag. There were 75 fish that were tagged in 2000 or earlier, and 65 that were tagged in Auke Lake during the lake population project in April 2001. Of the 197 unmarked fish, 194 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 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 downstream migrant cutthroat trout in 2001 was 246 mm.

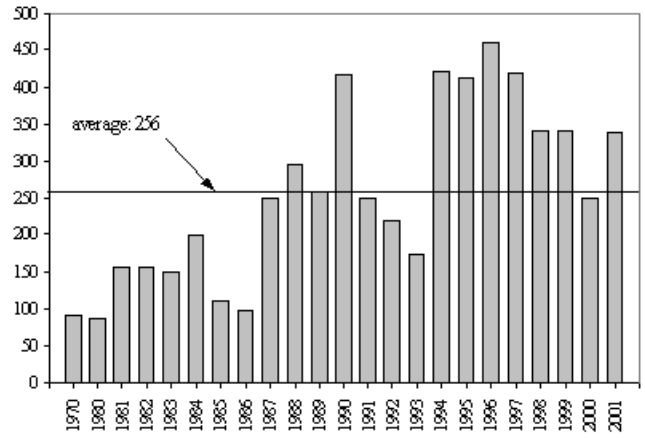

Figure 25. Downstream migrant wild cutthroat trout at Auke Creek.

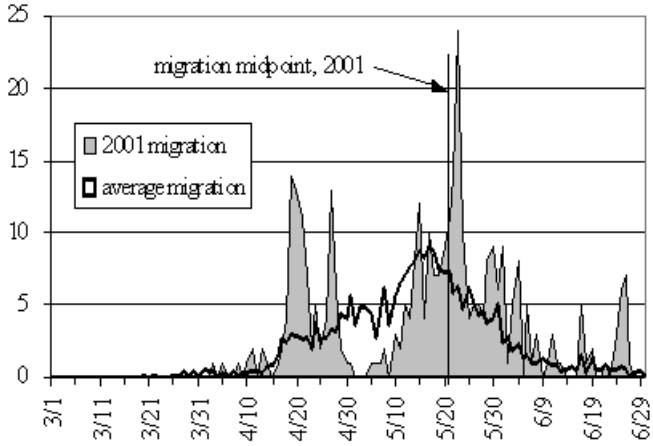

Figure 26. Average and 2001 downstream migration of wild cutthroat trout at Auke Creek.

All upstream migrant cutthroat in 2001, 228, were examined for adipose clips and visible implant and PIT tags before release upstream. The 1997-2001 average count of upstream migrant cutthroat is 273. No cutthroat migrated upstream in June, July or August, 167 did so in September, and 61 in October (Appendix 6). In 2001, 106 cutthroat trout captured during upstream migration were missing the adipose fin (105 had a PIT tag), and 122 were unmarked. Marine residence, seasonal growth, and growth rate between down- and upstream migration in 2001 were determined from individual fish with PIT tags. On average, marine residence of cutthroat trout was 131 days (range 81 to 185 days). Average seasonal growth was 60 mm (range 9-112 mm), and average growth rate was 0.47 mm/day (range 0.06-0.85 mm/day) (Figure 28).

Eight steelhead trout were counted downstream, and 11 migrated upstream in the fall. Steelhead migrated downstream between May 17-28, and upstream between September 24 and October 19. Fork lengths of steelhead captured at Auke Creek weir ranged from 142-205 mm.

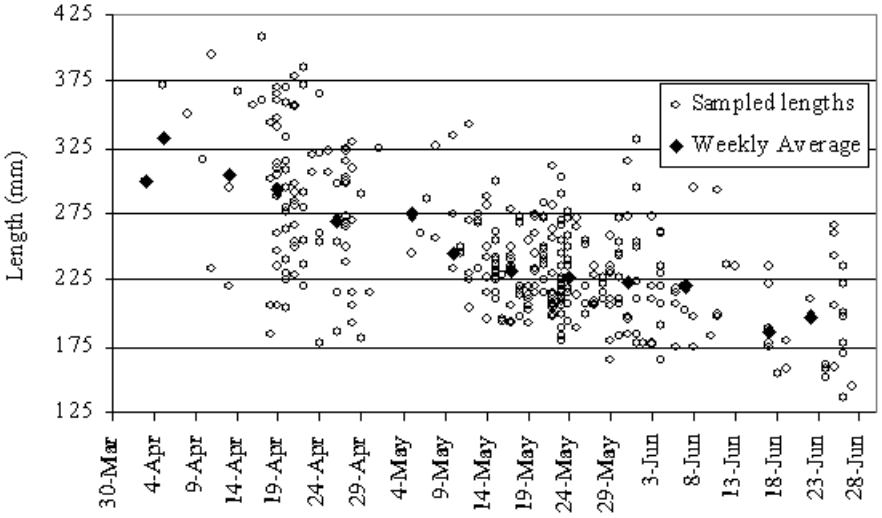

Figure 27. Fork lengths, daily samples and weekly averages, of cutthroat trout at Auke Creek, 2001.

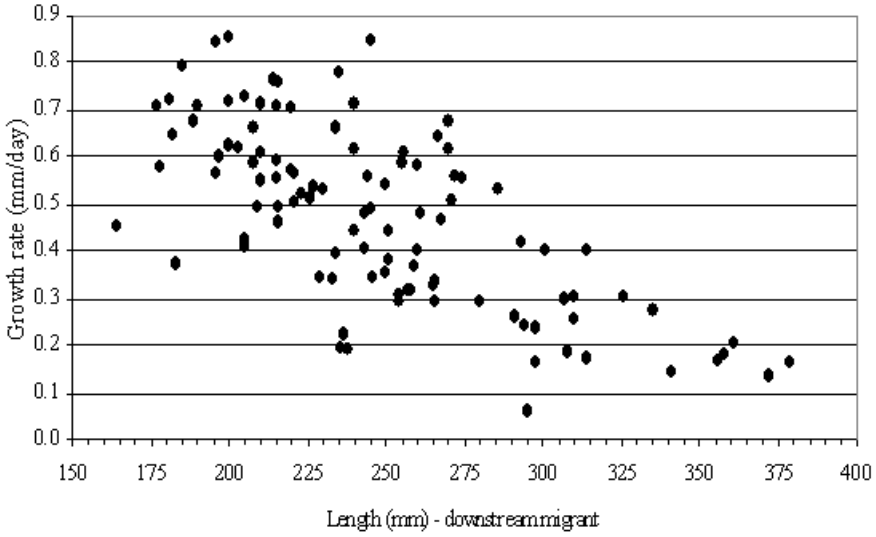

Figure 28. Growth of cutthroat trout between downstream and upstream migrations at Auke Creek, 2001.

Table 6. Number of cutthroat trout in the downstream and upstream migrations Auke Creek.

	downstream			upstream			
	wild	hatchery	total	adipose mark	no mark	not checked	total
1980	85		85				
1981	157		157				
1982	157		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	213	254		467
1998	340	34	374	164	196	1	361
1999	340	11	351	118	79	8	205
2000	249	1	250	37	68		105
2001	337	0	337	106	122		228
mean	264	110	354	128	144		273

Chinook Salmon

Chinook salmon are not native to the Auke Lake system. Chinook captured at Auke Creek are hatchery fish resulting 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, 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 Douglas Island Pink and Chum Incorporated.

At Auke Creek, chinook have been captured at the weir since 1987, 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.

In 2001, 452 chinook salmon were captured at Auke Creek, including 228 mini-jacks and 224 adults (Table 7). The number of chinook adults was close to average 218 fish (Figure 29). Chinook adults entered Auke Creek in response to increased stream flow, mostly August 28-September 2 (Appendix 6). Heads from adipose marked fish, 15 mini-jacks and 28 adults, were sent to the ADF&G tag lab. All chinook were offered to local charities.

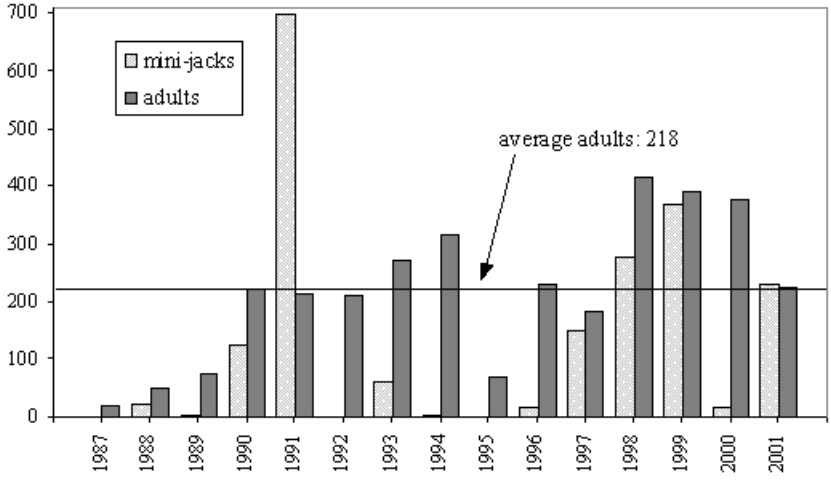

Figure 29. Chinook salmon mini-jacks and adults at Auke Creek, 1987-2001.

Table 7. Number of adipose marked and unmarked chinook salmon at Auke Creek, 1987-2001.

	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
2001	21	207	228	28	196	224
mean	30	102	131	59	159	218

Appendix 1. Downstream migrant wild salmonids at Auke Creek, 1961-2001. The sockeye average is 1980-2001, other averages are for all years.

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
2001	21,428	61,504	23,372	5,742	7,356	337
average	16,897	114,577	5,385	6,433	6,421	263

Appendix 2. Salmon adults captured at Auke Creek weir. Hatchery fish are included: sockeye 1977-79, 1989-95; pink 1973-94, 1996, 1998-2001; chum 1979-91, 1994-2001; 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
2001	3,963	8,323	588	865	224
average	5,265	10,427	768	718	218

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
2001	April 6
average	April 18

Appendix 4. Daily water temperatures at Auke Creek, 2001

day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1.9	2.3	1.6	3.6	7.3	12.0	17.6	14.8	13.8	9.9	5.7	1.5
2	1.7	2.3	1.7	3.5	6.8	12.7	17.6	15.6	13.2	9.8	5.6	1.4
3	2.1	2.3	1.7	3.7	6.7	12.7	17.6	16.3	13.1	9.9	5.5	1.6
4	2.2	2.1	1.6	3.9	6.6	12.2	17.1	16.3	13.0	10.0	5.4	1.6
5	1.9	1.9	1.7	4.0	6.6	12.5	16.3	16.4	12.6	10.2	5.3	1.5
6	1.9	1.6	1.7	4.0	6.8	12.4	15.4	16.5	12.4	10.2	5.0	1.5
7	2.0	1.5	1.8	4.1	6.9	12.5	14.6	16.7	12.3	9.9	4.8	1.6
8	2.2	1.3	1.9	4.0	6.7	13.3	13.6	16.4	12.0	9.8	4.9	1.5
9	2.1	1.2	2.0	4.1	6.7	14.1	13.6	16.1	12.1	9.5	4.9	1.6
10	1.9	1.0	1.9	4.2	6.8	13.4	13.9	16.3	12.5	9.2	4.9	1.6
11	1.9	1.1	2.0	4.4	7.3	13.6	13.9	16.8	12.4	9.2	4.8	1.6
12	1.8	1.3	2.1	4.6	7.6	13.6	13.8	16.8	12.2	8.9	4.5	1.6
13	1.8	1.3	2.2	4.6	7.8	13.5	13.9	17.4	11.5	8.6	4.4	1.6
14	1.6	1.2	2.2	4.9	8.2	13.8	14.0	18.0	11.6	8.5	4.5	1.4
15	1.7	1.1	2.4	5.0	7.8	14.7	14.5	18.2	11.8	8.3	4.4	1.2
16	1.7	1.1	2.4	5.1	8.2	15.3	15.2	18.1	11.9	8.1	4.4	0.9
17	1.8	1.0	2.5	5.8	8.6	15.4	15.7	18.0	12.0	8.0	4.3	1.0
18	2.0	1.0	2.5	5.8	9.2	15.8	15.6	16.9	11.8	7.7	4.3	0.9
19	2.1	1.1	2.4	5.7	9.6	16.2	15.8	16.7	11.8	7.6	4.2	1.0
20	2.0	1.1	2.2	6.2	9.6	16.3	17.0	16.6	11.5	7.5	4.2	1.1
21	1.9	1.2	2.4	6.6	10.1	16.2	18.1	16.7	11.3	7.3	4.3	1.2
22	2.0	1.2	2.4	7.2	9.9	16.0	18.3	16.8	11.3	7.1	4.3	1.3
23	2.2	1.0	2.6	6.8	9.4	15.9	16.5	16.1	11.1	7.0	4.2	1.3
24	2.1	0.9	2.8	6.8	9.4	16.1	16.3	15.8	10.8	6.8	4.0	1.4
25	2.0	1.0	3.1	6.9	9.3	16.5	15.2	15.3	10.6	6.6	3.5	1.5
26	2.0	1.3	3.1	7.1	10.3	16.7	14.5	15.2	10.5	6.3	3.1	1.6
27	2.2	1.4	3.1	7.0	11.8	17.7	14.5	14.9	10.5	6.0	2.2	1.6
28	2.1	1.5	3.1	7.0	12.2	17.6	14.4	14.8	10.3	6.0	1.6	1.6
29	2.0		3.3	6.9	12.3	17.0	14.5	14.8	10.1	6.0	1.7	1.6
30	1.9		3.2	6.9	12.0	17.3	14.7	14.4	10.0	5.8	1.5	1.6
31	2.2		3.5		12.2		14.5	14.2		5.7		1.5

Appendix 5. Monthly totals and daily counts of downstream migrant wild salmonids a Auke Creek, 2001.

	Pink fry	Coho smolts	Sockeye smolts	Chum fry	Dolly Varden	Cut-throat	Steel-head
March	12,336	0	0	13,501	15	0	0
April	49,150	3	3	9,795	1,780	96	0
May	18	5,319	17,381	31	5,393	177	6
June	0	420	4,044	45	168	64	2
total	61,504	5,742	21,428	23,372	7,356	337	8
Mar 2	65			53			
3	79			92			
4	59			114			
5	76			140			
6	47			117			
7	107			148			
8	44			184			
9	98			330	1		
10	99			346			
11	64			381			
12	121			200			
13	132			317			
14	77			248			
15	164			478			
16	237			633			
17	222			669			
18	271			668			
19	289			614	1		
20	238			491	1		
21	270			564			
22	437			721			
23	307			710	1		
24	506			681	1		
25	765			805			
26	1285			909			
27	781			465	1		
28	1238			674	1		
29	1763			655			
30	1547			629	7		
31	948			465	1		
Apr 1	1477			522			
2	1975			649	2		
3	1429			597	1	1	
4	2681			1549			
5	2257			570	4	1	
6	2561			574	6		
7	1920			456			
8	2174			499	1	1	
9	2690			1453	5		
10	2042			417	23	1	
11	1557			363	16	2	
12	1886			282	11		
13	3789			374	17	2	
14	1513			251	3	1	
15	2653			216	4		
16	2539			201	9	1	
17	2199			256	12	2	
18	2311			156	8	4	
19	2872			150	69	14	
20	1920			79	372	13	
21	1792			64	161	11	
22	1421			44	112	7	
23	459			24	29	2	
24	285			9	24	5	
25	474			22	32	2	
26	113			5	86	4	
27	88			6	94	13	
28	32		1	3	511	6	
29	26	2		2	121	2	
30	15	1	2	2	47	1	

	Pink fry	Coho smolts	Sockeye smolts	Chum fry	Dolly Varden	Cut-throat	Steel-head
May 1	8	2	3	5	224	1	
2	1	1		1	13		
3	2		2		33		
4		9	3	2	329		
5	3	14	8	2	212	1	
6	1	12	5	3	132	1	
7		14	4	1	48	1	
8	2	21	10	3	82	2	
9	1	18	5	2	118		
10		36	7		468	3	
11		30	8	2	195	2	
12		57	17		893	5	
13		85	10		509	4	
14		127	21		376	8	
15		271	25		160	12	
16		245	52		215	4	
17		363	57		267	10	1
18		269	81		119	7	
19		420	278		203	7	1
20		289	274		160	9	1
21		289	262		118	11	
22		302	638		83	14	
23		572	964		117	24	1
24		497	1099	1	46	10	1
25		356	2708		30	4	
26		245	2656		70	5	
27		158	2032		45	5	1
28		167	2640	1	37	4	
29		202	1363	2	32	8	
30		116	1049	3	25	9	
31		132	1100	3	34	6	
June 1		88	1013	6	26	9	
2		71	730	1	25	1	
3		60	305	2	23	5	
4		46	394	4	3	8	1
5		36	225	4	2		
6		40	286	1	10	5	
7		19	201	2	4	1	
8		12	216	5	4	3	
9		12	154	2	8		
10		6	102	4	1	1	
11		5	71	4		3	
12		1	82			1	
13		3	44			1	
14		5	31	2			
15		6	73	1	1		
16		2	26		1		
17		3	14		2	5	
18			21			1	
19			9		1	2	
20			9				
21		2	11				
22			5	1		1	
23			5				
24			1			3	
25			11	2	41	6	
26		3	2	3	15	7	1
27					1	1	
28			2	1			
29			1				
total	61,504	5,742	21,428	23,372	7,356	337	8

Appendix 6. Monthly totals and daily counts of upstream migrant salmonids at Auke Creek, 2001. 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	68	0	0	0	0	0	0	0
July	3,483	201	186	0	11	1,305	0	0
August	267	6,086	399	0	186	601	0	0
Sept.	145	2,036	3	635	27	1,741	167	3
Oct.	0	0	0	230	0	602	61	8
Nov.	0	0	0	0	0	0	0	0
total	3,963	8323	588	865	224	4249	228	11
June 27	68							
28								
29								
30								
July 1								
2								
3								
4								
5								
6	184					142		
7	11					24		
8	90					109		
9	400					68		
10	250		1			47		
11	323		2			40		
12	642		1			40		
13	86		2			21		
14	128		2			7		
15	107		4			13		
16	233		6		1	43		
17	88	3	5			14		
18	30		4			28		
19	3	1	3			29		
20	6		3			20		
21			1			15		
22								
23	508	4	25		1	357		
24	91	4	12			71		
25	68	11	16			115		
26	128	22	16		1	52		
27	59	41	13			17		
28	16	20	7		2	10		
29	20	40	18			3		
30	10	21	20		3	15		
31	2	34	25		3	5		
Aug. 1	3	4	23		5	3		
2	4	25	35			14		
3	3	10	38		2	14		
4	3	13	48			14		
5	5	21	48			12		
6	6	12	37		2	8		
7	5	12	33			42		
8	2	7	18		6	13		
9	5	8	22		3	21		

	Sockeye adults	Pink adults	Chum adults	Coho adults	Chinook adults	Dolly Varden	Cut-throat	Steel-head
Aug. 10	5	12	19			29		
11		17	19		2	1		
12		36	10			23		
13		23	20			7		
14		16	6			6		
15	1	32	1			15		
16		30	1			9		
17		27						
18		33						
19		59				6		
20		183				6		
21	24	375	5			8		
22	2	207	1			16		
23	1	100			2	8		
24	2	117				12		
25		115			1	2		
26		137				3		
27	26	1,298	2		2	3		
28	123	1,074	4		17	52		
29	15	633	5		26	59		
30	19	809	2		18	68		
31	13	641	2		100	127		
Sept.1	14	301	3		6	81		
2	16	268			3	47		
3	40	276			2	71		
4	11	172			1	65		
5	22	133			6	51		
6	14	339			6	165		
7	9	171			3	134		
8	7	110				88		
9	4	66				69		
10	1	42				21		
11	1	20				32		
12		15				13		
13	2	35				54		
14	1	38		190		304	53	
15	2	12		22		32	12	
16		11		39		32	13	
17		14		53		55	20	
18		6		44		37	11	
19		4		43		28	11	
20		3		16		43	7	
21				56		33	8	
22				16		82	6	
23				16		31	8	
24	1			51		51	6	2
25				33		30	5	
26				8		37	5	
27				9		14		
28				14		17	2	
29				11		13		1
30				14		11		
Oct. 1				37		24	6	
2				61		35	10	
3				30		35	9	

	Sockeye adults	Pink adults	Chum adults	Coho adults	Chinook adults	Dolly Varden	Cut-throat	Steel-head
Oct. 4				24		25	1	1
5				13		3	2	1
6				5			2	1
7				1		12	1	
8				4		6		
9				5		15	1	1
10				4		9		1
11				3		9		
12				10		12	4	
13				9		16	3	
14						26	1	1
15				2		21	1	1
16				2		8	2	
17				3		17	1	
18				4		98	6	
19				5		116	5	1
20				1		15	2	
21				3		19		
22				1		15	1	
23						6	1	
24				1		4	1	
25				1		5		
26				1		23		
27						9		
28						1		
29						3	1	
30						11		
31						4		
total	3963	8323	588	865	224	4249	228	11