

Fishery Data Series No. 00-30

Dolly Varden and Cutthroat Trout Populations in Auke Lake, Southeast Alaska, during 1999

by

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November 2000

Alaska Department of Fish and Game

Division of Sport Fish



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Weights and measures (metric)		General		Mathematics, statistics, fisheries	
centimeter	cm	All commonly accepted abbreviations.	e.g., Mr., Mrs., a.m., p.m., etc.	alternate hypothesis	H_A
deciliter	dL			base of natural logarithm	e
gram	g	All commonly accepted professional titles.	e.g., Dr., Ph.D., R.N., etc.	catch per unit effort	CPUE
hectare	ha	and	&	coefficient of variation	CV
kilogram	kg	at	@	common test statistics	F, t, χ^2 , etc.
kilometer	km	Compass directions:		confidence interval	C.I.
liter	L			correlation coefficient	R (multiple)
meter	m	east	E	correlation coefficient	r (simple)
metric ton	mt	north	N	covariance	cov
milliliter	ml	south	S	degree (angular or temperature)	°
millimeter	mm	west	W	degrees of freedom	df
Weights and measures (English)		Copyright	©	divided by	÷ or / (in equations)
cubic feet per second	ft ³ /s	Corporate suffixes:		equals	=
foot	ft	Company	Co.	expected value	E
gallon	gal	Corporation	Corp.	fork length	FL
inch	in	Incorporated	Inc.	greater than	>
mile	mi	Limited	Ltd.	greater than or equal to	≥
ounce	oz	et alii (and other people)	et al.	harvest per unit effort	HPUE
pound	lb	et cetera (and so forth)	etc.	less than	<
quart	qt	exempli gratia (for example)	e.g.,	less than or equal to	≤
yard	yd	id est (that is)	i.e.,	logarithm (natural)	ln
Spell out acre and ton.		latitude or longitude	lat. or long.	logarithm (base 10)	log
Time and temperature		monetary symbols (U.S.)	\$, ¢	logarithm (specify base)	log ₂ , etc.
day	d	months (tables and figures): first three letters	Jan,...,Dec	mid-eye-to-fork	MEF
degrees Celsius	°C	number (before a number)	# (e.g., #10)	minute (angular)	'
degrees Fahrenheit	°F	pounds (after a number)	# (e.g., 10#)	multiplied by	x
hour (spell out for 24-hour clock)	h	registered trademark	®	not significant	NS
minute	min	trademark	™	null hypothesis	H_0
second	s	United States (adjective)	U.S.	percent	%
Spell out year, month, and week.		United States of America (noun)	USA	probability	P
Physics and chemistry		U.S. state and District of Columbia abbreviations	use two-letter abbreviations (e.g., AK, DC)	probability of a type I error (rejection of the null hypothesis when true)	α
all atomic symbols				probability of a type II error (acceptance of the null hypothesis when false)	β
alternating current	AC			second (angular)	"
ampere	A			standard deviation	SD
calorie	cal			standard error	SE
direct current	DC			standard length	SL
hertz	Hz			total length	TL
horsepower	hp			variance	Var
hydrogen ion activity	pH				
parts per million	ppm				
parts per thousand	ppt, ‰				
volts	V				
watts	W				

FISHERY DATA SERIES NO. 00-30

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LAKE, SOUTHEAST ALASKA, DURING 1999**

by

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ABSTRACT

The Auke Creek weir near Juneau, Alaska, was operated in 1999 to count migrating sea-run Dolly Varden *Salvelinus malma*, cutthroat trout *Oncorhynchus clarki*, and other species of Pacific salmon *Oncorhynchus* spp. Abundance for downstream migrant Dolly Varden from March through June was 6,393 and upstream counts from July through mid-November totaled 4,709, 74% of the emigrating population. Estimated average fork length of downstream Dolly Varden was 245 mm (SD = 70 mm). Abundance for downstream cutthroat trout in the spring was 351, and the upstream count in the fall was 205. Average fork length of downstream cutthroat trout was 282 mm (SD = 54 mm) and of upstream cutthroat trout was 293 mm (SD = 67 mm). The 1999 emigration of Dolly Varden from Auke Creek was about average, while emigration of wild cutthroat trout remained above average. The estimated abundance of cutthroat trout ≥ 180 mm residing in Auke Lake during late May and early June was 464 (SE = 23), about twice the 247 estimated in 1998.

Key words: Alaska, cutthroat trout, Dolly Varden, sea-run, weir, abundance, length, timing, PIT, VI, tag retention

INTRODUCTION

The Alaska Department of Fish and Game, Division of Sport Fish (ADF&G), the University of Alaska, Fairbanks (UAF), and the National Marine Fisheries Service (NMFS) cooperatively fund and operate the NMFS Auke Creek weir on the outlet of Auke Lake, near Juneau, Alaska. The weir has been operated since 1963 and has provided consistent, long-term information on all emigrating and immigrating species, including the most complete database for several salmonid species at any single site in Southeast Alaska. Data from the weir are used as indicators of local stock status, to help guide management decisions for the Juneau area, and in a number of research projects conducted by ADF&G, UAF, and NMFS. Studies initiated at the weir have provided important insights into life history behavior, age composition, maturity, run timing, and growth of species present in the Auke Lake system (Neimark 1984a, 1984b; Lum et al. 1998, 1999; Taylor and Lum 1999, 2000).

A permanent weir structure, installed during the spring of 1980, captures all immigrant and emigrant fish. It is operated from March 1 through June 30 to intercept emigrating cutthroat trout *Oncorhynchus clarki*, Dolly Varden *Salvelinus malma*, steelhead *O. mykiss*, and pink *O. gorbuscha*, chum *O. keta*, coho *O. kisutch*, and sockeye *O. nerka* salmon (Table 1). The weir is converted on June 30 to count upstream migrants and is operated through November. During this

period, the weir also captures chinook salmon *O. tshawytscha* returning to Auke Creek as a result of a sport fishing enhancement program in the Juneau area. The Auke Creek weir operations and fish counts for 1999 are reported in their entirety in the annual report for the weir (Taylor and Lum 2000).

Dolly Varden populations along the Juneau roadside declined in the late 1970s, and special regulations were put into effect to reduce harvest. As part of those regulations, Auke Lake was closed to fishing for Dolly Varden, as were other local lake systems, and the freshwater bag limit on other Juneau roadside systems was reduced from 10 to 2. Populations improved for a short period but later dropped to average levels; therefore, the restrictions remain in place. In addition, the Alaska Board of Fisheries reduced the bag limit for Dolly Varden in 1994 from 10/day to 2/day along the Juneau road system in salt water to ¼ mile offshore. Annual counts of the spring emigration provide an indicator of the relative abundance of local populations of Dolly Varden.

Auke Lake supports a small sport fishery for cutthroat trout (Table 2). Cutthroat trout are caught through the ice during the winter and from the beach or small boats during the remainder of the year. Anecdotal information suggests that the cutthroat fishery in Auke Lake was more productive than at present. Strategic planning exercises identified improvement of the cutthroat trout fishery in Auke Lake as a strategy to help

Table 1.—Average number of migrant salmonids counted at Auke Creek; spring average from 1980–1999 and fall average from 1963–1999 where information is available.

Annual average	Pink salmon	Coho salmon	Sockeye salmon	Chum salmon	Chinook salmon	Dolly Varden	Cutthroat trout	Steelhead
Emigrating	105,729	6,546	16,839	4,456	—	6,440	260	12 ^a
Immigrating	10,751	703	5,376	655	206	5,136 ^a	344 ^a	3 ^a

^a Average of only 1997, 1998, and 1999 weir counts.

satisfy the demand for trout fisheries along the Juneau roadside (Schwan 1990). Determining the existence of a resident (non-sea-run) cutthroat trout population and the abundance of migrating trout became of interest in monitoring the roadside fishery and for obtaining baseline information at Auke Creek, especially when considering the impact directed fisheries can have on these small populations (Behnke 1979, Spense 1990, Wright 1992).

An attempt to estimate the population size of Auke Lake cutthroat trout during 1991 was unsuccessful. During spring 1997, a multi-agency study (UAF, NMFS, and ADF&G) provided an estimate of 694 (SE = 157), without respect to size, resident cutthroat trout in Auke Lake (National Marine Fisheries Service, Auke Bay Laboratory, Juneau, personal communication). Because tagged fish from the 1997 study were recovered in marine waters by sport anglers over the next few summers, it was evident that Auke Lake provides a rearing area for sea-run, as well as resident, cutthroat trout. Therefore, maintaining the health of the Auke Lake cutthroat trout population is an important component in the overall health of the Juneau roadside fishery.

The purpose of this report is to summarize weir counts and biological characteristics of Dolly Varden and cutthroat trout at Auke Creek in 1999 and to summarize results of a mark-recapture experiment to estimate abundance of cutthroat trout residing in Auke Lake. The specific objectives of this project were to:

1. Count all sea-run Dolly Varden and cutthroat trout emigrating from Auke Lake from March 1 through June 30;
2. Estimate the size composition of Dolly Varden and cutthroat trout emigrating from Auke Lake;
3. Count all sea-run Dolly Varden and cutthroat trout entering Auke Lake from June 30 through November 15;
4. Measure all tagged cutthroat trout entering Auke Lake from June 30 through November 15; and
5. Estimate the abundance of cutthroat trout residing in Auke Lake during late May–early June.

STUDY SITE

The Auke Lake system is a mainland watershed covering 1,072 ha and located approximately 19 km north of Juneau, Alaska (58°23', 134°37'), on the Juneau road system (Figure 1). Auke Lake has a surface area of 67 ha and is fed by 5 tributaries. Lake Creek is the largest tributary and drains about 648 ha. Auke Lake's greatest depth is 31 m, and the elevation is approximately 19 m. The weir is located on Auke Creek, the outlet stream, about 400 m downstream from the lake near the head of tidewater (Figure 1).

METHODS

EMIGRANT POPULATIONS

In 1999, the weir was operated from March 1 through June 30 to intercept all emigrating salmonids. During the spring emigration, Auke Creek was diverted through 5 inclined aluminum traps with 3-mm perforations that allowed most of the water to spill. Fish were diverted through a

Table 2.—Estimates of sport fishing effort, total catch, and harvest of cutthroat trout and Dolly Varden in Auke Lake, 1990–1998 (ADF&G unpublished data). Estimates for Auke Lake were derived from small numbers of responses to a statewide mail survey (Howe et al. 1999) and are considered imprecise.

Year	Anglers	Trips	Days	Cutthroat trout		Dolly Varden ^a	
				Catch	Harvest	Catch	Harvest
1990	34	34	34	17	17	0	0
1991	– ^b	– ^b	– ^b	– ^b	– ^b	– ^b	– ^b
1992	75	87	75	18	0	0	0
1993	50	325	271	391	224	49	0
1994	– ^b	– ^b	– ^b	– ^b	– ^b	– ^b	– ^b
1995	29	32	29	26	0	0	0
1996	40	397	375	1,104	0	485	0
1997	45	47	47	16	0	54	0
1998	46	100	113	101	17	177	0

^a Auke Lake is closed to the harvest of Dolly Varden.

^b No estimates were made in 1991 or 1994.

metal trough and collected in a fiberglass holding tank located in a pool downstream of the weir. Fish were sorted, counted, sampled, tagged, and released downstream of the weir daily.

All emigrating Dolly Varden were counted and examined for Floy tags and adipose finclips. Length composition was estimated by using a systematic sampling procedure. Every tenth Dolly Varden passed downstream was measured to the nearest 5 mm from the tip of snout to fork of tail (FL).

Average length of migrants sampled at the weir over time was estimated:

$$\bar{y} = \frac{1}{n}(y_1 + y_2 + \dots + y_n) = \frac{1}{n} \sum_{i=1}^n y_i \quad (1)$$

where \bar{y} is the sample mean or the average of the y-values in the sample, and n is the number sampled for length. The standard error of \bar{y} was estimated:

$$se(\bar{y}) = \sqrt{\frac{s^2}{n}} = \sqrt{\left(1 - \frac{n}{N}\right) \frac{1}{n*(n-1)} \sum_{i=1}^n (y_i - \bar{y})^2} \quad (2)$$

where s^2 is the sample variance; a finite

population correction $\left(fpc = 1 - \frac{n}{N}\right)$ is included in s^2 because of the high sampling rate.

In addition, all emigrating cutthroat trout were counted, measured to the nearest millimeter FL, examined for external marks or tags, and, if adipose-clipped, checked for VI (visual implant) or PIT (passive integrated transponder) tags.

All emigrating cutthroat trout not previously tagged were PIT tagged, and adipose finclipped if not already marked prior to release in 1999. PIT tags were first used on cutthroat trout leaving Auke Lake in spring 1997 (Lum et al. 1998). Tags were inserted in the dorsal sinus or in muscle tissue located directly below the dorsal fin (Dr. Hershburger, University of Washington, Seattle, personal communication), and a drop of super glue was applied to the skin after tagging to prevent tag loss and infection, and to promote healing. During the fall, examination of weir mortalities carrying a PIT tag showed no scarring or encysting, good tag placement, and no migration of the tag into the body cavity or out through the skin. Other possible external marks on cutthroat trout in 1999 included: (1) right

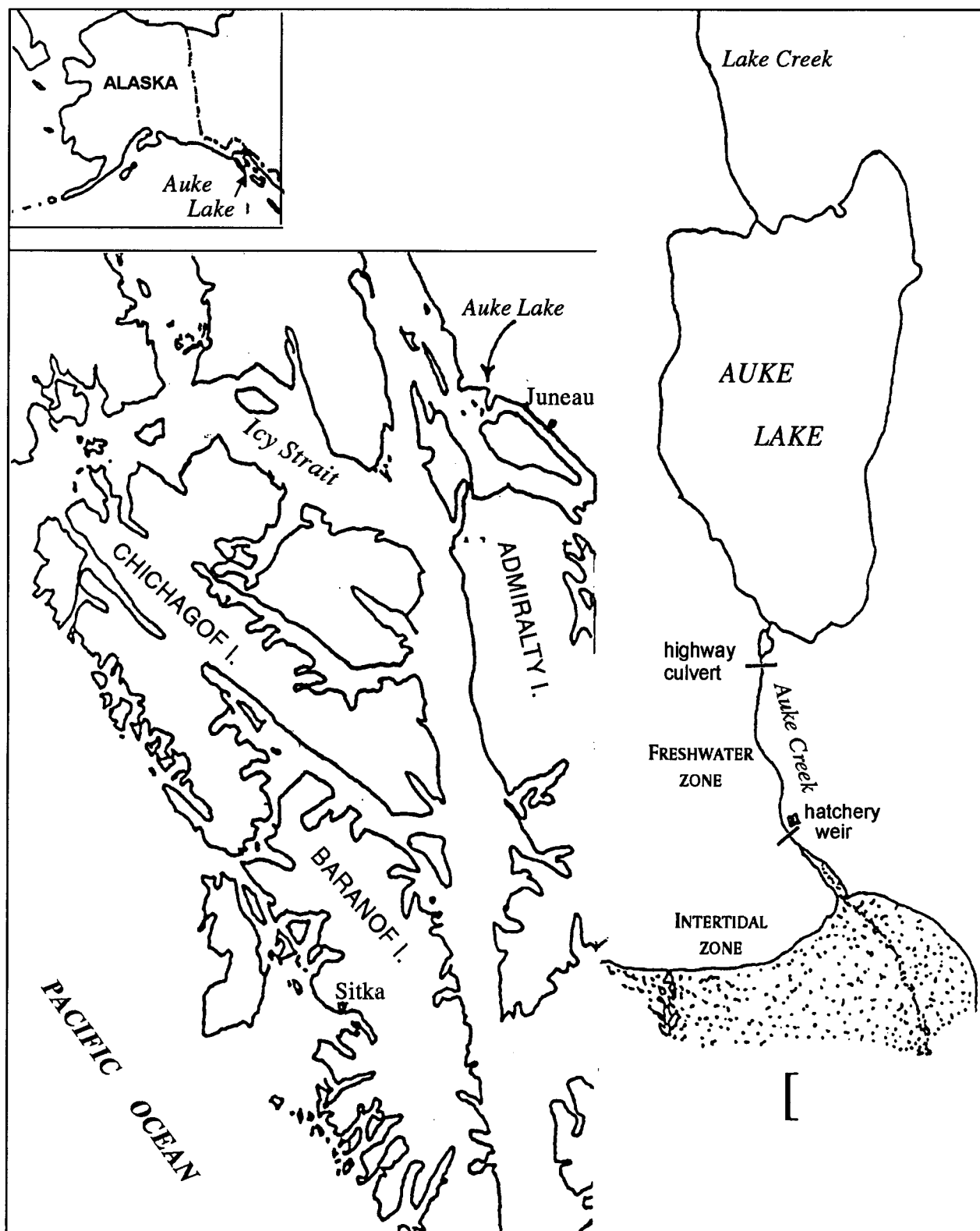


Figure 1.—The Auke Lake system in northern Southeast Alaska and location of the Auke Creek weir.

ventral-clipped hatchery fish released in 1983 and 1991; (2) left ventral-clipped hatchery fish released in 1983 and 1994; (3) adipose-clipped hatchery fish released in 1986 and 1987; (4) VI tagged and adipose-clipped fish marked during emigration from Auke Lake in 1994, 1995, and 1996; and (5) adipose-clipped and PIT tagged fish marked during emigration in 1997 and 1998.

All cutthroat trout mortalities were measured and sampled for scales, otoliths, and ovaries. Scales from cutthroat trout mortalities were taken from the left side of the caudal peduncle immediately above the lateral line (Brown and Bailey 1949, Laasko and Cope 1956). Prior to taking a scale sample, each fish was wiped with the blunt side of a knife to remove excess mucus. A sample of 15 to 20 scales was removed from each fish and spread out on clear plastic so that no scales were overlapping (Erickson 1999). The plastic was stored inside a coin envelope inscribed with the sample number and date. Scale samples have not yet been aged.

IMMIGRANT POPULATIONS

The weir was converted to count upstream migrants on June 30 and operated through November 15. In addition to the existing weir structure, 2 small-mesh traps were placed on the upstream side of the weir to capture immigrant Dolly Varden and cutthroat trout. Pickets on the trap entrance were spaced one inch apart to prevent larger salmon from entering the trout traps. Two panels (16 × 38 inches in size) made out of perforated aluminum, with rectangular slots (0.5 × 4 inches), were fitted to the upstream side of each weir panel to prevent movement of smaller fish through the existing weir panels.

All immigrating species were counted and released upstream. Dolly Varden were examined for adipose fin clips and Floy tags. Marked fish were measured to the nearest 5 mm FL and released upstream from the weir. All cutthroat trout were measured, examined for marks and a PIT tag, and released upstream from the weir. Untagged cutthroat trout were marked on the anal fin with a blue photonic dye prior to release. Early in the immigration, cutthroat trout were placed back downstream to reduce the potential for injury and death caused by low stream flow

and high creek temperatures. Immigrant cutthroat trout were not PIT tagged because upstream tagging in 1996 resulted in high levels of mortality of cutthroat trout (ADF&G unpublished data, Juneau, Alaska). Mortalities were sampled for FL (nearest mm), scales, otoliths, and ovaries as well as being checked for PIT tags.

LAKE POPULATION ESTIMATE

A two-event mark-recapture experiment for a closed population was used to estimate abundance of cutthroat trout ≥ 180 mm FL in Auke Lake. Two 9-day sampling events were conducted to capture fish in Auke Lake, with a 5-day break between each event. The marking event occurred from May 25 to June 2, and the recapture event occurred from June 7 to 16. Cutthroat trout were inspected for tags or marks, measured for FL, given a uniquely numbered PIT tag (if they did not have one) along with a secondary and tertiary mark and an adipose clip, and released back into the area of capture. The secondary and tertiary marks in 1998 were a half right ventral clip with a blue external photonic mark on the base of the right ventral fin, respectively. In 1999, PIT tagged fish received a secondary, external photonic mark on the left ventral fin which was not clipped. Fish captured during the recapture event also received a shallow lower caudal clip to prevent double sampling in the event of tag loss. Area of capture, gear type, and trap number (where appropriate) were recorded for each fish. Any previously tagged fish recaptured were treated as usual except "recapture" was noted in the comments. Mortality status and other comments were also recorded. Additionally, catch, trap depth, and numbers of gear units (trap-hours or rod-hours) for each gear type were recorded each sampling day so that depth of capture was available for fish caught in traps. Cutthroat trout were captured with baited large minnow traps with a funnel opening (1 m long × 0.5 m wide) and with hook-and-line gear. Bait for traps consisted of whole salmon eggs collected from chinook salmon mortalities at the weir in 1998.

Previous work in 1997 (ADF&G unpublished data, Juneau, Alaska) had demonstrated that cutthroat trout were not captured at depths >15 m in Auke Lake during summer (July) sampling.

Therefore, traps were uniformly distributed over the bottom of the lake only in areas ≤ 15 m (50 ft) deep (Figure 2). Depths were determined by a fathometer. During each event, traps were systematically moved throughout the sampling area so that the total amount of gear was uniformly distributed across those parts of the lake ≤ 15 m in depth. During the recapture event, the geographic order in which the areas were fished was similar, to insure relatively constant hiatus between sampling events by area of the lake. Fifteen traps were fished each night. Thus, by trapping to 15 m, an attempt was made to insure that each fish in the lake had an equal probability of being sampled. To facilitate consistent recording of locations where cutthroat trout were captured, Auke Lake was divided into 8 sections (Figure 2).

Hook-and-line-fishing was conducted in each sampling area along the lake shoreline. The effort in each area was in proportion to the surface area in each section relative to the surface area of the whole lake, for depths ≤ 15 m. Hook-and-line fishing was conducted by casting (near surface depths) small spoons, spinners, and other lures in a manner so that the entire sampling area of the lake was fished.

During data analysis, catch and effort data were pooled into 3 groups (A, B, C) to assist in testing experimental assumptions. Group A consisted of study areas 1–3, B consisted of study areas 4–6, and C consisted of study areas 7–8 (Figure 2). The abundance of cutthroat trout ≥ 180 mm FL in Auke Lake was calculated using Chapman's modification of the Petersen estimator (Seber 1982).

Assumptions necessary for an accurate estimation of abundance in this experiment were (Seber 1982):

1. The population is closed; i.e., both recruitment (or immigration) and death (or emigration) do not occur between sampling events.
2. All cutthroat trout have equal probability of being marked during the first event, *or* every fish has an equal probability of being sampled during the second event, *or* marked and unmarked fish mix completely between events.
3. Marking does not affect the catchability of a fish.
4. Cutthroat trout do not lose their marks between events, and marks are recognized and reported.

Growth recruitment in the first assumption was not expected to be significant due to the short duration between mark and recapture events. Because sampling was assumed to occur after the spawning season (Harding 1995, Lum et al. 1999) and a weir was operated on the outlet of the lake, significant immigration was also unlikely. Emigration from Auke Lake during the study would be detected at the weir. Assumption 4 was assured because of double marking (secondary fin clip mark) and thorough examination of all cutthroat trout captured.

Size-selective sampling (a violation of the second assumption) was investigated with two Kolmogorov-Smirnov (KS) tests (Appendix B1). If size-selective sampling occurred during the second sampling event ($P < 0.1$), the experiment would be stratified by fish size to reduce bias. Appropriate strata for such an analysis would be determined with a series of chi-square tests based on 30-mm size classes. The scheme that produced the largest chi-square value (i.e., the greatest difference in capture probabilities) would be employed to stratify the data.

Two chi-square tests (Seber 1982:438-39, Arnason et al. 1996) were also used to determine if the data were consistent with the second assumption. Data were compiled by marking and recovery area (areas A-C of the lake) and input to the Stratified Population Analysis System (SPAS) (Arnason et al. 1996) to complete the consistency tests, any beneficial data pooling, and to estimate abundance. The chi-square tests estimate probabilities that (1) fish marked in the different initial strata were recaptured at equal rates in the second sample, and (2) marked fractions were similar in each recovery stratum. If either of these tests yielded a non-significant result, strata were pooled to simplify the model. If all spatial strata are pooled, a Petersen model remained to estimate abundance. If a geographically stratified model was needed, strata were pooled to find admissible

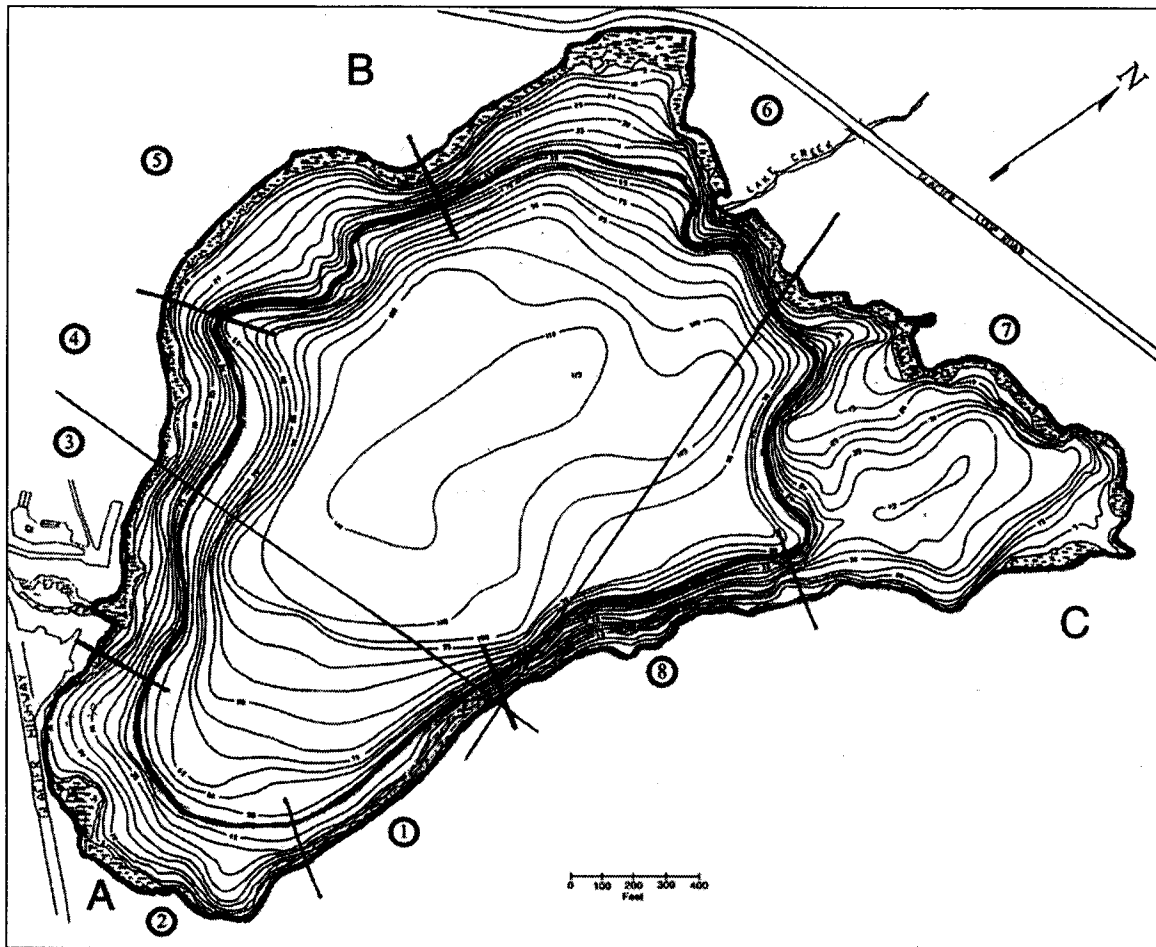


Figure 2.—Bathymetric map of Auke Lake in northern Southeast Alaska, showing location of sampling areas in 1999. The lake area inside the inner bold line was excluded from sampling as depths were >15 m.

(non-negative) estimates, reduce the number of estimated parameters and increase precision while finding no evidence of lack of fit (Arnason et al. 1996). Two main points were considered if pooling strata: the similarity of the fractions of fish marked (for recovery strata), and the similarity of recovery fractions (for marking strata).

LAKE POPULATION LENGTH COMPOSITION

Length composition of cutthroat trout in the lake was estimated by size increments. If the population estimate was stratified, then the fraction $p_{a,i}$ of the fish in length group a (i.e., 20-mm increments) of length stratum i (i.e., large or small fish) was

calculated as:

$$\hat{p}_{a,i} = \frac{n_{a,i}}{n_i} \quad (3)$$

where n_i is the number of large or small fish successfully measured for length and $n_{a,i}$ is the number from this sample that belong to length group a . Note that $\sum_a \hat{p}_{a,i} = 1$. The variance for $\hat{p}_{a,i}$ is

$$V[\hat{p}_{a,i}] = \left(1 - \frac{n_i}{\hat{N}_i}\right) \frac{\hat{p}_{a,i}(1 - \hat{p}_{a,i})}{n_i - 1} \quad (4)$$

where a finite population correction factor, $(1 - \frac{n_i}{\hat{N}})$, is included because of the high sampling rate and availability of a precise estimate of abundance (\hat{N}_i) from the mark-recapture experiment. The estimated abundance of length group a in the population (\hat{N}_a) is

$$\hat{N}_a = \sum_i \hat{p}_{a,i} \hat{N}_i \quad (5)$$

where \hat{N}_i = the estimated abundance in length stratum i of the mark-recapture experiment. The variance of \hat{N}_a is (Goodman 1960):

$$\text{var}[\hat{N}_a] = \sum_i \left[\text{var}(\hat{p}_{a,i}) \hat{N}_i^2 + \text{var}(\hat{N}_i) \hat{p}_{a,i}^2 - \text{var}(\hat{p}_{a,i}) \text{var}(\hat{N}_i) \right] \quad (6)$$

If the population estimate was unstratified by size class, the notation for length stratum i is dropped from the equations above and no further calculations are required. If size stratification is needed, the estimated fraction of the population that belongs to length group a (\hat{p}_a) is

$$\hat{p}_a = \frac{\hat{N}_a}{\sum_i \hat{N}_i} \quad (7)$$

and variance of \hat{p}_a is approximated with the delta method (see Seber 1982):

$$\text{var}(\hat{p}_a) \cong \hat{N}^{-2} \sum_i [\hat{N}_i^2 \text{var}(\hat{p}_{a,i})] + \hat{N}^{-2} \sum_i [\text{var}(\hat{N}_i) (\hat{p}_{a,i} - \hat{p}_a)^2] \quad (8)$$

where $\hat{N} \equiv \sum_i \hat{N}_i$.

If size-selectivity could not be excluded with one application of the protocols in Appendix B1, large and small fish were subdivided further, and the equations reapplied to achieve unbiased estimates.

RESULTS AND DISCUSSION

MIGRANT DOLLY VARDEN

The total number of Dolly Varden passed downstream through the weir in 1999 was 6,393 (Table 3 and Figure 3). The first Dolly Varden was captured on March 24 and the daily counts peaked on May 14 (Appendix A1). The midpoint of the migration was on May 14 (Figure 4 and Table 3). The average midpoint date of the emigration for 1980–1998 was May 8, with a range between April 30 in 1988 and May 24 in 1982. A total of 16 adipose-clipped fish emigrated which probably were marked in 1997 at Windfall Lake which is located about 15 km north of Auke Lake (Jones and Harding 1998).

Table 3.—Annual counts of downstream migrant, wild Dolly Varden and cutthroat trout at Auke Creek, 1980–1999. Hatchery-produced or lake-stocked cutthroat trout are not included in this table.

Year	Dolly Varden	Midpoint of emigration	Cutthroat trout	Midpoint of emigration
1980	3,110	13-May	85	18-May
1981	6,461	05-May	157	14-May
1982	4,136	24-May	157	31-May
1983	3,718	07-May	149	15-May
1984	4,512	08-May	198	14-May
1985	3,052	14-May	112	21-May
1986	4,358	13-May	99	24-May
1987	6,443	06-May	250	17-May
1988	6,770	30-Apr	294	09-May
1989	7,230	08-May	259	18-May
1990	6,425	05-May	417	11-May
1991	5,579	17-May	237	20-May
1992	6,839	04-May	219	16-May
1993	5,074	08-May	174	14-May
1994	7,600	04-May	422	13-May
1995	11,732	09-May	412	13-May
1996	11,323	04-May	462	07-May
1997	10,506	07-May	418	12-May
1998	7,532	01-May	336	11-May
Average	6,442	08-May	256	15-May
1999	6,393	14-May	340	16-May

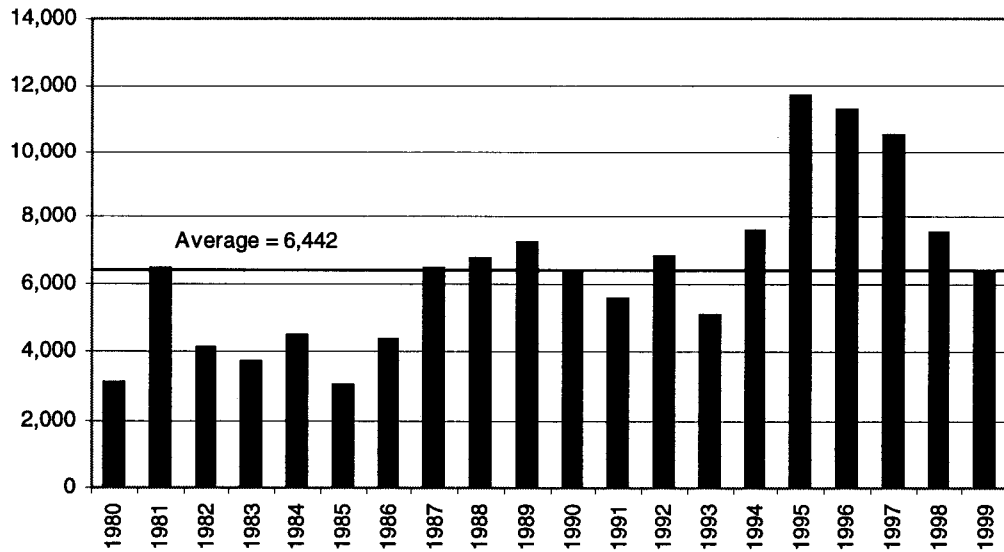


Figure 3.—Annual emigration of Dolly Varden at Auke Creek, 1980–1999.

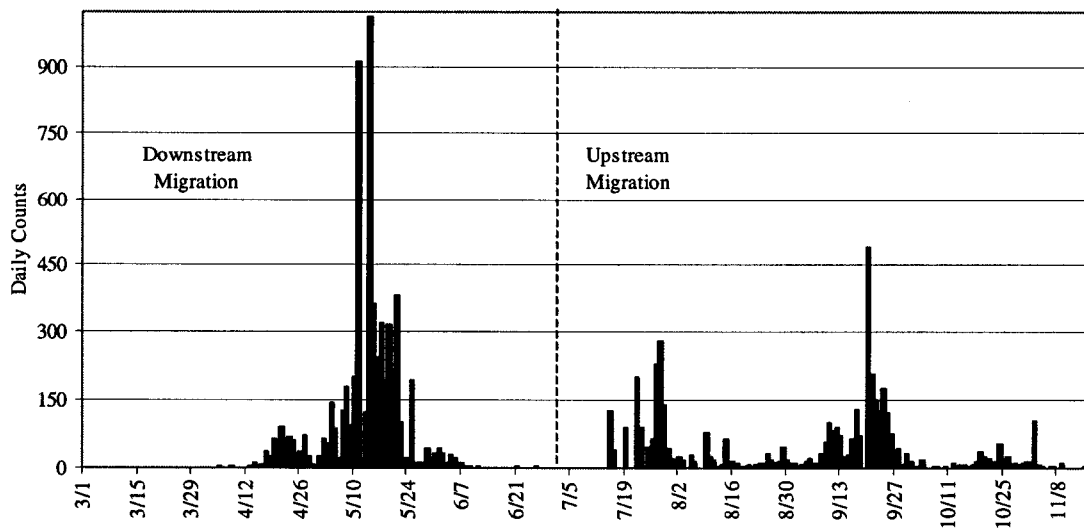


Figure 4.—The 1999 migration for Dolly Varden at Auke Creek. Spring downstream migration started March 24 and ended June 27. Fall upstream migration started July 15 and ended November 16. The vertical dashed line delineates when the weir was converted to count upstream migrants.

The Dolly Varden immigration began July 15, and the last fish was captured November 16. A total of 4,709 fish passed upstream through the weir (Figure 4 and Appendix A2). Major peaks in immigration occurred in late July and late September.

The average fork length of emigrant Dolly Varden in 1999 was 245 mm (SD = 70), with a range from 87 mm to 555 mm (n = 691). The weekly average length of emigrant Dolly Varden declined over time (Figure 5) as larger fish tended to emigrate earlier.

MIGRANT CUTTHROAT TROUT

A total of 351 cutthroat trout emigrated in 1999 including 340 wild fish and 11 lake-stocked fish identified by missing ventral fins. This is below the recent (1994–1998) average of 410 wild cutthroat trout, but above the 1980–1998 average of 256 (Table 3, Figure 6). The total emigration of cutthroat trout from Auke Lake has been bolstered by lake-stocked releases since 1983

(Figure 6); however, lake-stocked fish are not included in the average count. The first emigrant was captured April 16, and the last on June 22; the midpoint of emigration was May 16 (Figure 7 and Appendix A1). The average historical median date of emigration is May 15 (1980–1998), with a range from May 7 to May 31 (Table 3). For both Dolly Varden and cutthroat trout, the midpoint of the migration was latest in 1982, coinciding with the latest date (May 14) of ice breakup on Auke Lake (Wing and Pella 1998). Water temperatures during the emigration in 1999 ranged between 2.3° and 15.8°C.

Of the 351 emigrants in 1999, 149 had been tagged during downstream migrations in 1997 or 1998. The remaining 202 fish were successfully PIT tagged and released (Appendix A3). Gravid cutthroat trout (gametes easily extruded during handling) were observed through May 21. Of the 351 emigrants, 127 (36%), including 67 females, showed obvious signs of being sexually mature. Three cutthroat trout died during downstream operations.

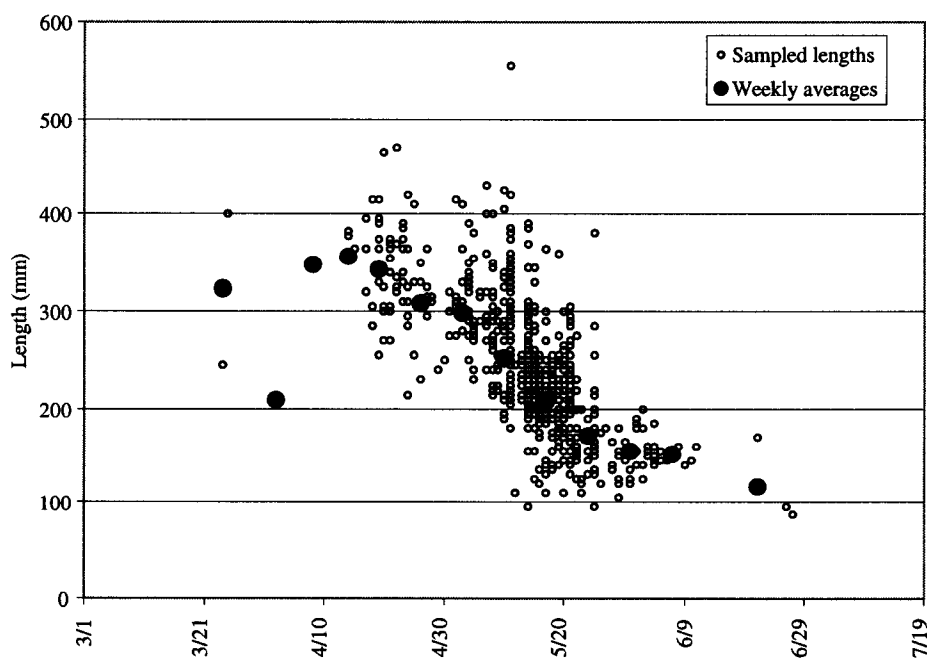


Figure 5.—Dolly Varden fork lengths (mm) over time during the downstream migration at Auke Creek, 1999. Average lengths by week are overlaid upon sampled length data.

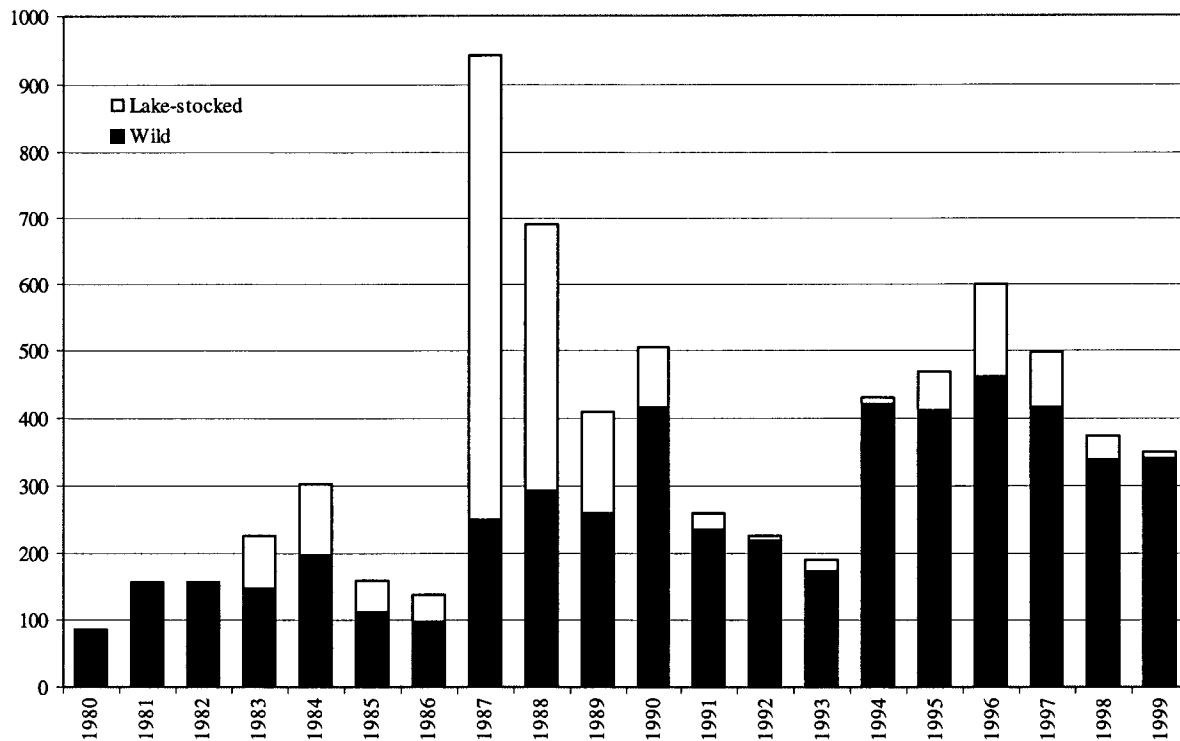


Figure 6.—Annual downstream cutthroat trout migration for Auke Creek, 1980–1999. Hatchery cutthroat trout were stocked in Auke Lake in 1983 (1,286 right ventral marked and 4,078 left ventral marked fish), 1986 (3,489 adipose-clipped fish), 1987 (1,719 adipose-clipped fish), 1991 (2,465 right ventral marked fish), and 1994 (3,098 left and right ventral marked fish).

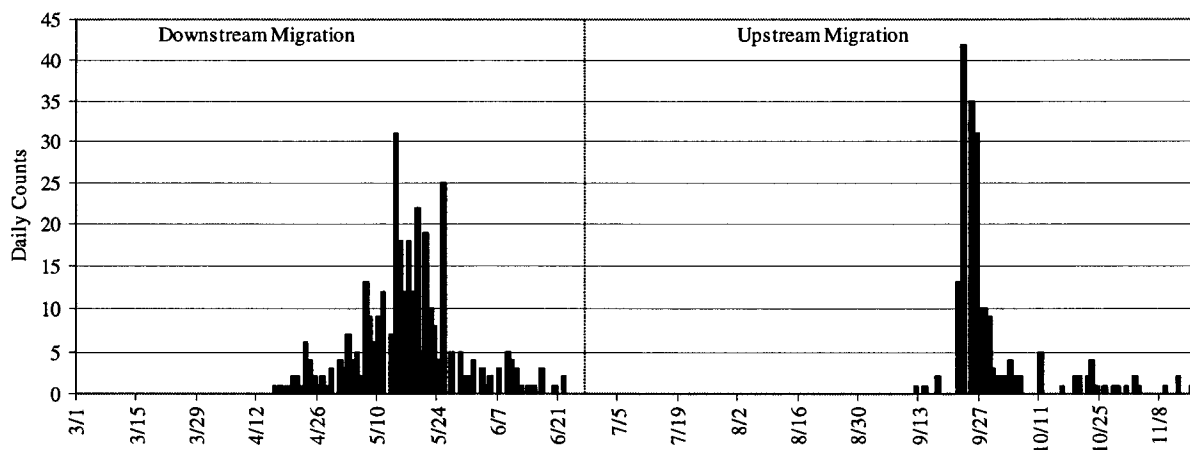


Figure 7.—The cutthroat trout migration for Auke Creek, 1999. Spring downstream migration started April 16 and ended June 22. Fall upstream migration started August 16 and ended November 16. The vertical dashed line delineates when the weir was converted to count upstream migrants.

The first of 205 immigrant cutthroat trout returned on August 16; however, to prevent high mortality seen in previous years, cutthroat trout showing signs of freshwater intolerance were placed back downstream. During 1997, marked fish that were placed back downstream returned back to the weir within 2 to 3 weeks and had grown on average another 10 mm prior to their release upstream. Because immigration during the fall tends to be influenced by increased water flow during freshets anyway, run timing was sacrificed to ensure fewer numbers of mortalities. Despite our efforts, 10 cutthroat trout mortalities were recovered at the weir during the immigration, of which all were PIT tagged. The peak in mortalities occurred in mid-September, and wounds were noted on several of these fish as they were passed through the weir. Most of the cutthroat trout (162 fish) migrated upstream in late September, with the highest daily count of the upstream migration on September 23 (Figure 7).

There were 126 adipose-clipped cutthroat trout, one of those did not have a PIT or a VI tag (Appendix A4). It isn't known if this fish lost its PIT tag, or if it had been clipped during studies prior to 1997 when we were not PIT tagging fish. Cutthroat trout were adipose-clipped and tagged with VI tags in 1994, 1995, and 1996. Analysis from 1996 and 1997 outmigrants indicated high one-year VI tag loss of 69% and 60%, respectively. Separating VI tag loss from PIT tag loss has been difficult because of the diverse life history behavior cutthroat trout exhibit. Cutthroat trout have been shown to overwinter in other systems for 1 or more years before returning to the Auke Lake system, as opposed to overwintering in one system every year. Four adipose-clipped PIT tagged fish also had VI tags from 1996.

Length Distribution

The fork length of emigrating wild sea-run cutthroat trout averaged 282 mm (SD = 54 mm), and ranged from 166 to 444 mm. The lake-stocked (ventral fin-clipped) emigrants averaged 314 mm (SD = 45 mm), and ranged from 228 to 380 mm. The weekly average length of all emigrants tended to decline over time (Figure 8).

Immigrants averaged 293 mm (SD = 67 mm), ranging from 126 to 462 mm. Average lengths of immigrating cutthroat trout did not vary over time (Figure 9). The length of lake-stocked immigrants returning in the fall (7 trout) averaged 341 mm (SD = 35 mm) and ranged from 302 to 405 mm. The length frequency distributions for cutthroat trout measured at the weir during the spring was unimodal with a peak around 250 mm, while the fall migration was bimodal with peaks around 210 mm and 320 mm (Figure 10).

Marine Residence and Growth

PIT-tagged cutthroat trout that returned to Auke Creek in the summer and fall averaged 133 days out of the Auke Lake system (versus 126 days in 1998), ranging from 90 to 199 days. During this time, average length increased 59 mm (range from 13 to 124 mm) and average daily growth rates ranged from about 0.1 to 0.8 mm/day, depending on the size at emigration (Figures 11 and 12). The average growth rate of cutthroat trout was 0.45 mm/day, slightly less than the 0.48 mm/day and 0.49 mm/day observed in the fall of 1997 and 1998, respectively (Lum et al. 1999).

CUTTHROAT TROUT IN AUKE LAKE

Abundance

We captured a total of 678 cutthroat trout in Auke Lake: 99% (670) of the fish were caught in large traps, and 8 were caught by hook-and-line gear (Table 4 and Figure 13). We PIT tagged 338 fish from the 611 which had a FL \geq 180 mm (Appendix A5); the rest were already tagged.

In the first sampling event, 185 unmarked cutthroat trout between 180 mm and 349 mm FL were captured and tagged (Table 5). Also captured were three sea-run fish that were PIT tagged at the weir during either the 1997 (1 fish) or 1998 (2 fish) spring migrations (they did not migrate out of the lake during spring 1999).

During the recapture event, 262 cutthroat trout between 180 mm FL and 432 mm FL were captured and inspected for marks; and of these, 106 (105 newly tagged plus 1 sea-run recapture)

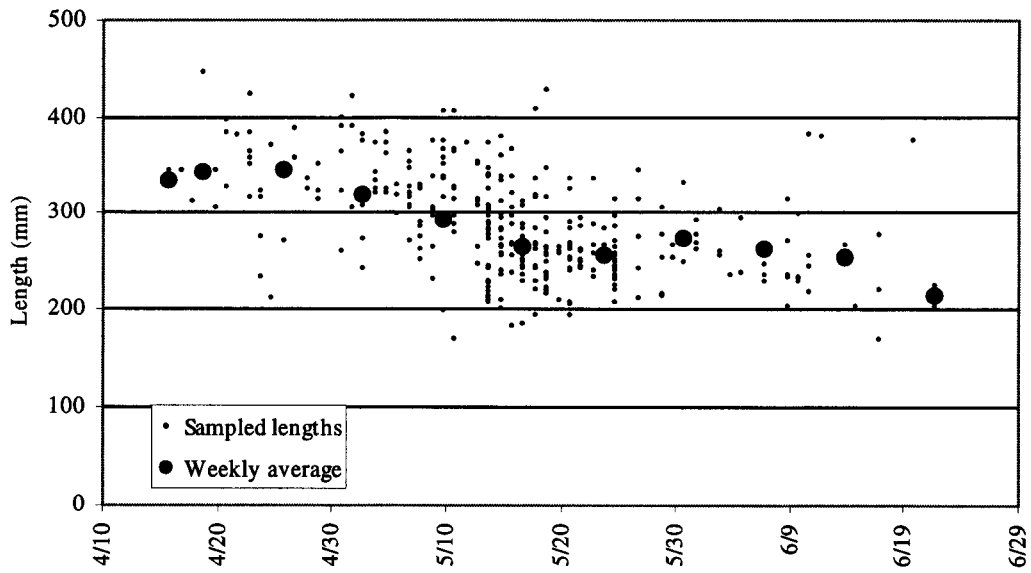


Figure 8.—Cutthroat trout lengths (mm) over time during the downstream migration at Auke Creek, 1999. Average lengths by week are overlaid upon sampled length data.

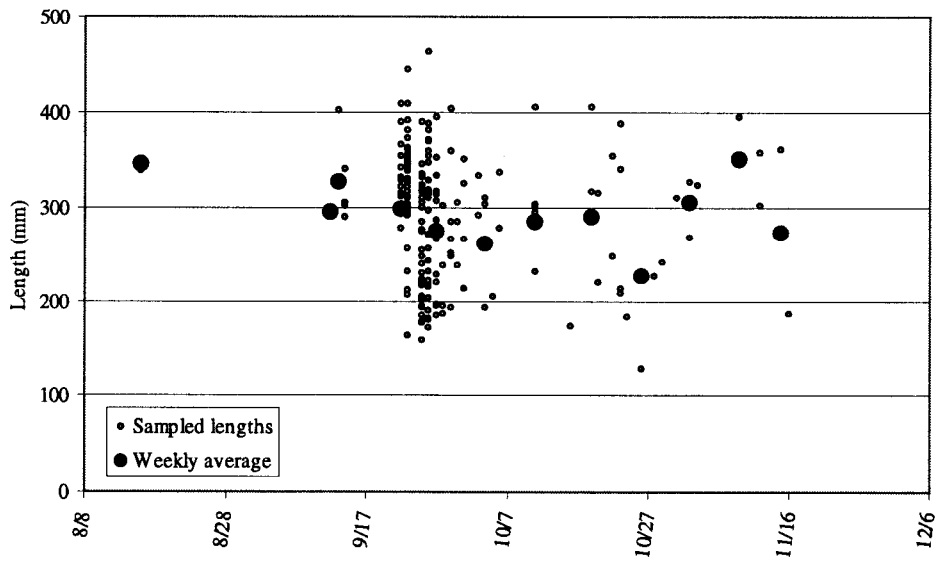


Figure 9.—Cutthroat trout lengths (mm) over time during the upstream migration at Auke Creek, 1999. Average lengths by week are overlaid upon sampled length data.

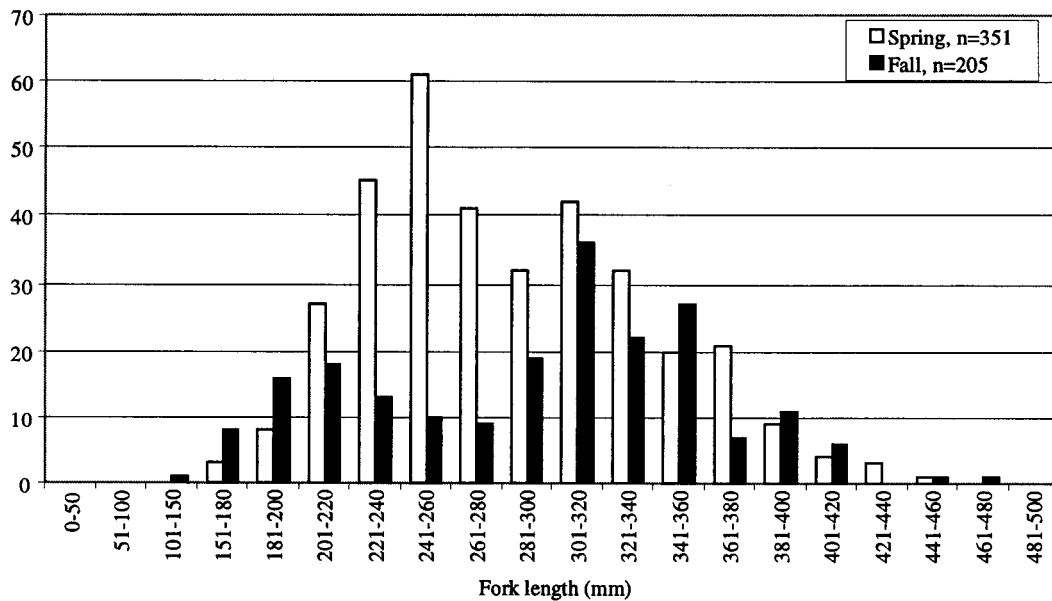


Figure 10.—Length frequency distributions of cutthroat trout captured at Auke Creek weir, spring emigration and fall immigration, 1999.

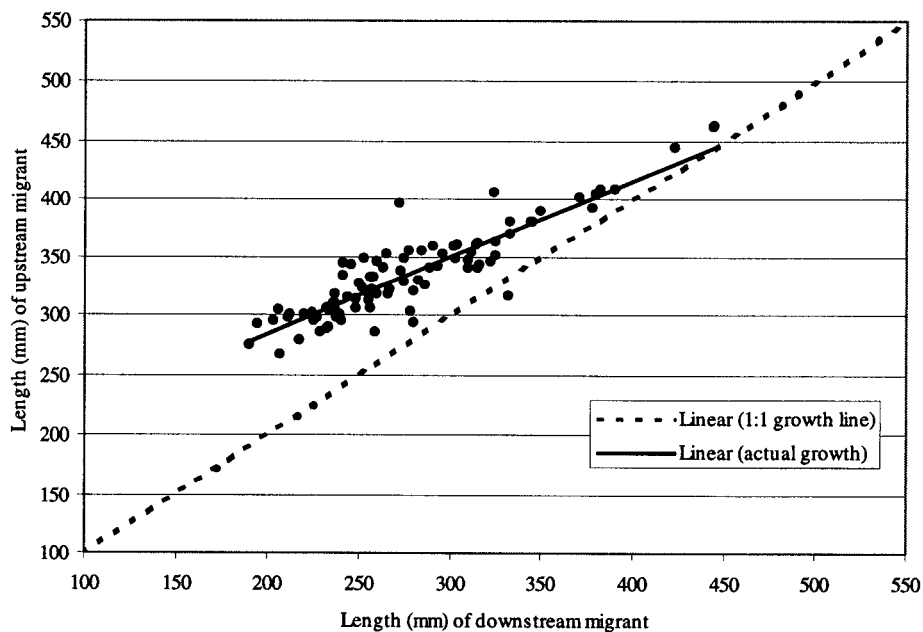


Figure 11.—Length (mm) of upstream migrant cutthroat trout plotted against their length at the time of downstream migration and tagging in the spring, 1999. A 1:1 growth line (dashed line) was added for comparison.

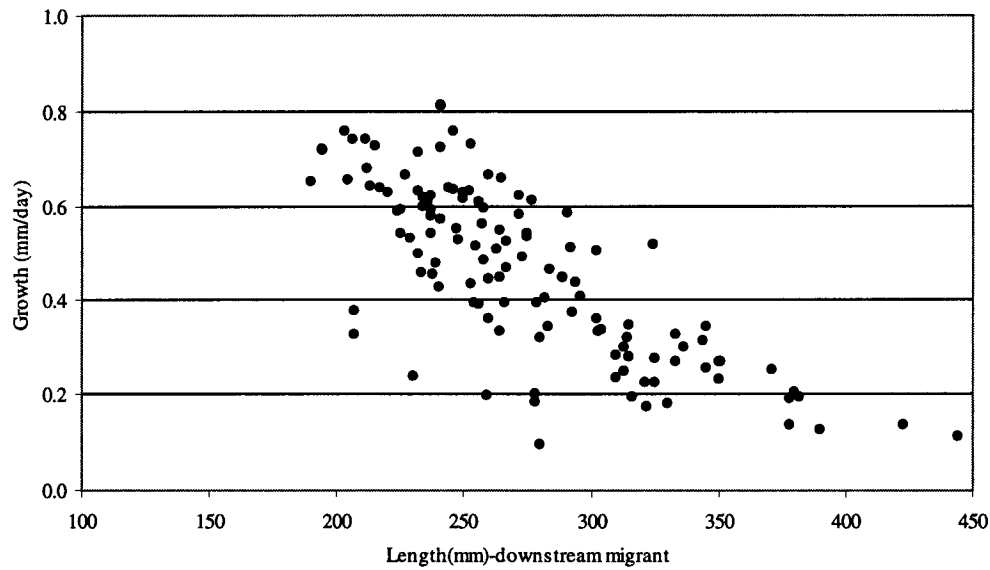


Figure 12.–Cutthroat trout growth (mm/day) during the time between downstream and upstream migration plotted against their size at the time of downstream migration and tagging, Auke Creek, 1999.

Table 4.–Sampling effort (hours) and cutthroat trout catch, and catch per unit effort (CPUE, fish per hour) by sampling event, gear, and size class, Auke Lake, 1999.

Sampling event ^a	Gear	Effort	Size class					
			≥180 mm		<180 mm		Combined	
			Catch	CPUE	Catch	CPUE	Catch	CPUE
Marking	Hook and line	20	1	0.050	0	0.000	1	0.050
	Large traps	3,240	216	0.067	25	0.008	241	0.074
Recovery	Hook and line	20	6	0.300	1	0.050	7	0.350
	Large traps	3,240	388	0.120	41	0.013	429	0.132
Subtotals	Hook and line	40	7	0.175	1	0.025	8	0.200
	Large traps	6,480	604	0.093	66	0.010	670	0.103
Total both events, all gear			611		67		678	

^aMarking = May 25-June 2; Recovery = June 7-June 16.

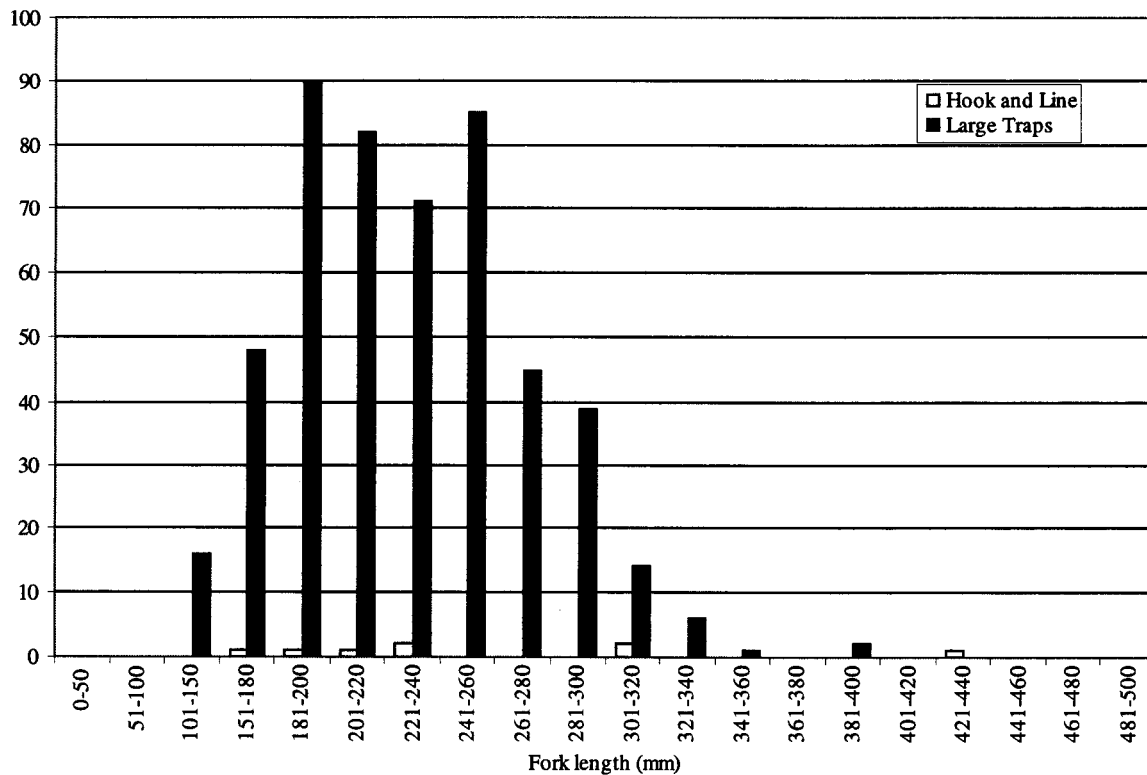


Figure 13.—Length frequency distribution of cutthroat trout captured at Auke Lake by gear type, 1999.

Table 5.—Summary of tagging and recovery data for all cutthroat trout ≥ 180 mm included in the abundance experiment, Auke Lake, 1999. Marking event was 5/25 – 6/2; recapture event was 6/7 – 6/16.

	Marking event	Recapture event
Newly tagged fish released, ≥ 180 mm	185	153
Recaptured newly-tagged fish		105
Sea-run fish observed (remained in lake)	3 ^a	3 ^b
Recaptured sea-run fish ^a		1
Total “marked” or inspected	188	262

^a Three sea-run fish ≥ 180 mm originally PIT tagged at the Auke Creek weir in spring 1997 or 1998, one of which was again caught during recapture event.

^b Three different sea-run fish than those captured during marking event.

had been marked in the first sampling event (Table 5). Three of the fish inspected had also been tagged at the weir in the spring of 1997 or 1998.

Eight cutthroat trout tagged in the marking event and one cutthroat trout tagged in the recapture event outmigrated downstream through the weir in June. These sea-run fish were removed from the study and were not used to estimate abundance of lake-resident fish.

The length frequency distributions of cutthroat trout released with marks during the marking event and those recaptured during the recapture event were not significantly different ($d_{\max} = 0.0907$, $P = 0.564$; Figure 14), suggesting that no size selectivity occurred during the recapture event. Thus, stratification based on size was not necessary for estimating abundance (Appendix B1).

Mixing of fish between sampling areas occurred (Table 6), and the hypothesis of equal marked fractions by area was accepted, suggesting that a simple Petersen model should be used to estimate abundance. The fraction of marked fish (m/c) sampled in the recovery event did not vary significantly ($P = 0.339$, $\chi^2 = 2.16$) between area A (0.45), area B (0.36), and area C (0.36). Fish marked in the different areas were, however, not recaptured at similar rates in the second event ($P = 0.02$, $\chi^2 = 7.77$); the recovery rates of marked fish (Table 6) were 0.54 for fish marked in area A, as compared to 0.47 for B, and 0.75 for area C. The equal marked fractions in each recovery area are enough to insure the Petersen estimate would be unbiased. The estimated abundance of cutthroat trout ≥ 180 mm FL in Auke Lake was 464 (SE = 23). Relative precision for the estimate was $\pm 10\%$, for a 95% confidence interval.

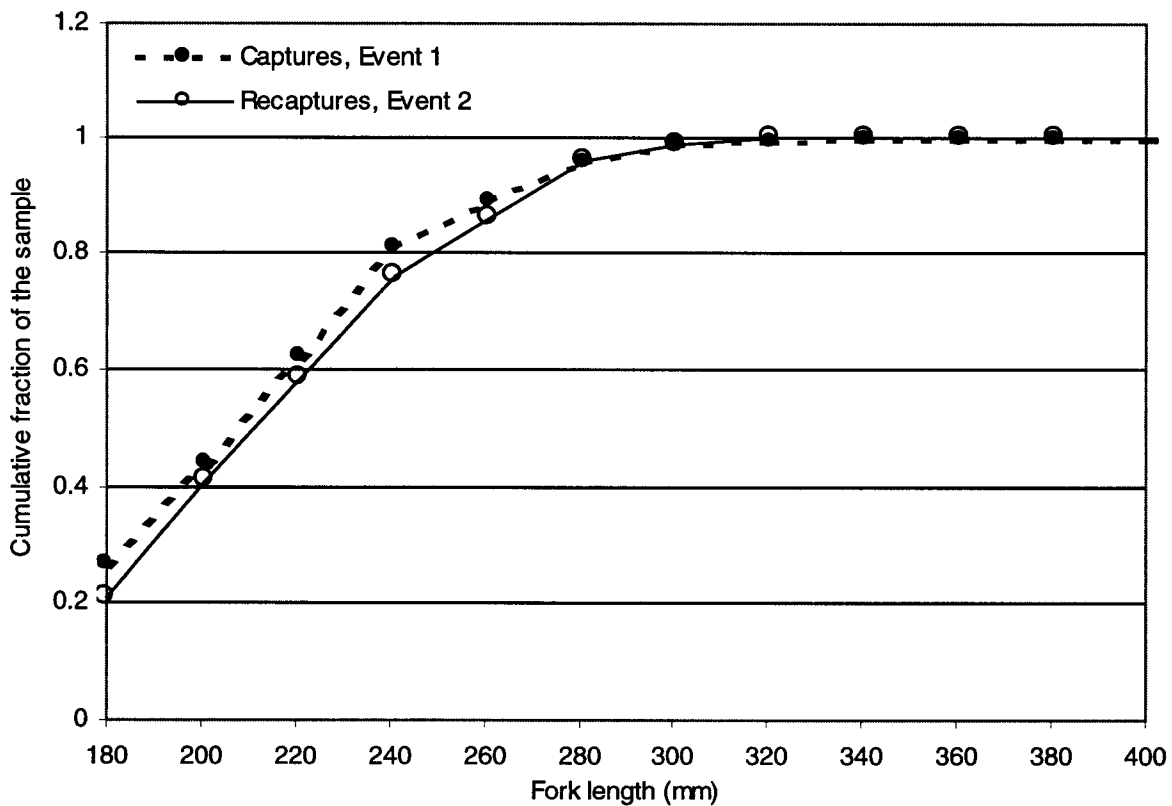


Figure 14.—Cumulative histogram of lengths of cutthroat trout marked versus lengths of cutthroat trout recaptured, Auke Lake, 1999.

Table 6.—Number of cutthroat trout marked by area (a_i), number of marked fish recaptured by area of recapture (m_{ij}), and number of unmarked fish caught by area (u_j) during the recovery event at Auke Lake, 1999.

Area fish was marked	Total fish marked (a_i)	Number of marked fish recaptured by area of recapture (m_{ij})				Proportion recaptured
		A ^a	B ^b	C ^c	Total (all areas)	
A	89 ^d	34	10	4	48	0.54
B	59 ^d	12	8	8	28	0.47
C	40 ^d	10 ^e	7	13	30	0.75
Total	188	56	25	25	106	0.56
Unmarked fish caught (u_j)		68 ^f	44 ^d	44	156	
Total caught in recapture event		124	69	69	262	

^a Study zones 1, 2, and 3.

^b Study zones 4, 5, and 6.

^c Study zones 7 and 8.

^d Count includes 1 fish previously tagged at the weir in 1997 or 1998.

^e Count includes 1 recaptured sea-run fish from marking event and previously tagged at the weir in 1997 or 1998.

^f Count includes 2 fish previously tagged at the weir in 1997 or 1998.

The estimated abundance in 1999 was substantially higher than the estimate of 247 cutthroat trout ≥ 180 mm FL in Auke Lake during July 1998 (Lum et al. 1999). Fish < 180 mm (too small to tag) were also caught in the traps in larger numbers than in 1998. Low catch rates in 1998 may be attributed to either a smaller population or high water temperatures during sampling, or both. We believe that the early timing of sampling in 1999 provided favorable water conditions which resulted in higher catch rates.

In fall 1998, 106 PIT tagged cutthroat trout immigrated into the lake (Lum et al. 1999) and in 1999, 54 of those PIT tagged fish emigrated from the lake, leaving 52 of the PIT tagged fish that either chose to remain in Auke Lake for the summer or died over the winter. An estimated 8 (6 tagged / 344 inspected * total population of 464) PIT tagged fish ≥ 180 mm FL remained alive in the lake in 1999, so we estimate overwinter survival of the 106 fall 1998 immigrants carrying PIT tags at 58% ((54 + 8)/106). This compares to the estimated overwinter survival in 1998 of 67% of the immigrants (Lum et al. 1999).

During our 1999 lake and weir studies, we examined 46 cutthroat trout marked with photonic

dye as a secondary mark during the abundance study in Auke Lake in 1998 and found that 87% (40) still retained their marks in 1999. This indicates that the marking procedure is generally successful for at least a year, but the 13% loss of marks suggests this procedure should not be solely depended upon as a long-term mark.

Length composition

Cutthroat trout caught in the lake averaged 228 mm (SD = 45 mm) in length, and ranged from 109 to 432 mm. The length frequency distributions of cutthroat trout captured during the first and second sampling events were significantly different ($d_{\max} = 0.1284$, $P = 0.0453$; Figure 15), suggesting that there was size selectivity during the first event (marking). Consequently, length data from both events were pooled to estimate length composition of cutthroat trout ≥ 180 mm FL (Table 7). Thirty-seven percent of the population was ≤ 220 mm FL. By regulation, harvest of cutthroat trout in Auke Lake is restricted to fish ≥ 356 mm FL (14 inches TL). Our data suggest that 6 of the cutthroat trout in Auke Lake during July and August exceeded the 14-inch minimum size limit.

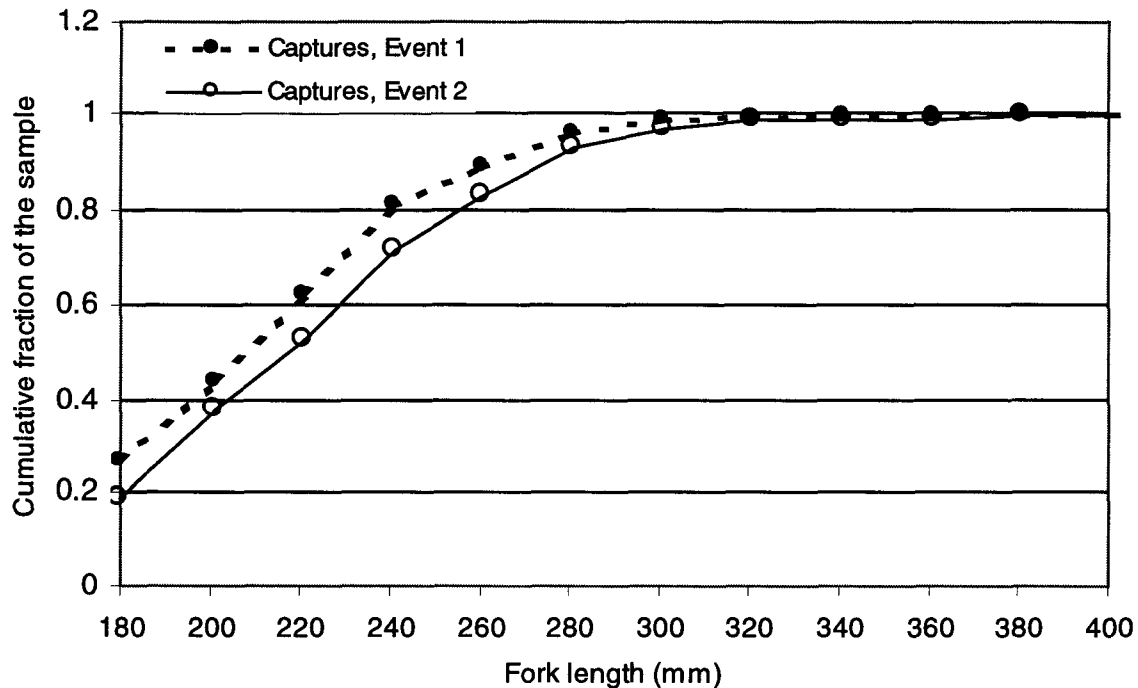


Figure 15.—Cumulative histogram of lengths of cutthroat trout marked versus lengths of cutthroat trout examined for marks, Auke Lake, 1999.

Table 7.—Length composition and estimated abundance at length for cutthroat trout ≥ 180 mm FL, Auke Lake, 1999. Number sampled (n_k), proportion (p_k), abundance (N_k), and standard error (SE) are shown for each 20-mm length class.

Length k, mm FL	n_k	p_k	SE(p_k)	N_k	SE(N_k)
180-199	44	0.17	0.015	77	8
200-219	54	0.20	0.016	95	9
220-239	40	0.15	0.015	70	8
240-259	47	0.18	0.015	83	8
260-279	33	0.13	0.013	58	7
280-299	26	0.10	0.012	46	6
300-319	11	0.04	0.008	19	4
320-339	6	0.02	0.006	11	3
340-359	0	0.00	0	0	0
360-379	0	0.00	0	0	0
380-399	2	0.01	0.004	4	2
400-419	0	0.00	0	0	0
420-439	1	<0.01	0.003	2	1
440-459	0	0.00	0	0	0
460-479	0	0.00	0	0	0
480-499	0	0.00	0	0	0
Total	264		N(est) =	464	

CONCLUSIONS AND RECOMMENDATIONS

Sea-run populations of both Dolly Varden and cutthroat trout overwintering in Auke Lake have increased since the early 1980s, but the recent trend is declining and Dolly Varden numbers are now at the long-term average. Monitoring of these populations at the Auke Creek weir should continue as they provide an important indicator of Juneau area stocks of these species. PIT tagging of emigrating cutthroat trout has also provided valuable information on life history of this species and should also be continued. Catches of cutthroat trout in Auke Lake were much better in 1999, in part because sampling took place in late May and early June rather than in August as in 1998. These increased catches improved the precision of our population estimate, and we therefore recommend that lake sampling in spring should be continued. Continuation of marking and recapture each year will improve and help make baseline information more complete and will provide better evaluation of the photonic dye mark.

ACKNOWLEDGMENTS

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LITERATURE CITED

- Arnason, A. N., C. W. Kirby, C. J. Schwarz, and J. R. Irvine. 1996. Computer analysis of data from stratified mark-recovery experiments for estimation of salmon escapements and other populations. Canadian Technical Report of Fisheries and Aquatic Sciences No. 2106. Department of Fisheries and Oceans, Pacific Biological Station, Nanaimo, B.C.
- Behnke, R. J. 1979. Management and utilization of native trouts. Monograph of the native trouts of the Genus *Salmo* of western North America. Joint publication of USFS, USFWS, and BLM.
- Bernard, D. R. and P. A. Hansen. 1992. Mark-recapture experiments to estimate the abundance of fish. Alaska Department of Fish and Game, Fishery Data Series No. 92-4, Juneau.
- Brown, C. J. D. and J. E. Bailey. 1949. Time and pattern of scale formation in Yellowstone trout *Salmo clarkii lewisii*. Trans. Amer. Micros. Soc. 71: 120-124.
- Ericksen, R. P. 1999. Scale aging manual for coastal cutthroat trout from Southeast Alaska. Alaska Department of Fish and Game, Fishery Data Series No. 99-4, Juneau.
- Goodman, L. A. 1960. On the exact variance of products. Journal of the American Statistical Association 55:708-713.
- Harding, R. D. 1995. Abundance and length composition of cutthroat trout in Florence, Turner, and Young lakes. Alaska Department of Fish and Game, Fishery Data Series No. 95-43, Anchorage.
- Howe, A. L., R. J. Walker, C. Olnes, G. Heineman, and A. E. Bingham. 1999. Harvest and catch in Alaska sport fisheries during 1998. Alaska Department of Fish and Game, Fishery Data Series No. 99-41, Anchorage.
- Jones, J. D. and R. D. Harding. 1998. Juneau roadside cutthroat trout studies: Windfall Creek weir and Windfall Lake, 1997. Alaska Department of Fish and Game, Fishery Data Series No. 98-44, Anchorage.
- Laakso, M. and O. B. Cope. 1956. Age determination in Yellowstone cutthroat trout by the scale method. Journal of Wildlife Management 20(2):2138-2153.
- Lum, J. L., K. Kondzela, J. D. Jones, and S. G. Taylor. 1998. Dolly Varden char and sea-run cutthroat trout populations at Auke Lake, Southeast Alaska, during 1997. Alaska Department of Fish and Game, Fishery Data Series No. 98-43, Anchorage.
- Lum, J. L., J. D. Jones, K. Kondzela, and S. G. Taylor. 1999. Dolly Varden and cutthroat trout populations in Auke Lake, Southeast Alaska, during 1998. Alaska Department of Fish and Game, Fishery Data Series No. 99-32, Anchorage.
- Neimark, L. M. 1984a. Fish migration studies in Southeast Alaska. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual Performance Report 1983-1984. Project F-9-16, 25 (G-II-D).
- Neimark, L. M. 1984b. Enhancement of recreational fishing opportunities in Southeast Alaska. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual Performance Report 1983-1984. Project F-9-16, 25 (G-III-A).
- Schwan, M. 1990. Strategic plans for the Juneau, Ketchikan, and Sitka recreational fisheries. Alaska Department of Fish and Game, Juneau.
- Seber, G. A. F. 1982. The estimation of animal abundance and related parameters. MacMillan and Company, New York.
- Spense, C. R. 1990. Management options for sea-run cutthroat trout on the Queen Charlotte Islands. Province of British Columbia Ministry of Environment Fish and Wildlife Branch Report.
- Taylor, S. G. and J. L. Lum. 1999. Annual report Auke Creek weir 1998, Operations, fish counts, and historical summaries. Unpublished report located at: National Marine Fisheries Service. Auke Bay Laboratory, 11305 Glacier Highway, Juneau, Alaska 99801-8626.
- Taylor, S. G. and J. L. Lum. 2000. Annual report Auke Creek weir 1999, Operations, fish counts, and historical summaries. Unpublished report located at: National Marine Fisheries Service. Auke Bay Laboratory, 11305 Glacier Highway, Juneau, Alaska 99801-8626.
- Wing, B. L. and J. J. Pella. 1998. Time series analyses of climatological records from Auke Bay, Alaska. U.S. Dept. Com., NOAA Tech. Memo. NMFS-AFSC-91.
- Wright, S. 1992. Guidelines for selecting regulations to manage open-access fisheries for natural populations of anadromous and resident trout in stream habitats. North American Journal of Fisheries Management 12:517-527.

APPENDICES

Appendix A1.—Daily counts of downstream migrant salmonids at Auke Creek, 1999.

		Daily counts							
		Water temp	Pink salmon fry	Coho salmon smolts	Sockeye salmon smolts	Chum salmon fry	Dolly Varden	Cutthroat trout	Steelhead
March	1	1.0	0	0	0	0	0	0	0
	2	1.0	0	0	0	0	0	0	0
	3	0.7	0	0	0	0	0	0	0
	4	0.7	0	0	0	0	0	0	0
	5	0.8	0	0	0	0	0	0	0
	6	0.8	0	0	0	0	0	0	0
	7	0.8	0	0	0	0	0	0	0
	8	0.8	1	0	0	0	0	0	0
	9	0.8	0	0	0	0	0	0	0
	10	1.0	2	0	0	1	0	0	0
	11	1.0	2	0	0	3	0	0	0
	12	1.0	6	0	0	3	0	0	0
	13	1.0	0	0	0	0	0	0	0
	14	1.0	0	0	0	0	0	0	0
	15	1.0	10	0	0	3	0	0	0
	16	1.0	13	0	0	1	0	0	0
	17	0.9	7	0	0	7	0	0	0
	18	0.8	9	0	0	9	0	0	0
	19	1.0	5	0	0	2	0	0	0
	20	1.0	6	0	0	1	0	0	0
	21	1.0	7	0	0	1	0	0	0
	22	1.2	12	0	0	3	0	0	0
	23	1.3	53	0	0	4	0	0	0
	24	1.8	172	0	0	21	1	0	0
	25	1.8	51	0	0	0	1	0	0
	26	1.8	41	0	0	2	0	0	0
	27	1.8	83	0	0	8	0	0	0
	28	1.8	24	0	0	3	1	0	0
	29	1.8	74	0	0	4	0	0	0
	30	1.8	64	0	0	4	0	0	0
	31	1.9	159	0	0	10	0	0	0
April	1	2.0	121	0	0	8	0	0	0
	2	2.0	109	0	0	10	1	0	0
	3	2.0	163	0	0	8	0	0	0
	4	2.0	143	0	0	5	0	0	0
	5	2.0	222	0	0	15	4	0	0
	6	2.0	232	0	0	10	0	0	0
	7	2.0	129	0	0	15	1	0	0
	8	2.0	162	0	0	7	3	0	0
	9	2.0	376	0	0	32	0	0	0
	10	2.0	324	0	0	28	1	0	0
	11	2.2	313	0	0	20	1	0	0
	12	2.2	824	0	0	29	0	0	0
	13	2.4	616	0	0	29	5	0	0
	14	2.4	686	0	0	23	12	0	0
	15	2.3	983	0	0	62	4	0	0
	16	2.3	1,951	0	0	13	6	1	0
	17	2.5	679	0	0	16	37	1	0
	18	2.8	854	0	0	37	26	1	0
	19	2.8	1,726	0	0	45	64	1	0
	20	3.0	2,177	0	0	48	60	2	0
	21	3.0	918	0	0	8	91	3	0
	22	3.0	1,316	0	0	31	65	1	0
	23	3.0	3,375	0	0	29	68	6	0
	24	3.0	914	0	0	17	62	4	0

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Appendix A1.–Page 2 of 3.

Daily counts								
	Water temp	Pink salmon fry	Coho salmon smolts	Sockeye salmon smolts	Chum salmon fry	Dolly Varden	Cutthroat trout	Steelhead
April 25	3.0	1,862	0	0	23	26	2	0
26	3.1	3,738	0	0	39	36	1	0
27	3.1	2,687	0	0	82	70	2	0
28	3.3	3,114	0	0	63	26	2	0
29	3.5	2,984	0	0	67	6	3	0
30	3.9	2,180	0	0	36	5	0	0
May 1	3.8	1,962	0	0	21	26	5	0
2	3.3	4,123	0	0	64	64	3	0
3	3.6	1,709	1	0	32	55	7	0
4	3.9	1,973	2	0	24	142	5	0
5	4.0	1,717	3	0	24	86	5	0
6	4.2	1,560	2	0	39	22	3	0
7	4.3	576	2	0	21	126	13	0
8	4.8	1,323	2	0	29	180	9	0
9	4.6	437	3	1	15	92	7	0
10	6.0	533	1	0	14	200	10	0
11	6.8	328	18	0	28	908	12	0
12	7.0	226	11	0	5	17	1	0
13	7.7	186	52	1	7	123	7	0
14	9.0	58	139	1	0	1,011	31	0
15	9.5	37	147	10	0	362	18	1
16	10.5	18	235	4	0	242	12	0
17	10.2	39	607	3	0	317	18	1
18	10.7	9	381	7	1	193	13	0
19	10.3	11	330	11	0	316	22	0
20	10.3	5	630	31	0	212	5	0
21	9.9	2	531	53	0	380	19	0
22	9.3	8	389	62	0	100	10	0
23	9.4	4	394	236	0	20	8	0
24	9.1	2	75	115	0	23	4	2
25	7.0	8	286	1,258	0	192	25	1
26	7.2	0	94	495	0	10	0	0
27	7.2	0	54	549	0	9	5	0
28	7.2	0	74	480	0	12	0	0
29	7.4	0	185	1,979	0	44	5	0
30	7.4	0	42	730	0	21	2	0
31	7.8	0	52	1,264	0	32	2	0
June 1	8.3	0	155	2,251	0	43	4	0
2	9.9	0	90	2,905	0	31	0	0
3	9.1	0	52	769	0	11	3	0
4	9.1	2	98	2,911	0	30	1	0
5	9.8	0	53	2,184	0	20	2	0
6	10.3	0	29	1,922	0	10	0	0
7	11.4	0	32	1,827	0	10	3	0
8	12.6	0	33	1,279	0	3	0	0
9	13.2	0	58	724	0	4	5	0
10	13.6	0	8	205	0	1	4	0
11	13.1	0	17	96	0	4	4	0
12	14.2	0	16	294	0	0	1	0
13	15.2	0	15	197	0	0	0	0
14	15.0	0	15	119	0	0	1	0
15	15.8	0	24	75	0	0	1	0
16	16.4	0	8	20	0	0	0	0
17	15.2	0	17	46	0	0	3	0
18	15.3	0	12	31	0	0	0	0

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Appendix A1.–Page 3 of 3.

Daily counts								
	Water temp	Pink salmon fry	Coho salmon smolts	Sockeye salmon smolts	Chum salmon fry	Dolly Varden	Cutthroat trout	Steelhead
June 19	14.8	0	7	23	0	0	0	0
20	14.2	0	4	20	0	0	1	0
21	14.9	0	4	26	0	3	0	0
22	14.9	0	1	2	0	0	2	0
23	15.0	0	1	4	0	0	0	0
24	15.0	0	0	6	0	0	0	0
25	16.0	0	0	6	0	0	0	0
26	16.3	0	0	5	0	2	0	0
27	15.5	0	0	1	0	1	0	0
28	16.0	0	0	3	0	0	0	0
29	15.6	0	0	3	0	0	0	0
30	16.4	0	0	5	0	0	0	0
Totals		53,535	5,491	25,249	1,269	6,393	351	5

Appendix A2.—Daily counts of upstream migrant salmonids at Auke Creek weir, 1999.
Counts do not include sockeye or coho jacks (0-ocean; < 400 mm MEFL), or chinook mini-jacks (0-ocean).

Daily counts									
	Water temp	Sockeye salmon adults	Pink salmon adults	Chum salmon adults	Coho salmon adults	Chinook salmon adults	Dolly Varden	Cutthroat trout	Steelhead
July 1	15.5	0	0	0	0	0	0	0	0
2	15.4	0	0	0	0	0	0	0	0
3	15.5	0	0	0	0	0	0	0	0
4	15.6	0	0	0	0	0	0	0	0
5	15.8	0	0	0	0	0	0	0	0
6	15.8	0	0	0	0	0	0	0	0
7	15.0	0	0	0	0	0	0	0	0
8	16.2	0	0	0	0	0	0	0	0
9	15.4	0	0	0	0	0	0	0	0
10	15.4	0	0	0	0	0	0	0	0
11	15.4	0	0	0	0	0	0	0	0
12	15.8	68	0	0	0	0	0	0	0
13	16.0	206	0	0	0	0	0	0	0
14	16.4	47	0	0	0	0	0	0	0
15	16.8	71	0	0	0	0	124	0	0
16	18.5	9	0	0	0	0	41	0	0
17	18.5	0	0	0	0	0	0	0	0
18	17.5	0	0	0	0	0	0	0	0
19	17.0	2	0	0	0	0	89	0	0
20	16.7	0	0	0	0	0	0	0	0
21	16.2	0	0	0	0	0	0	0	0
22	16.0	454	1	0	0	0	199	0	0
23	16.0	59	0	0	0	0	89	0	0
24	15.7	8	0	0	0	0	3	0	0
25	15.4	0	0	0	0	0	45	0	0
26	14.9	9	0	2	0	0	66	0	0
27	14.5	87	1	10	0	0	228	0	0
28	14.0	123	2	15	0	7	279	0	0
29	14.3	120	21	6	0	2	141	0	0
30	15.2	17	9	9	0	7	42	0	0
31	15.6	4	9	14	0	5	23	0	0
Aug. 1	16.8	1	2	3	0	0	19	0	0
2	17.8	4	1	4	0	0	25	0	0
3	18.2	3	1	1	0	0	18	0	0
4	19.0	0	0	0	0	0	0	0	0
5	19.6	1	1	0	0	0	30	0	0
6	19.9	1	4	0	0	0	15	0	0
7	19.0	0	0	0	0	0	0	0	0
8	18.1	0	0	0	0	0	0	0	0
9	17.2	28	194	32	0	0	80	0	0
10	17.0	31	329	21	0	6	24	0	0
11	16.9	4	88	19	0	1	17	0	0
12	17.5	10	84	4	0	3	2	0	0
13	17.5	5	78	9	0	2	6	0	0
14	16.2	25	836	52	0	0	65	0	0
15	16.3	14	245	13	0	8	24	0	0
16	16.3	10	217	28	0	9	16	2	0
17	15.5	3	166	16	0	3	10	0	0
18	15.7	12	284	19	0	5	5	0	0
19	15.5	8	148	9	0	13	2	0	0
20	15.8	1	257	16	0	1	7	0	0
21	15.6	2	193	8	0	3	0	0	0
22	14.2	8	1,231	17	0	40	8	0	0

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Appendix A2.– Page 2 of 3.

Daily counts									
	Water temp	Sockeye salmon adults	Pink salmon adults	Chum salmon adults	Coho salmon adults	Chinook salmon adults	Dolly Varden	Cutthroat trout	Steelhead
Aug. 23	14.0	5	1,099	13	0	19	12	0	0
24	13.4	7	796	14	0	16	11	0	0
25	13.3	11	2,401	4	0	17	34	0	0
26	13.0	8	1,459	5	0	20	13	0	0
27	13.2	4	582	3	0	21	10	0	0
28	13.2	4	438	5	0	6	14	0	0
29	12.9	4	921	2	0	10	46	0	0
30	12.7	4	1,075	2	0	25	18	0	0
31	12.3	3	450	2	0	11	9	0	0
Sept. 1	12.4	0	561	0	0	15	11	0	0
2	12.8	3	571	0	0	24	4	0	0
3	12.8	8	1,600	0	0	13	7	0	0
4	12.4	7	2,128	1	0	22	13	0	0
5	12.4	2	1,043	1	0	12	22	0	0
6	12.1	0	687	2	0	7	11	0	0
7	12.1	0	852	0	0	12	8	0	0
8	12.0	0	1,430	0	0	7	32	0	0
9	11.8	2	1,855	2	3	8	56	0	0
10	11.8	7	1,912	1	0	4	100	0	0
11	11.7	2	937	2	36	1	84	0	0
12	11.7	7	623	0	24	4	88	1	0
13	11.5	3	332	0	17	0	70	1	0
14	11.4	1	216	0	5	1	24	1	0
15	11.3	0	491	0	4	1	30	0	0
16	11.1	3	520	0	0	0	66	0	0
17	11.0	0	378	0	14	1	128	3	0
18	11.0	11	190	0	103	0	73	0	0
19	11.0	^a	^a	^a	^a	^a	^a	^a	^a
20	10.8	5	77	0	81	0	491	0	0
21	10.7	2	33	0	67	0	207	0	0
22	11.0	2	12	0	88	0	149	13	0
23	11.0	1	15	0	70	0	125	45	0
24	10.1	0	1	0	20	0	177	0	0
25	10.0	0	2	0	23	0	120	35	0
26	10.0	0	4	0	19	0	76	31	1
27	10.1	0	3	0	27	0	37	10	0
28	9.5	0	0	0	20	0	42	10	0
29	9.4	0	1	0	9	0	6	7	1
30	9.3	0	0	0	11	0	33	3	0
Oct. 1	9.7	0	0	0	16	0	13	2	0
2	9.4	0	0	0	21	0	3	2	0
3	9.1	0	0	0	26	0	3	2	0
4	9.1	0	0	0	22	0	19	4	1
5	9.2	0	0	0	6	0	1	2	0
6	9.3	0	0	0	19	0	0	2	0
7	9.0	0	0	0	11	0	2	0	0
8	9.0	0	0	0	8	0	2	0	0
9	8.8	0	0	0	12	0	1	0	0
10	8.5	0	0	0	13	0	2	0	0
11	8.1	0	0	0	4	0	1	5	0
12	8.0	0	0	0	5	0	12	0	0
13	8.0	0	0	0	2	0	4	0	0
14	8.0	0	0	0	8	0	6	0	0
15	7.7	0	0	0	1	0	7	0	0
16	7.8	0	0	0	7	0	3	1	0

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Appendix A2.– Page 3 of 3.

Daily counts									
	Water temp	Sockeye salmon adults	Pink salmon adults	Chum salmon adults	Coho salmon adults	Chinook salmon adults	Dolly Varden	Cutthroat trout	Steelhead
Oct. 17	7.8	0	0	0	3	0	8	0	0
18	7.8	0	0	0	2	0	13	0	0
19	7.8	0	0	0	5	0	35	2	0
20	7.6	0	0	0	1	0	26	2	0
21	7.5	0	0	0	4	0	22	0	0
22	7.2	0	0	0	3	0	15	2	0
23	7.2	0	0	0	0	0	14	4	0
24	7.1	0	0	0	1	0	55	1	0
25	7.1	0	0	0	1	0	18	0	0
26	7.0	0	0	0	0	0	25	1	0
27	7.0	0	0	0	0	0	7	0	0
28	6.8	0	0	0	2	0	12	1	0
29	6.6	0	0	0	0	0	7	1	0
30	6.4	0	0	0	0	0	12	0	0
31	6.1	0	0	0	0	0	13	1	0
Nov. 1	6.1	0	0	0	0	0	14	0	0
2	6.0	0	0	0	1	0	104	2	0
3	5.7	0	0	0	0	0	7	1	0
4	5.5	0	0	0	0	0	4	0	0
5	5.5	0	0	0	0	0	1	0	0
6	5.5	0	0	0	0	0	2	0	0
7	5.5	0	0	0	0	0	3	0	0
8	5.5	0	0	0	0	0	0	0	0
9	5.5	0	0	0	0	0	9	1	0
10	5.5	0	0	0	0	0	0	0	0
11	5.4	0	0	0	0	0	0	0	0
12	5.4	0	0	0	0	0	1	2	0
13	5.1	0	0	0	0	0	0	0	0
14	5.0	0	0	0	0	0	0	0	0
15	5.0	0	0	0	0	0	2	1	0
16	5.1	0	0	0	0	0	2	1	0
Total		1,571	30,097	386	845	392	4,709	205	3

^a The counting weir was closed on September 19 because of high water and no fish were allowed upstream.

Appendix A3.—PIT tagging information from spring tagging of emigrant cutthroat trout at Auke Creek weir, 1999. Codes used for tagging: NA = data not available, AD = adipose finclip, LV = left ventral finclip, RV = right ventral finclip, AVI = anal fin-visual implant tag, EVI = eye tissue-visual implant tag, ½RV = half right ventral finclip, BDRV = blue dot right ventral fin, BDLV = blue dot left ventral fin, UC = upper caudal finclip, LC = lower caudal finclip.

Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	New fish		Recaptured fish			Comments	
					PIT tag code	Finclip	Tag type	Tag no.	PIT tag code		Finclip
04/16/1999	2.3	1	343	M			PIT		41365A0F20	AD	Ripe
04/17/1999	2.5	2	343	F			PIT		4137282837	AD	
04/18/1999	2.8	3	309	M			PIT		41375D623E	AD	Ripe
04/19/1999	2.8	4	444	F			PIT		412D56377F	AD	Spawn this year
04/20/1999	3.0	5	302	M			PIT		4137362A53	AD	Ripe
04/20/1999	3.0	6	342	M			PIT		4137253357	AD	Ripe
04/21/1999	3.0	7	396	F			PIT		412D6E1E35	AD	Ripe
04/21/1999	3.0	8	382	F			PIT		412D0B450D	AD	Ripe
04/21/1999	3.0	9	325	M	4137233605	AD	PIT			LV	Ripe
04/22/1999	3.0	10	380	F			PIT		4112317B43	AD	Spawn this year
04/23/1999	3.0	11	383	M	41372A2C4A	AD	PIT				Ripe
04/23/1999	3.0	12	349	F	41373A0F32		PIT			AD	Ripe
04/23/1999	3.0	13	423	F			EVI	JK4	412D05384A	AD	
04/23/1999	3.0	14	362	M			PIT		412D156144	AD	Ripe
04/23/1999	3.0	15	314	M			PIT		41375D7363	AD	Ripe
04/23/1999	3.0	16	357	M			PIT		4137403434	AD	Ripe
04/24/1999	3.0	17	230	M	4137301871	AD	PIT				Ripe
04/24/1999	3.0	18	272	F	413742404D	AD	PIT				
04/24/1999	3.0	19	321	M	4136525118	AD	PIT				Ripe
04/24/1999	3.0	20	314	F	4137474E3D	AD	PIT				Ripe
04/25/1999	3.0	21	370	F			PIT		412D7A103D	AD	Ripe
04/25/1999	3.0	22	207	?	4137666E3D	AD	PIT				
04/26/1999	3.1	23	267	M			PIT		41373E5246	AD	
04/27/1999	3.1	24	357	M			PIT		4137482629	AD	Ripe
04/27/1999	3.1	25	387	M			PIT		412D590942	AD	Ripe
04/28/1999	3.3	26	322	M			PIT		4137263033	AD	Ripe
04/28/1999	3.3	27	333	M			PIT		411273252A	ADLV	Ripe
04/29/1999	3.5	28	350	M			PIT		4137702B7A	AD	Ripe
04/29/1999	3.5	29	320	M			PIT		41373D7418	AD	Ripe
04/29/1999	3.5	30	311	M	413749425D	AD	PIT				Ripe
05/01/1999	3.8	31	390	F			PIT		412C7D5348	AD	Ripe
05/01/1999	3.8	32	362	F			PIT		412E333C53	AD	Ripe
05/01/1999	3.8	33	398	F			PIT		412D5E5445	AD	Ripe
05/01/1999	3.8	34	321	M			PIT		41375E2846	AD	Ripe
05/01/1999	3.8	35	256	M			PIT		4111266A1E	ADRV	Ripe, regenerated RV clip
05/02/1999	3.3	36	420	M			PIT		412D166137	AD	Ripe
05/02/1999	3.3	37	389	M			PIT		411270076E	AD	Ripe

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Appendix A3.—Page 2 of 10.

Codes used for tagging: NA = data not available, AD = adipose finclip, LV = left ventral finclip, RV = right ventral finclip, AVI = anal fin-visual implant tag, EVI = eye tissue-visual implant tag, ½RV = half right ventral finclip, BDRV = blue dot right ventral fin, BDLV = blue dot left ventral fin, UC = upper caudal finclip, LC = lower caudal finclip.

Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	New fish		Recaptured fish			Comments
					PIT tag code	Finclip	Tag type	Tag no.	PIT tag code	
05/02/1999	3.3	38	303	M	41373C3E07	AD	PIT			Ripe
05/03/1999	3.6	39	375	F	41372C2653	AD	PIT			Ripe
05/03/1999	3.6	40	240	M	41365D2972	AD	PIT			Ripe
05/03/1999	3.6	41	271	M	4136795C54	AD	PIT			Ripe
05/03/1999	3.6	42	381	F			PIT		412D225A6C	AD
05/03/1999	3.6	43	306	M			PIT		4137277753	AD
05/03/1999	3.6	44	320	M			PIT		4137375205	AD
05/03/1999	3.6	45	322	F			PIT		4136662452	AD
05/04/1999	3.9	46	332	F	413748762E	AD	PIT			Ripe
05/04/1999	3.9	47	340	M			PIT		412D73424D	AD
05/04/1999	3.9	48	371	M			PIT		412C7B627D	AD
05/04/1999	3.9	49	322	F			PIT		41377D3E72	AD
05/04/1999	3.9	50	318	F			PIT		41125E1202	ADLV
05/05/1999	4.0	51	360	F	41374F2541	AD	PIT			Ripe, upper caudal torn
05/05/1999	4.0	52	371	F			PIT		412D5A2174	AD
05/05/1999	4.0	53	318	M			PIT		4137685852	AD
05/05/1999	4.0	54	382	F			PIT		412D5D2B79	AD
05/05/1999	4.0	55	323	F			PIT		41374E6221	AD
05/06/1999	4.2	56	316	F	4137732D27	AD	PIT			LV
05/06/1999	4.2	57	327	F	41374C1830	AD	PIT			Ripe
05/06/1999	4.2	58	296	F			PIT		41374C665C	AD
05/07/1999	4.3	59	317	M	4137497971	AD	PIT			Ripe
05/07/1999	4.3	60	267	?	4137427509	AD	PIT			
05/07/1999	4.3	61	362	F	4137394150		PIT			AD
05/07/1999	4.3	62	352	M			PIT		4113151639	AD
05/07/1999	4.3	63	351	F			PIT		412D0E386E	AD
05/07/1999	4.3	64	325	F			PIT		412D5F0E24	AD
05/07/1999	4.3	65	318	F			PIT		4137365728	AD
05/07/1999	4.3	66	314	F			PIT		4137542509	AD
05/07/1999	4.3	67	306	M			PIT		4137786B54	AD
05/07/1999	4.3	68	316	M			PIT		412D572018	AD
05/07/1999	4.3	69	345	F			PIT		412D19057F	AD
05/07/1999	4.3	70	303	F			PIT		41374C031F	AD
05/07/1999	4.3	71	314	F			PIT		41120C426F	AD
05/08/1999	4.8	72	283	F	41365A514F	AD	PIT			Ripe
05/08/1999	4.8	73	258	M	41373D2C59	AD	PIT			Ripe
05/08/1999	4.8	74	247	F	4137406510	AD	PIT			Spawn this year

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Appendix A3.—Page 3 of 10.

Codes used for tagging: NA = data not available, AD = adipose finclip, LV = left ventral finclip, RV = right ventral finclip, AVI = anal fin-visual implant tag, EVI = eye tissue-visual implant tag, ½RV = half right ventral finclip, BDRV = blue dot right ventral fin, BDLV = blue dot left ventral fin, UC = upper caudal finclip, LC = lower caudal finclip.

Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	New fish		Tag type	Recaptured fish			Comments
					PIT tag code	Finclip		Tag no.	PIT tag code	Finclip	
05/08/1999	4.8	75	272	M	4136515571	AD	PIT				Ripe
05/08/1999	4.8	76	258	M	41365E7D1C	AD	PIT				Ripe
05/08/1999	4.8	77	288	F	41374B4848	AD	PIT				Ripe
05/08/1999	4.8	78	327	M			PIT		41374D0525	AD	Ripe
05/08/1999	4.8	79	322	F			PIT		412D72763E	AD	Ripe
05/08/1999	4.8	80	326	M			PIT		41374D7C44	AD	Ripe
05/09/1999	4.6	81	228	M	413745727B	AD	PIT			LV	Ripe
05/09/1999	4.6	82	303	M	4137470E44	AD	PIT				Ripe
05/09/1999	4.6	83	294	M	4137291402	AD	PIT				Ripe
05/09/1999	4.6	84	261	M			PIT		4136612114	AD	Ripe
05/09/1999	4.6	85	336	F			PIT		4137236721	AD	Ripe
05/09/1999	4.6	86	374	M			PIT		412D012838	AD	Ripe
05/09/1999	4.6	87	300	M			PIT		41373D7236	AD	Ripe
05/10/1999	6.0	88	194	?	4137394C2F	AD	PIT				Tagged in body cavity
05/10/1999	6.0	89	405	F			PIT		412D5B6737	AD	Ripe
05/10/1999	6.0	90	350	F			PIT		4137403723	AD	Ripe
05/10/1999	6.0	91	364	F			PIT		412D1D5F06	AD	Ripe
05/10/1999	6.0	92	333	M			PIT		4112622B3A	ADLV	Ripe
05/10/1999	6.0	93	336	F			PIT		412D061545	AD	Ripe
05/10/1999	6.0	94	374	F			PIT		412D23584C	AD	Ripe
05/10/1999	6.0	95	357	F			PIT		412D136B5D	AD	Ripe
05/10/1999	6.0	96	350	F			PIT		4136721930	AD	Ripe
05/10/1999	6.0	97	315	F			PIT		41373B4E7C	AD	Ripe
05/11/1999	6.8	98	166	M	4137274334	AD	PIT				Ripe
05/11/1999	6.8	99	276	F			PIT		413745280E	AD½RV	Ripe, BDRV,LC (regen.fin)
05/11/1999	6.8	100	322	F			PIT		4137476678	AD	Ripe
05/11/1999	6.8	101	295	F			PIT		41126B4052	AD	Ripe
05/11/1999	6.8	102	405	M			PIT		412D6D4B78	AD	Ripe
05/11/1999	6.8	103	362	F			PIT		412D637C34	AD	Ripe
05/11/1999	6.8	104	312	F			PIT		4137401C71	AD	Ripe
05/11/1999	6.8	105	364	M			PIT		4137286C54	AD	Ripe
05/11/1999	6.8	106	326	F			PIT		41373C5970	AD	Ripe
05/11/1999	6.8	107	313	F			PIT		413762551D	AD	Ripe
05/11/1999	6.8	108	286	M			PIT		4137621269	AD	Ripe
05/11/1999	6.8	109	362	F			PIT		412D19632B	AD	Ripe
05/12/1999	7.0	110	371	F			PIT		412D6E7D58	ADLV	Ripe
05/13/1999	7.7	111	260	M	41374E4A64	AD	PIT				Ripe

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Appendix A3.-Page 4 of 10.

Codes used for tagging: NA = data not available, AD = adipose finclip, LV = left ventral finclip, RV = right ventral finclip, AVI = anal fin-visual implant tag, EVI = eye tissue-visual implant tag, ½RV = half right ventral finclip, BDRV = blue dot right ventral fin, BDLV = blue dot left ventral fin, UC = upper caudal finclip, LC = lower caudal finclip.

Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	New fish		Tag type	Recaptured fish			Comments
					PIT tag code	Finclip		Tag no.	PIT tag code	Finclip	
05/13/1999	7.7	112	243	M	41366C2541	AD	PIT				
05/13/1999	7.7	113	351	F			PIT		4137591315	AD	Ripe
05/13/1999	7.7	114	313	F			PIT		4137784311	AD	
05/13/1999	7.7	115	309	F			PIT		41373A3127	AD	
05/13/1999	7.7	116	306	F			PIT		4137277567	AD	
05/13/1999	7.7	117	349	F			PIT		4113203A05	AD	Ripe
05/14/1999	9.0	118	220	?	4136581F39	AD	PIT				
05/14/1999	9.0	119		M	ESCAPED						ESCAPED
05/14/1999	9.0	120	279	F	4137726116	AD	PIT				
05/14/1999	9.0	121	305	F	4137796306	AD	PIT				
05/14/1999	9.0	122	324	M	4137274E4B	AD	PIT				
05/14/1999	9.0	123	294	M	413745516F	AD	PIT				Ripe
05/14/1999	9.0	124	288	F	4136521B13	AD	PIT				
05/14/1999	9.0	125	215	?	41374D6F2D	AD	PIT				
05/14/1999	9.0	126	241	?	4137267664	AD	PIT				
05/14/1999	9.0	127	238	?	4137254D3B	AD	PIT				
05/14/1999	9.0	128	206	?	41374F6E69	AD	PIT				
05/14/1999	9.0	129	207	?	4137262928	AD	PIT				
05/14/1999	9.0	130	215	?	4136505268	AD	PIT				
05/14/1999	9.0	131	203	?	41373D4D00	AD	PIT				
05/14/1999	9.0	132	210	?	4137356605	AD	PIT				
05/14/1999	9.0	133	215	?	413729776F	AD	PIT				
05/14/1999	9.0	134	224	M	4137355E3E	AD	PIT				Ripe
05/14/1999	9.0	135	225	?	4137463920	AD	PIT				
05/14/1999	9.0	136	338	M			PIT		41373C6765	AD	Ripe
05/14/1999	9.0	137	345	F			PIT		4136513428	AD	Ripe
05/14/1999	9.0	138	295	M			PIT		41374D364F	AD½RV	
05/14/1999	9.0	139	337	F			PIT		4137262740	AD	
05/14/1999	9.0	140	371	M			PIT		4137311865	AD	Ripe
05/14/1999	9.0	141	302	F			PIT		41372C7A08	AD	
05/14/1999	9.0	142	275	M			PIT		41372D2C35	AD	
05/14/1999	9.0	143	220	?			PIT		41365C124A	AD½RV	No BDRV
05/14/1999	9.0	144	286	M			PIT		41373C5718	AD	
05/14/1999	9.0	145	300	F			PIT		413761633D	AD	
05/14/1999	9.0	146	323	F			PIT		413726204D	AD	
05/14/1999	9.0	147	270	F			PIT		4137416B6C	AD	
05/14/1999	9.0	148	282	M	4137363348		PIT			AD	Ripe

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Appendix A3.-Page 5 of 10.

Codes used for tagging: NA = data not available, AD = adipose finclip, LV = left ventral finclip, RV = right ventral finclip, AVI = anal fin-visual implant tag, EVI = eye tissue-visual implant tag, ½RV = half right ventral finclip, BDRV = blue dot right ventral fin, BDLV = blue dot left ventral fin, UC = upper caudal finclip, LC = lower caudal finclip.

Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	New fish		Recaptured fish			Comments	
					PIT tag code	Finclip	Tag type	Tag no.	PIT tag code		Finclip
05/15/1999	9.5	149	310	F			PIT		412D1F2C72	AD	Ripe
05/15/1999	9.5	150	278	F			PIT		412D19257C	ADLV	Ripe
05/15/1999	9.5	151	378	M			PIT		4137481777	AD	Ripe
05/15/1999	9.5	152	271	M			PIT		4136726B00	AD½RV	BDRV (UC?) Scoliosis
05/15/1999	9.5	153	297	F			PIT		4137297D1D	AD½RV	BDRV (LC?)
05/15/1999	9.5	154	293	?			PIT		4137343C64	AD	
05/15/1999	9.5	155	336	F			PIT		412D0A5B0F	AD	Ripe
05/15/1999	9.5	156	332	F	4137486B2F	AD	PIT				Ripe
05/15/1999	9.5	157	281	M	4136666B60	AD	PIT				
05/15/1999	9.5	158	359	M	4137717D47	AD	PIT				Ripe
05/15/1999	9.5	159	233	M	41372A3765	AD	PIT				
05/15/1999	9.5	160	253	M	413740567A	AD	PIT				Ripe
05/15/1999	9.5	161	260	F	4137354028	AD	PIT				
05/15/1999	9.5	162	254	M	4136727869	AD	PIT				
05/15/1999	9.5	163	237	M	4137474176	AD	PIT				
05/15/1999	9.5	164	205	?	4136643D2E	AD	PIT				
05/15/1999	9.5	165	196	?	413774A6520	AD	PIT				
05/15/1999	9.5	166	205	?	ESCAPED						ESCAPED
05/16/1999	10.5	167	336	F			PIT		4137493259	AD	Ripe
05/16/1999	10.5	168	252	M			PIT		4137252507	AD½RV	
05/16/1999	10.5	169	319	F			PIT		41377A2138	AD	Ripe
05/16/1999	10.5	170	302	M			PIT		4137327430	AD	
05/16/1999	10.5	171	294	M			PIT		4137436054	AD	
05/16/1999	10.5	172	286	F			PIT		413725457D	AD	Ripe
05/16/1999	10.5	173	264	?			PIT		4137273027	AD½RV	
05/16/1999	10.5	174	285	F	4137770D28		PIT				Ripe
05/16/1999	10.5	175	364	F	4136494417		PIT				Ripe
05/16/1999	10.5	176	266	F	413763050E		PIT				Very Ripe
05/16/1999	10.5	177	235	?	41373C540F		PIT				
05/16/1999	10.5	178	180	?	413743272E		PIT				PIT in body cavity; Red dot anal
05/17/1999	10.2	179	285	?			PIT		4137237448	AD	
05/17/1999	10.2	180	305	F			PIT		413747644C	AD	Ripe
05/17/1999	10.2	181	232	F			PIT		41372B191A	AD½RV	Ripe; BDRV (LC?)
05/17/1999	10.2	182	280	F			PIT		4137286B59	AD	Ripe
05/17/1999	10.2	183	181	?	4136555353	AD	PIT				PIT in body cavity; Red dot anal
05/17/1999	10.2	184	282	?	4136506E49	AD	PIT				
05/17/1999	10.2	185	261	?	413774605E	AD	PIT				

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Appendix A3.—Page 6 of 10.

Codes used for tagging: NA = data not available, AD = adipose finclip, LV = left ventral finclip, RV = right ventral finclip, AVI = anal fin-visual implant tag, EVI = eye tissue-visual implant tag, ½RV = half right ventral finclip, BDRV = blue dot right ventral fin, BDLV = blue dot left ventral fin, UC = upper caudal finclip, LC = lower caudal finclip.

Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	New fish		Recaptured fish			Comments	
					PIT tag code	Finclip	Tag type	Tag no.	PIT tag code		Finclip
05/17/1999	10.2	186	310	F	41374B196C	AD	PIT			Ripe	
05/17/1999	10.2	187	246	?	41374A2D1F	AD	PIT				
05/17/1999	10.2	188	280	?	4137342046	AD	PIT				
05/17/1999	10.2	189	240	?	41374F3006	AD	PIT				
05/17/1999	10.2	190	242	?	413768437D	AD	PIT				
05/17/1999	10.2	191	248	?	4137336806	AD	PIT				
05/17/1999	10.2	192	273	?	4137382407	AD	PIT				
05/17/1999	10.2	193	248	?	4137283702	AD	PIT				
05/17/1999	10.2	194	252	?	4137325D56	AD	PIT				
05/17/1999	10.2	195	269	?	413741387C	AD	PIT				
05/17/1999	10.2	196	225	?	4137506920	AD	PIT				
05/18/1999	10.7	197	264	?	4137435942	AD	PIT				
05/18/1999	10.7	198	241	?	41377C6413	AD	PIT				
05/18/1999	10.7	199	190	?	41374B3410	AD	PIT				
05/18/1999	10.7	200	265	?	41376E1006	AD	PIT				
05/18/1999	10.7	201	239	?	41373E131C	AD	PIT				
05/18/1999	10.7	202	316	?	4137262F06	AD	PIT				
05/18/1999	10.7	203	225	?	4136601444	AD	PIT				
05/18/1999	10.7	204	259	?	41373B3529	AD	PIT				
05/18/1999	10.7	205	408	M			PIT		412D1D280F	AD	Ripe
05/18/1999	10.7	206	217	M			PIT		413733374A	AD½RV	BDRV (LC?)
05/18/1999	10.7	207	315	F			PIT		4113031975	ADLV	Ripe
05/18/1999	10.7	208	333	F			PIT		413728312C	AD	Ripe
05/18/1999	10.7	209	282	?			PIT		41377C0F38	AD	
05/19/1999	10.3	210	428	M			PIT		4137395700	AD	
05/19/1999	10.3	211	346	M			PIT		412D24423F	AD	
05/19/1999	10.3	212	260	?			PIT		41373F5A14	AD½RV	
05/19/1999	10.3	213	277	?			PIT		41372A2301	AD	
05/19/1999	10.3	214	315	F	4137317C05	AD	PIT				Ripe
05/19/1999	10.3	215	246	?	4137465879	AD	PIT				
05/19/1999	10.3	216	260	?	4137602047	AD	PIT				
05/19/1999	10.3	217	232	?	413746520B	AD	PIT				
05/19/1999	10.3	218	231	?	41374E2B3D	AD	PIT				
05/19/1999	10.3	219	259	?	41376B0559	AD	PIT				
05/19/1999	10.3	220	292	?	4136620350	AD	PIT				Ripped lower jaw
05/19/1999	10.3	221	228	?	4137275269	AD	PIT				
05/19/1999	10.3	222	214	?	4137391363	AD	PIT				

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Appendix A3.—Page 7 of 10.

Codes used for tagging: NA = data not available, AD = adipose finclip, LV = left ventral finclip, RV = right ventral finclip, AVI = anal fin-visual implant tag, EVI = eye tissue-visual implant tag, ½RV = half right ventral finclip, BDRV = blue dot right ventral fin, BDLV = blue dot left ventral fin, UC = upper caudal finclip, LC = lower caudal finclip.

Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	New fish		Recaptured fish			Comments
					PIT tag code	Finclip	Tag type	Tag no.	PIT tag code	
05/19/1999	10.3	223	277	?	41365E2E0C	AD	PIT			
05/19/1999	10.3	224	217	?	41372B5F4D	AD	PIT			
05/19/1999	10.3	225	253	?	4136681B58	AD	PIT			
05/19/1999	10.3	226	220	?	4136505A2E	AD	PIT			
05/19/1999	10.3	227	255	?	413647516C	AD	PIT			
05/19/1999	10.3	228	245	?	4136487A16	AD	PIT			
05/19/1999	10.3	229	235	?	41364E5238	AD	PIT			
05/19/1999	10.3	230	212	?	4137372B64	AD	PIT			
05/19/1999	10.3	231	232	?	4137317B08	AD	PIT			
05/20/1999	10.3	232	206	?	4137426C12	AD	PIT			
05/20/1999	10.3	233	257	?	41374B5D0F	AD	PIT			
05/20/1999	10.3	234	255	?	413665787A	AD	PIT			
05/20/1999	10.3	235	257	?	41374B1530	AD	PIT			
05/20/1999	10.3	236	260	?	41365B4628	AD	PIT			
05/21/1999	9.9	237	323	?			PIT	41374E1E79	AD	
05/21/1999	9.9	238	288	?			PIT	4137310269	AD	
05/21/1999	9.9	239	204	?			PIT	4136446162	AD½RV	BDRV; Caudal?
05/21/1999	9.9	240	280	F			PIT	413731460A	AD½RV	Ripe; Caudal?
05/21/1999	9.9	241	248	?	41373C137B	AD	PIT			
05/21/1999	9.9	242	250	?	4137301619	AD	PIT			
05/21/1999	9.9	243	265	?	41366A1474	AD	PIT			
05/21/1999	9.9	244	264	?	41365F7831	AD	PIT			
05/21/1999	9.9	245	260	?	413656480F	AD	PIT			Silver
05/21/1999	9.9	246	240	?	4136630B02	AD	PIT			Silver
05/21/1999	9.9	247	201	?	4137500732	AD	PIT			
05/21/1999	9.9	248	258	?	41373E5365	AD	PIT			
05/21/1999	9.9	249	240	?	41366C5E14	AD	PIT			
05/21/1999	9.9	250	250	?	4136533C09	AD	PIT			
05/21/1999	9.9	251	258	?	41366D7148	AD	PIT			
05/21/1999	9.9	252	247	?	4136621617	AD	PIT			Silver
05/21/1999	9.9	253	237	?	4137326B05	AD	PIT			Silver
05/21/1999	9.9	254	191	?	4137445058	AD	PIT			
05/21/1999	9.9	255	334	M	MORT		PIT	4136685070	AD½RV	BDRV; Mort
05/22/1999	9.3	256	284	?			PIT	4137445E30	AD	
05/22/1999	9.3	257	248	?	41365D2300	AD	PIT			Silver
05/22/1999	9.3	258	259	?	41372F0A7F	AD	PIT			Silver
05/22/1999	9.3	259	246	?	4137422E5F	AD	PIT			

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Appendix A3.—Page 8 of 10.

Codes used for tagging: NA = data not available, AD = adipose finclip, LV = left ventral finclip, RV = right ventral finclip, AVI = anal fin-visual implant tag, EVI = eye tissue-visual implant tag, ½RV = half right ventral finclip, BDRV = blue dot right ventral fin, BDLV = blue dot left ventral fin, UC = upper caudal finclip, LC = lower caudal finclip.

Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	New fish		Recaptured fish			Comments
					PIT tag code	Finclip	Tag type	Tag no.	PIT tag code	
05/22/1999	9.3	260	291	?	41374D597E	AD	PIT			
05/22/1999	9.3	261	239	?	4136732731	AD	PIT			Silver
05/22/1999	9.3	262	247	?	4136644C09	AD	PIT			Silver
05/22/1999	9.3	263	256	?	4137300D36	AD	PIT			Silver
05/22/1999	9.3	264	256	?	41374C6C2E	AD	PIT			
05/22/1999	9.3	265	241	?	413729130F	AD	PIT			
05/23/1999	9.4	266	335	?			PIT		412D241B5D	AD
05/23/1999	9.4	267	285	?	4136693527	AD	PIT			
05/23/1999	9.4	268	231	?	4136516035	AD	PIT			
05/23/1999	9.4	269	254	?	41374F4315	AD	PIT			
05/23/1999	9.4	270	263	?	4137295D1E	AD	PIT			
05/23/1999	9.4	271	237	?	4137397E66	AD	PIT			
05/23/1999	9.4	272	241	?	Not tagged		PIT			Mort next day; immature female
05/23/1999	9.4	273	187	F	Mort		PIT			Dead in box, immature female
05/24/1999	9.1	274	264	?	41365E397F	AD	PIT			
05/24/1999	9.1	275	280	F	4136656F09	AD	PIT			Ripe
05/24/1999	9.1	276	246	?	4136726934	AD	PIT			
05/24/1999	9.1	277	255	?	41364F7138	AD	PIT			
05/15/1999	9.5	278	264	M			PIT		4136612114	AD
05/25/1999	7.0	279	284	?			PIT		413772092A	AD
05/25/1999	7.0	280	294	?			PIT		41373D0125	AD
05/25/1999	7.0	281	311	?			PIT		41376C447C	AD
05/25/1999	7.0	282	246	?			PIT		41364E512F	AD½RV
05/25/1999	7.0	283	248	?	41374C6246	AD	PIT			BDRV;LC; Silver
05/25/1999	7.0	284	242	?	4136556A4B	AD	PIT			Silver
05/25/1999	7.0	285	231	?	413668423A	AD	PIT			Silver
05/25/1999	7.0	286	236	?	413663621D	AD	PIT			Silver
05/25/1999	7.0	287	237	?	4136630A21	AD	PIT			Silver
05/25/1999	7.0	288	230	?	41373D5964	AD	PIT			Silver
05/25/1999	7.0	289	217	?	41366B6773	AD	PIT			Silver
05/25/1999	7.0	290	203	?	413650372B	AD	PIT			Silver
05/25/1999	7.0	291	253	?	41364C5E03	AD	PIT			Silver
05/25/1999	7.0	292	261	?	41366E6820	AD	PIT			Dark
05/25/1999	7.0	293	232	?	4137336D3F	AD	PIT			Silver
05/25/1999	7.0	294	254	?	413737380D	AD	PIT			Silver; Mort on 5/26/99
05/25/1999	7.0	295	247	?	4137477D57	AD	PIT			Silver
05/25/1999	7.0	296	267	?	41372F0239	AD	PIT			Silver

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Appendix A3.—Page 9 of 10.

Codes used for tagging: NA = data not available, AD = adipose finclip, LV = left ventral finclip, RV = right ventral finclip, AVI = anal fin-visual implant tag, EVI = eye tissue-visual implant tag, ½RV = half right ventral finclip, BDRV = blue dot right ventral fin, BDLV = blue dot left ventral fin, UC = upper caudal finclip, LC = lower caudal finclip.

Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	New fish		Recaptured fish			Comments	
					PIT tag code	Finclip	Tag type	Tag no.	PIT tag code		Finclip
05/25/1999	7.0	297	217	?	41373B5149	AD	PIT			Silver; Mort on 5/26/99	
05/25/1999	7.0	298	222	?	4137386B35	AD	PIT			Silver	
05/25/1999	7.0	299	240	?	4137454957	AD	PIT			Silver; Mort on 5/26/99	
05/25/1999	7.0	300	231	?	4137301F7C	AD	PIT			Silver	
05/25/1999	7.0	301	241	?	4136685E18	AD	PIT			Silver	
05/25/1999	7.0	302	227	?	413741632A	AD	PIT			Silver	
05/25/1999	7.0	303	268	?	41373B6851	AD	PIT			Silver	
05/27/1999	7.2	304	344	F			PIT		412C7B6667	AD	Spent female
05/27/1999	7.2	305	311	?			PIT		4137635F7B	AD	Silver
05/27/1999	7.2	306	273	?	4137753E25	AD	PIT				Silver
05/27/1999	7.2	307	240	?	41372D7C32	AD	PIT				Silver
05/27/1999	7.2	308	208	?	41377C2549	AD	PIT				Silver
05/29/1999	7.4	309	304	?			PIT		413777133E	AD	
05/29/1999	7.4	310	274	?	41374D3C3D	AD	PIT				Silver
05/29/1999	7.4	311	213	?	4137370321	AD	PIT				Silver
05/29/1999	7.4	312	211	?	41366A740E	AD	PIT				Silver
05/29/1999	7.4	313	251	?	413741132E	AD	PIT				
05/30/1999	7.4	314	264	?	4137583015	AD	PIT				Silver
05/30/1999	7.4	315	250	?	4137233726	AD	PIT				Silver
05/31/1999	7.8	316	246	?	4137243F1F	AD	PIT		MORT		
05/31/1999	7.8	317	330	F	4137425324	AD	EVI	F29?		AD	Spent female
06/01/1999	8.3	318	289	?	413745092E	AD	PIT				Silver
06/01/1999	8.3	319	274	?	4137257A4B	AD	PIT				Silver
06/01/1999	8.3	320	258	?	4137436D25	AD	PIT				Silver
06/01/1999	8.3	321	266	?	4137372C69	AD	PIT				Silver
06/03/1999	9.1	322	301	?			PIT		41376C785D	AD	Silver
06/03/1999	9.1	323	252	?	41374B7C2F	AD	PIT				
06/03/1999	9.1	324	257	?	41365C5841	AD	PIT				
06/04/1999	9.1	325	232	?	413647673F	AD	PIT				
06/05/1999	9.8	326	234	?	4137496C36	AD	PIT				Silver
06/05/1999	9.8	327	291	?	413662574D	AD	PIT				Silver
06/07/1999	11.4	328	232	?			PIT		41364A607D	ADBDLV	Silver; BDLV
06/07/1999	11.4	329	226	?			PIT		41375E491F	ADBDLV	Silver; BDLV
06/07/1999	11.4	330	244	?	4137334A31	AD	PIT				Silver
06/09/1999	13.2	331	267	?	4136541E41	AD	PIT				Silver
06/09/1999	13.2	332	232	?	41374D4900	AD	PIT				Silver
06/09/1999	13.2	333	311	?	41374E3E7A	AD	PIT				Silver

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Appendix A3.–Page 10 of 10. Codes used for tagging: NA = data not available, AD = adipose finclip, LV = left ventral finclip, RV = right ventral finclip, AVI = anal fin-visual implant tag, EVI = eye tissue-visual implant tag, ½RV = half right ventral finclip, BDRV = blue dot right ventral fin, BDLV = blue dot left ventral fin, UC = upper caudal finclip, LC = lower caudal finclip.

Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	New fish		Recaptured fish				Comments
					PIT tag code	Finclip	Tag type	Tag no.	PIT tag code	Finclip	
06/09/1999	13.2	334	199	?	4137330737	AD	PIT				Silver
06/09/1999	13.2	335	230	?			PIT		413734F13B	ADBDLV	Silver
06/10/1999	13.6	336	297	?	41372E4A12	AD	PIT				Silver
06/10/1999	13.6	337	229	?	4137320F65	AD	PIT				Silver
06/10/1999	13.6	338	225	?	41365E413D	AD	PIT				Silver
06/10/1999	13.6	339	227	?			PIT		413777567E	ADBDLV	
06/11/1999	13.1	340	252	?	413644645B	AD	PIT				
06/11/1999	13.1	341	215	?			PIT		41376A3413	ADBDLV	
06/11/1999	13.1	342	380	F			PIT		412E01590C	ADLV	Spent female
06/11/1999	13.1	343	424	?			PIT		41372A1A19	ADBDLV	
06/12/1999	14.2	344	378	M			EVI	JH3	412D7B0A25	AD	Spent male
06/14/1999	15.0	345	263	?	4137254044	AD					Silver
06/15/1999	15.8	346	200	M	MORT		PIT		41365F0D0C	ADBDLV	Large predator wound
06/17/1999	15.2	347	275	?	41372a6d10	AD	PIT				
06/17/1999	15.2	348	167	?	41373c1476	AD	PIT				
06/17/1999	15.2	349	217	?	4137454a40	AD	PIT				
06/20/1999	14.2	350	375	F			EVI	JH8	412D1F710A	AD	Spent
06/22/1999	14.9	351	221	?			PIT		41365F5779	ADBDLV	LC
06/22/1999	14.9	352	200	?			PIT		4137455C10	ADBDLV	

Appendix A4.—PIT tagging information from fall recoveries of immigrant cutthroat trout at Auke Creek weir, 1999. Codes used for tagging: NA = data not available, AD = adipose finclip, LV = left ventral finclip, RV = right ventral finclip, AVI = anal fin-visual implant tag, EVI = eye tissue-visual implant tag, NM = no mark, BDA = blue dot on anal fin, ½RV = half right ventral finclip, BDRV = blue dot right ventral fin, BDLV = blue dot left ventral fin, UC = upper caudal finclip, LC = lower caudal finclip.

Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	New fish		Recaptured fish			Comments	
					PIT tag code	Finclip	Tag type	Tag no.	PIT tag code		Finclip
08/16/99	16.3	1	351				PIT		4137233605	AD/LV	Released up by Kurt
08/16/99	16.3	2	340				PIT		4113031975	AD/LV	BDA
09/12/99	11.7	3	295				PIT		4137506920	Ad	MORT 9/13
09/13/99	11.5	4	402				PIT		412D6E7058	AD	BDA
09/14/99	11.4	5	342				PIT		4137343C64	AD	
09/17/99	11.0	6	303				PIT		412D19257C	LV/AD	MORT
09/17/99	11.0	7	290				PIT/AVI		41372A3765	AD	
09/17/99	11.0	8	305				PIT		4137336D3F	AD	
09/22/99	11.0	9	322				PIT		4136541E41	AD	MORT
09/22/99	11.0	10	332				PIT		41366D7148	AD	
09/22/99	11.0	11	343				PIT		41374A2D1F	AD	BDA Faint
09/22/99	11.0	12	409				PIT		412D5D2B79	AD	BDA Faint
09/22/99	11.0	13	330				PIT		41365A514F	AD	
09/22/99	11.0	14	297				PIT		41366A740E	AD	
09/22/99	11.0	15	367				PIT		4137327430	AD	
09/22/99	11.0	16	390				PIT		4136513428	AD	BDA
09/22/99	11.0	17	312				PIT		413665787A	AD	
09/22/99	11.0	18	316				PIT		4137602047	AD	
09/22/99	11.0	19	279				PIT		4137454A40	AD	
09/22/99	11.0	20	355							AD	No PIT
09/22/99	11.0	21	316				PIT		4137267664	AD	MORT
09/23/99	11.0	22	392				PIT		412D7B0A25	AD	BDA vi JH3
09/23/99	11.0	23	327				PIT		4137465879	AD	MORT 7 OCT 99
09/23/99	11.0	24	374				PIT		4137493259	AD	BDA vi JH3
09/23/99	11.0	25	343				PIT		4137732D27	AD/LV	MORT
09/23/99	11.0	26	302				PIT		412D19257C	AD/LV	
09/23/99	11.0	27	313				PIT		4137474176	AD	
09/23/99	11.0	28	355				PIT		41365E2E0C	AD	
09/23/99	11.0	29	444				PIT		412D05384A	AD	BDA VI UNREADABLE
09/23/99	11.0	30	408				PIT		412C7D5348	AD	
09/23/99	11.0	31	347				PIT		412D1F2C72	AD	BDA
09/23/99	11.0	32	318				PIT		41364F7138	AD	
09/23/99	11.0	33	300				PIT		4136505A2E	AD	
09/23/99	11.0	34	302				PIT		4137355E3E	AD	BDA
09/23/99	11.0	35	340				PIT		413745092E	AD	BDA
09/23/99	11.0	36	298				PIT		4137254D3B	AD	

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Appendix A4.-Page 2 of 6. Codes used for tagging: NA = data not available, AD = adipose finclip, LV = left ventral finclip, RV = right ventral finclip, AVI = anal fin-visual implant tag, EVI = eye tissue-visual implant tag, NM = no mark, BDA = blue dot on anal fin, ½RV = half right ventral finclip, BDRV = blue dot right ventral fin, BDLV = blue dot left ventral fin, UC = upper caudal finclip, LC = lower caudal finclip.

Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	New fish		Recaptured fish			Comments	
					PIT tag code	Finclip	Tag type	Tag no.	PIT tag code		Finclip
09/23/99	11.0	37	392				PIT		413743605A	AD	
09/23/99	11.0	38	346				PIT		412D727B3E	AD	
09/23/99	11.0	39	317				PIT		413763050E	AD	
09/23/99	11.0	40	353				PIT		41374C665C	AD	BDA
09/23/99	11.0	41	297				PIT		413777567E	AD	BDLV MORT
09/23/99	11.0	42	363				PIT		412D5F0E24	AD	
09/23/99	11.0	43	340				PIT		41374B196C	AD	MORT
09/23/99	11.0	44	300				PIT		41373E131C	AD	
09/23/99	11.0	45	357				PIT		4136620350	AD	
09/23/99	11.0	46	354				PIT		4137291402	AD	BDA
09/23/99	11.0	47	345				PIT		41377C6413	AD	
09/23/99	11.0	48	349				PIT		41374C031F	AD	
09/23/99	11.0	49	304				PIT		41374F6E69	AD	BDA MORT
09/23/99	11.0	50	323				PIT		41374B7C2F	AD	
09/23/99	11.0	51	256				PIT		4137666E3D	AD	
09/23/99	11.0	52	362				PIT		41373B4E7C	AD	BDA
09/23/99	11.0	53	327				PIT		4136533C09	AD	BDA
09/23/99	11.0	54	310				PIT		413663621D	AD	
09/23/99	11.0	55	311				PIT		4136505268	AD	
09/23/99	11.0	56	295				PIT		41374F3006	AD	BDA MORT
09/23/99	11.0	57	331				PIT		4137726116	AD	MORT
09/23/99	11.0	58	381				PIT		4127CB6667	AD	BDA
09/23/99	11.0	59	381				PIT		411273252A	AD	BDA
09/23/99	11.0	60	295				PIT		413650372B	AD	
09/23/99	11.0	61	355				PIT		4136525118	AD	BDA
09/23/99	11.0	62	292				PIT		4137394C2F	AD	
09/23/99	11.0	63	231							NM	GIVEN BDA
09/23/99	11.0	64	206							NM	GIVEN BDA
09/23/99	11.0	65	211							NM	GIVEN BDA
09/23/99	11.0	66	163							NM	GIVEN BDA
09/25/99	10.0	67	305				PIT		4137300D36	AD	
09/25/99	10.0	68	390				PIT		4137702B7A	AD	BDA
09/25/99	10.0	69	317				PIT		4136621617	AD	BDA
09/25/99	10.0	70	333				PIT		41374C6C2E	AD	
09/25/99	10.0	71	195							NM	GIVEN BDA
09/25/99	10.0	72	192							NM	GIVEN BDA
09/25/99	10.0	73	218							NM	GIVEN BDA

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Appendix A4.-Page 3 of 6.

Codes used for tagging: NA = data not available, AD = adipose finclip, LV = left ventral finclip, RV = right ventral finclip, AVI = anal fin-visual implant tag, EVI = eye tissue-visual implant tag, NM = no mark, BDA = blue dot on anal fin, ½RV = half right ventral finclip, BDRV = blue dot right ventral fin, BDLV = blue dot left ventral fin, UC = upper caudal finclip, LC = lower caudal finclip.

Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	New fish		Recaptured fish			Comments	
					PIT tag code	Finclip	Tag type	Tag no.	PIT tag code		Finclip
09/25/99	10.0	74	184							NM	GIVEN BDA
09/25/99	10.0	75	277							NM	GIVEN BDA
09/25/99	10.0	76	305							NM	GIVEN BDA
09/25/99	10.0	77	223							NM	GIVEN BDA
09/25/99	10.0	78	325							NM	GIVEN BDA
09/25/99	10.0	79	321				PIT		41365C5841		
09/25/99	10.0	80	300				PIT		4137372B64		BDA faint
09/25/99	10.0	81	306				PIT		41373C137B		
09/25/99	10.0	82	336				PIT		4137363348		
09/25/99	10.0	83	333				PIT		4137427509		Wound near adipose
09/25/99	10.0	84	286				PIT		4137320F65		
09/25/99	10.0	85	310				PIT		4136630A21		
09/25/99	10.0	86	305				PIT		4137397E66		
09/25/99	10.0	87	275				PIT		41374B3410		
09/25/99	10.0	88	346				PIT		41373F5A14	AD ½RV	
09/25/99	10.0	89	255							NM	GIVEN BDA
09/25/99	10.0	90	230							NM	GIVEN BDA
09/25/99	10.0	91	221							NM	GIVEN BDA
09/25/99	10.0	92	175							NM	GIVEN BDA
09/25/99	10.0	93	157							NM	GIVEN BDA
09/25/99	10.0	94	216							NM	GIVEN BDA
09/25/99	10.0	95	240							NM	GIVEN BDA
09/25/99	10.0	96	201							NM	GIVEN BDA
09/25/99	10.0	97	249							NM	GIVEN BDA
09/25/99	10.0	98	205							NM	GIVEN BDA
09/25/99	10.0	99	193							NM	GIVEN BDA
09/25/99	10.0	100	175							NM	GIVEN BDA
09/25/99	10.0	101	178							NM	GIVEN BDA
09/26/99	10.0	102	179							NM	GIVEN BDA
09/26/99	10.0	103	221							NM	GIVEN BDA
09/26/99	10.0	104	202							NM	GIVEN BDA
09/26/99	10.0	105	216							NM	GIVEN BDA
09/26/99	10.0	106	272							NM	GIVEN BDA
09/26/99	10.0	107	203							NM	GIVEN BDA
09/26/99	10.0	108	257							NM	GIVEN BDA
09/26/99	10.0	109	231							NM	GIVEN BDA

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Appendix A4.-Page 4 of 6.

Codes used for tagging: NA = data not available, AD = adipose finclip, LV = left ventral finclip, RV = right ventral finclip, AVI = anal fin-visual implant tag, EVI = eye tissue-visual implant tag, NM = no mark, BDA = blue dot on anal fin, ½RV = half right ventral finclip, BDRV = blue dot right ventral fin, BDLV = blue dot left ventral fin, UC = upper caudal finclip, LC = lower caudal finclip.

Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	New fish		Recaptured fish			Comments	
					PIT tag code	Finclip	Tag type	Tag no.	PIT tag code		Finclip
09/26/99	10.0	110	214							NM	GIVEN BDA
09/26/99	10.0	111	243							NM	GIVEN BDA
09/26/99	10.0	112	190							NM	GIVEN BDA
09/26/99	10.0	113	181							NM	GIVEN BDA
09/26/99	10.0	114	214							NM	GIVEN BDA
09/26/99	10.0	115	171							NM	GIVEN BDA
09/26/99	10.0	116	320				PIT		4136656F09	AD	
09/26/99	10.0	117	354				PIT		4136515571	AD	
09/26/99	10.0	118	354				PIT		4137401C71	AD	
09/26/99	10.0	119	359				PIT		4137362A53	AD	BELLY WOUND
09/26/99	10.0	120	316				PIT		4137486B2F	AD	
09/26/99	10.0	121	372				PIT		41373F412B	AD	BELLY WOUND
09/26/99	10.0	122	315				PIT		4137334A31	AD	
09/26/99	10.0	123	370				PIT		4112622B3A	AD	WOUND
09/26/99	10.0	124	329				PIT		41372A6D10	AD	
09/26/99	10.0	125	348				PIT		41372D2C35	AD	BDA BELLY WOUND
09/26/99	10.0	126	320				PIT		41373E5365	AD	
09/26/99	10.0	127	462				PIT		412D56377F	AD	BDA FAINT
09/26/99	10.0	128	389				PIT		412DE386E	AD	
09/26/99	10.0	129	348				PIT		4136681B58	AD	
09/26/99	10.0	130	310				PIT		41374D6900	AD	
09/26/99	10.0	131	298				PIT		4137463920	AD	BELLY WOUND
09/26/99	10.0	132	381				PIT		412D19057F	AD	
09/26/99	10.0	133	171						STEELHEAD	NM	BLUE TAGGED STEELHEAD
09/27/99	10.1	134	314				PIT		41374C6246	AD	
09/27/99	10.1	135	288				PIT		41364A607D	AD	BDLV
09/27/99	10.1	136	334				PIT		413729130F	AD	
09/27/99	10.1	137	267				PIT		4137301871	AD	
09/27/99	10.1	138	220							NM	GIVEN BDA
09/27/99	10.1	139	196							NM	GIVEN BDA
09/27/99	10.1	140	194							NM	GIVEN BDA
09/27/99	10.1	141	228							NM	GIVEN BDA
09/27/99	10.1	142	184							NM	GIVEN BDA
09/27/99	10.1	143	308							NM	GIVEN BDA
09/27/99	10.1	144	353				PIT		41376E1006	AD	
09/27/99	10.1	145	395				PIT		412D5A7B01	AD	VI unreadable

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Appendix A4.--Page 5 of 6.

Codes used for tagging: NA = data not available, AD = adipose finclip, LV = left ventral finclip, RV = right ventral finclip, AVI = anal fin-visual implant tag, EVI = eye tissue-visual implant tag, NM = no mark, BDA = blue dot on anal fin, ½RV = half right ventral finclip, BDRV = blue dot right ventral fin, BDLV = blue dot left ventral fin, UC = upper caudal finclip, LC = lower caudal finclip.

Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	New fish		Recaptured fish			Comments	
					PIT tag code	Finclip	Tag type	Tag no.	PIT tag code		Finclip
09/27/99	10.1	146	318				PIT		4137326B05	AD	
09/28/99	9.5	147					PIT		4137283702	AD	
09/28/99	9.5	148	303				PIT		4137496C36	AD	
09/28/99	9.5	149	186							NM	Given BDA
09/28/99	9.5	150	195							NM	Given BDA
09/28/99	9.5	151	238							NM	Given BDA
09/28/99	9.5	152	239							NM	Given BDA
09/28/99	9.5	153	185							NM	Given BDA
09/29/99	9.4	154	359				PIT		413662574D	AD	BDA ripped jaw
09/29/99	9.4	155	285				PIT		41376B0559	AD	
09/29/99	9.4	156	404				PIT		4137481777	AD	BDA faint
09/29/99	9.4	157	360				PIT		41120C426F	AD	
09/29/99	9.4	158	248							NM	Given BDA
09/29/99	9.4	159	267							NM	Given BDA
09/29/99	9.4	160	251							NM	Given BDA
09/29/99	9.4	161	192						STEELHEAD	NM	Given BDA **steelhead
09/30/99	9.3	162	306							<u>NM</u>	Given BDA
09/30/99	9.3	163	285							NM	Given BDA
09/30/99	9.3	164	239							NM	Given BDA
10/01/99	9.7	165	212							NM	Given BDA
10/01/99	9.7	166	352				PIT		4137425324	AD	
10/01/99	9.7	167	267				PIT		4137666E3D	AD	
10/01/99	9.7	168	326				PIT		413725457D	AD	BDA
10/03/99	9.1	169	335				PIT		4137301619	AD	BDA faint
10/03/99	9.1	170	293				PIT		4137286B59	AD	
10/04/99	9.1	171	310				PIT		4136727869	AD	
10/04/99	9.1	172	304							NM	Given BDA
10/04/99	9.1	173	259							NM	Given BDA
10/04/99	9.1	174	193							NM	Given BDA
10/04/99	9.1	175	161						STEELHEAD	NM	STEELHEAD
10/05/99	9.2	176	205							NM	Given BDA
10/05/99	9.2	177	205							NM	Given BDA
10/06/99	9.3	178	338				PIT		4137753E25	AD	
10/06/99	9.3	179	279							NM	Given BDA
10/11/99	8.1	180	300				PIT		4137370321	AD	
10/11/99	8.1	181	232							NM	Given BDA

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Appendix A4.—Page 6 of 6.

Codes used for tagging: NA = data not available, AD = adipose finclip, LV = left ventral finclip, RV = right ventral finclip, AVI = anal fin-visual implant tag, EVI = eye tissue-visual implant tag, NM = no mark, BDA = blue dot on anal fin, ½RV = half right ventral finclip, BDRV = blue dot right ventral fin, BDLV = blue dot left ventral fin, UC = upper caudal finclip, LC = lower caudal finclip.

Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	New fish		Recaptured fish			Comments	
					PIT tag code	Finclip	Tag type	Tag no.	PIT tag code		Finclip
10/11/99	8.1	182	405				PIT		412E01590C	ADLV	
10/11/99	8.1	183	304							NM	Given BDA
10/11/99	8.1	184	295							NM	Given BDA
10/16/99	7.8	185	173							NM	Given BDA
10/19/99	7.8	186	317				PIT		41374E4A64	AD	BDA
10/19/99	7.8	187	406				PIT		4137274E4B	AD	
10/20/99	7.6	188	316							NM	BDA
10/20/99	7.6	189	220							NM	BDA
10/22/99	7.2	190	355				PIT		4137445E30	AD	
10/22/99	7.2	191	248							NM	Given BDA
10/23/99	7.2	192	208							NM	Given BDA
10/23/99	7.2	193	212							NM	Given BDA
10/23/99	7.2	194	341				PIT		4137295D1E	AD	
10/23/99	7.2	195	388				PIT		4137403723	AD	
10/24/99	7.1	196	182							NM	Given BDA
10/26/99	7.0	197	126							NM	Given BDA
10/28/99	6.8	198	226							NM	Given BDA
10/29/99	6.6	199	242							NM	Given BDA
10/31/99	6.1	200	311				PIT		4136446162	AD	
11/02/99	6.0	201	268							NM	Given BDA
11/02/99	6.0	202	327				PIT		413740537A	AD	
11/03/99	5.7	203	324							NM	
11/09/99	5.5	204	396				PIT		413742404D	AD	no BDA
11/12/99	5.4	205	302				PIT		4137435942	AD	no BDA
11/12/99	5.4	206	358				PIT		4137784311	AD	BDA
11/15/99	5.0	207	361				PIT		413777133E	AD	BDA faint
11/16/99	5.1	208	186							NM	Given BDA

Appendix A5.--Auke Lake cutthroat trout PIT tagging, 1999. Codes used in tagging: AD = adipose finclip, RV = right ventral finclip, LV = left ventral finclip, LC = lower caudal finclip, UC = upper caudal finclip, LT = large trap, HL = hook and line gear, ½RV = half right ventral finclip, BDRV = blue dot on right ventral fin, BDLV = blue dot on left ventral fin.

Date	Trip #	Area	Sample #	Length (mm)	Gear	New fish		Recaptured fish			Comments
						PIT #	2 nd mark	PIT #	2 nd mark	Other marks	
5/25/99	1	2	1	194	LT	41365F0D0C	ADBDLV				BDA, Mort 6-15-99 (200 mm)
5/25/99	1	2	2	289	LT	4136662571	ADBDLV				
5/25/99	1	2	3	183	LT	41372C3F48	ADBDLV				
5/25/99	1	2	4	246	LT	41364F7B4A	ADBDLV				
5/25/99	1	2	5	277	LT	413736751F	ADBDLV				
5/25/99	1	2	6	228	LT	4136655A4D	ADBDLV				
5/25/99	1	2	7	165	LT	4136636C75	ADBDLV				
5/25/99	1	2	8	250	LT		BDLV	413730716E	AD½RV	BDRV	LC(?)
5/25/99	1	2	9	237	LT	4136494700	ADBDLV				
5/25/99	1	2	10	164	LT	41372B5B57	ADBDLV				
5/25/99	1	2	11	189	LT	413738164E	ADBDLV				
5/25/99	1	2	12	192	LT	41372D1137	ADBDLV				
5/25/99	1	2	13	220	LT	41373C1147	ADBDLV				
5/25/99	1	2	14	200	LT	41372C7777	ADBDLV				
5/25/99	1	2	15	192	LT	41373B5644	ADBDLV				
5/25/99	1	2	16	229	LT	4136466C7A	ADBDLV				
5/25/99	1	2	17	189	LT		BDLV	413751510F	Ad½RV	BDRV	LC(?)
5/25/99	1	2	18	197	LT	41373B1409	ADBDLV				
5/25/99	1	2	19	194	LT	41373E577F	ADBDLV				
5/25/99	1	2	20	231	LT	41372A1A19	ADBDLV				
5/25/99	1	2	21	228	LT	41364A607D	ADBDLV			BDA(bad)	Left Auke 6-11-99 (242 mm)
5/25/99	1	2	22	183	LT	413732594C	ADBDLV				Left Auke 6-7-99 (232 mm)
5/25/99	1	2	23	230	LT		BDLV	41374B7364	Ad½RV	None	
5/25/99	1	2	24	233	LT	413748336E	ADBDLV				
5/25/99	1	2	25	217	LT	4136585D74	ADBDLV				
5/25/99	1	2	26	264	LT	4137521331	ADBDLV				
5/25/99	1	2	27	254	LT	4137341E53	ADBDLV				
5/25/99	1	2	28	180	LT	4136687364	ADBDLV				
5/25/99	1	2	29	188	LT		BDLV	41374C3833	Ad½RV	BDRV	Caudal?
5/25/99	1	2	30	192	LT	4136514B67	ADBDLV				
5/25/99	1	2	31	254	LT	4136554737	ADBDLV				
5/25/99	1	2	32	181	LT	41366D782D	ADBDLV				
5/25/99	1	2	33	246	LT		BDLV	41374C0008	Ad½RV	BDRV	LC(?)
5/25/99	1	2	34	302	LT	413649412E	ADBDLV				
5/25/99	1	2	35	302	LT	413726027A	ADBDLV				
5/25/99	1	2	36	250	LT	4137356C77	ADBDLV				
5/25/99	1	2	37	180	LT	413740102D	ADBDLV				

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Appendix A5.-Page 2 of 19.

Codes used in tagging: AD = adipose finclip, RV = right ventral finclip, LV = left ventral finclip, LC = lower caudal finclip, UC = upper caudal finclip, LT = large trap, HL = hook and line gear, ½RV = half right ventral finclip, BDRV = blue dot on the right ventral fin, BDLV = blue dot on left ventral fin.

Date	Trip #	Area	Sample #	Length (mm)	Gear	New fish		Recaptured fish			Comments
						PIT #	2 nd mark	PIT #	2 nd mark	Other marks	
5/25/99	1	2	38	188	LT	4137340D3A	ADBDLV				
5/25/99	1	2	39	257	LT	4137437333	ADBDLV				
5/25/99	1	2	40	180	LT	4137360864	ADBDLV				
5/26/99	1	2	1	247	LT	4137323B02	ADBDLV				
5/26/99	1	2	2	200	LT	413760045E	ADBDLV				
5/26/99	1	2	3	188	LT	41377E7529	ADBDLV				
5/26/99	1	2	4	232	LT	41373C563B	ADBDLV				
5/26/99	1	2	5	282	LT	413762272D	ADBDLV				female
5/26/99	1	2	6	256	LT	41372F0623	ADBDLV				
5/26/99	1	2	7	290	LT	413754742D	ADBDLV				
5/26/99	1	2	8	226	LT	41373F0061	ADBDLV				
5/26/99	1	2	9	254	LT	4137333047	ADBDLV				
5/26/99	1	2	10	177	LT	4137313337	ADBDLV				
5/26/99	1	2	11	180	LT	4137350E39	ADBDLV				
5/26/99	1	2	12	202	LT	4137357C09	ADBDLV				
5/26/99	1	2	13	231	LT		BDLV	413660072D	Ad½RV	BDRV	LC(?)
5/26/99	1	2	14	182	LT	4137455C10	ADBDLV				Left Auke 6-22-99 (200 mm)
5/26/99	1	2	15	250	LT		BDLV	4137336274	Ad½RV	None	
5/26/99	1	2	16	171	LT	41375F406E	ADBDLV				
5/26/99	1	2	17	195	LT	413734395D	ADBDLV				
5/26/99	1	2	18	201	LT	41373D7E6A	ADBDLV				
5/26/99	1	2	19	194	LT	41373B6C4B	ADBDLV				
5/26/99	1	2	20	201	LT	4137490529	ADBDLV				
5/26/99	1	2	21	161	LT	41376A0C28	ADBDLV				
5/26/99	1	2	22	232	LT	41373D607C	ADBDLV				
5/26/99	1	2	23	198	LT	413777633A	ADBDLV				
5/26/99	1	2	24	165	LT	41375F3767	ADBDLV				
5/26/99	1	2	25	192	LT	4137291715	ADBDLV				
5/26/99	1	2	26	230	LT	41374C3E1D	ADBDLV				
5/26/99	1	2	27	163	LT	41374E3977	ADBDLV				
5/26/99	1	2	28	134	LT	4136646D29	ADBDLV				
5/26/99	1	2	29	253	LT	41373D2843	ADBDLV				
5/26/99	1	2	30	182	LT	4137343501	ADBDLV				
5/26/99	1	2	31	206	LT	4137306429	ADBDLV				
5/26/99	1	2	32	246	LT	4137664E3E	ADBDLV				
5/26/99	1	2	33	276	LT	4137382E75	ADBDLV				female
5/26/99	1	2	34	288	LT	41375B0C47	ADBDLV				

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Appendix A5.–Page 3 of 19. Codes used in tagging: AD = adipose finclip, RV = right ventral finclip, LV = left ventral finclip, LC = lower caudal finclip, UC = upper caudal finclip, LT = large trap, HL = hook and line gear, ½RV = half right ventral finclip, BDRV = blue dot on the right ventral fin, BDLV = blue dot on left ventral fin.

Date	Trip #	Area	Sample #	Length (mm)	Gear	New fish		Recaptured fish			Comments
						PIT #	2 nd mark	PIT #	2 nd mark	Other marks	
5/26/99	1	2	35	315	LT		BDLV	4112635F30	Ad		Female, weir
5/26/99	1	2	36	202	HL	4137254270	ADBDLV				
5/27/99	1	3	1	191	LT	4137494D16	ADBDLV				
5/27/99	1	3	2	231	LT	413745080D	ADBDLV				
5/27/99	1	3	3	285	LT	41374B754A	ADBDLV				
5/27/99	1	3	4	236	LT		BDLV	41365C7A76	Ad½RV		
5/27/99	1	3	5	180	LT	41372B1546	ADBDLV				
5/27/99	1	3	6	158	LT	41373B0477	ADBDLV				
5/27/99	1	3	7	189	LT	41372C3003	ADBDLV				
5/27/99	1	3	8	221	LT	41375E491F	ADBDLV			BDA	Left Auke 6-7-99 (226 mm)
5/27/99	1	3	9	209	LT	4137495017	ADBDLV				
5/27/99	1	3	10	242	LT	41373E5072	ADBDLV			BDA (bad)	
5/27/99	1	3	11	214	LT	41376A3F42	ADBDLV				
5/27/99	1	3	12	207	LT	4137740729	ADBDLV				
5/27/99	1	3	13	188	LT	4137692709	ADBDLV				
5/27/99	1	3	14	203	LT		BDLV	4137301952	Ad½RV		
5/27/99	1	3	15	214	LT	4137394073	ADBDLV				
5/27/99	1	3	16	176	LT	41374D1062	ADBDLV				
5/27/99	1	3	17	250	LT	4137255A48	ADBDLV				
5/27/99	1	3	18	220	LT	413777567E	ADBDLV			BDA	Left Auke 6-10-99 (227 mm)
5/27/99	1	3	19	235	LT	4137565170	ADBDLV				
5/27/99	1	3	20	256	LT	4137473934	ADBDLV				
5/27/99	1	3	21	262	LT	41372A6829	ADBDLV				
5/27/99	1	3	22	240	LT	413746232C	ADBDLV				
5/27/99	1	3	23	222	LT	413748615D	ADBDLV				
5/27/99	1	4	24	178	LT	41372A2135	ADBDLV				
5/27/99	1	4	25	245	LT	413768263E	ADBDLV				
5/27/99	1	4	26	241	LT		BDLV	41372E2717	Ad½RV	BDRV	
5/27/99	1	4	27	236	LT	41364A5B51	ADBDLV				
5/27/99	1	4	28	234	LT	4137445D27	BDLV		Ad		No PIT tag, No VI tag female spent
5/27/99	1	4	29	304	LT	4137400D2C	ADBDLV				
5/27/99	1	4	30	236	LT	41376C201C	ADBDLV				
5/27/99	1	4	31	250	LT	41377B0238	ADBDLV				
5/27/99	1	4	32	212	LT	41377D3139	ADBDLV				
5/27/99	1	4	33	240	LT	4137316B76	ADBDLV				
5/27/99	1	4	34	303	LT		BDLV	413726027A	Ad½RV	BDRV	
5/27/99	1	4	35	254	LT	41374E1C4D	ADBDLV				

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Appendix A5.—Page 4 of 19. Codes used in tagging: AD = adipose finclip, RV = right ventral finclip, LV = left ventral finclip, LC = lower caudal finclip, UC = upper caudal finclip, LT = large trap, HL = hook and line gear, ½RV = half right ventral finclip, BDRV = blue dot on the right ventral fin, BDLV = blue dot on left ventral fin.

Date	Trip #	Area	Sample #	Length (mm)	Gear	New fish		Recaptured fish			Comments
						PIT #	2 nd mark	PIT #	2 nd mark	Other marks	
5/28/99	1	4	1	202	LT	41372C3237	ADBDLV				
5/28/99	1	4	2	210	LT	4137353218	ADBDLV				
5/28/99	1	4	3	283	LT		BDLV	413657051D	Ad½RV	BDRV UC	
5/28/99	1	4	4	207	LT	413733145E	ADBDLV				
5/28/99	1	4	5	225	LT	4137436C06	ADBDLV				
5/28/99	1	4	6	284	LT	413768071E	ADBDLV				
5/28/99	1	4	7	259	LT	4137750D4F	ADBDLV				
5/28/99	1	5	8	197	LT	4137387B4B	ADBDLV				
5/28/99	1	5	9	313	LT	4137364441	ADBDLV				
5/28/99	1	5	10	207	LT	4137317F12	ADBDLV				
5/28/99	1	5	11	250	LT	41374E537F	ADBDLV				
5/28/99	1	5	12	298	LT	4137321569	ADBDLV				
5/28/99	1	5	13	220	LT	41376C230B	ADBDLV				
5/28/99	1	5	14	206	LT	4137712E57	ADBDLV				
5/28/99	1	5	15	259	LT	4137417043	ADBDLV				
5/28/99	1	5	16	129	LT						Released w/o tag
5/28/99	1	5	17	238	LT			4136494700	ADBDLV		
5/28/99	1	5	18	190	LT	413736260F	ADBDLV				
5/28/99	1	5	19	282	LT	4137661B00	ADBDLV				
5/28/99	1	5	20	205	LT	4137680855	ADBDLV				
5/28/99	1	5	21	181	LT	4137783E6A	ADBDLV				
5/28/99	1	5	22	197	LT		BDLV	41365D7307	Ad½RV	BDRV	Caudal?
5/28/99	1	5	23	209	LT	41376A3413	ADBDLV				Left Auke 6-11-99 (215 mm)
5/28/99	1	5	24	275	LT	4137352F19	ADBDLV				
5/28/99	1	5	25	258	LT	4137464275	ADBDLV				female
5/28/99	1	5	26	292	LT		BDLV	412D065126	Ad		
5/28/99	1	5	27	220	LT	41372B315F	ADBDLV				
5/28/99	1	5	28	270	LT	413776495F	ADBDLV				
5/28/99	1	5	29	240	LT	4137234B7E	ADBDLV				
5/28/99	1	5	30	260	LT	4137741E32	ADBDLV				
5/28/99	1	5	31	227	LT	4137624B0B	ADBDLV				
5/29/99	1	5	1	186	LT	4137706937	ADBDLV				
5/29/99	1	5	2	213	LT			41377D3139	ADBDLV		
5/29/99	1	5	3	176	LT	4136596256	ADBDLV				
5/29/99	1	5	4	269	LT		BDLV	4137290853	Ad½RV	BDRV LC	
5/29/99	1	5	5	191	LT	41377F2845	ADBDLV				
5/29/99	1	5	6	169	LT	413739231E	ADBDLV				

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Appendix A5.--Page 5 of 19. Codes used in tagging: AD = adipose finclip, RV = right ventral finclip, LV = left ventral finclip, LC = lower caudal finclip, UC = upper caudal finclip, LT = large trap, HL = hook and line gear, ½RV = half right ventral finclip, BDRV = blue dot on the right ventral fin, BDLV = blue dot on left ventral fin.

Date	Trip #	Area	Sample #	Length (mm)	Gear	New fish		Recaptured fish		Other marks	Comments
						PIT #	2 nd mark	PIT #	2 nd mark		
5/29/99	1	5	7	232	LT			41374C3E1D	ADBDLV		
5/29/99	1	5	8	305	LT			413649412E	ADBDLV		
5/29/99	1	5	9	194	LT		BDLV	41372F531D	ADBDLV	BDRV	Caudal?
5/29/99	1	6	10	266	LT	41364E0E63	ADBDLV				
5/29/99	1	6	11	289	LT	41365A4C4E	ADBDLV				
5/29/99	1	6	12	170	LT	4137251C1F	ADBDLV				
5/29/99	1	6	13	250	LT	4137232C09	ADBDLV				
5/29/99	1	6	14	167	LT	41366C3D79	ADBDLV				
5/29/99	1	6	15	199	LT	413728496E	ADBDLV				
5/30/99	1	6	1	249	LT	4137544450	ADBDLV				
5/30/99	1	6	2	207	LT		BDLV	4137236949	Ad½RV	BDRV	Caudal?
5/30/99	1	6	3	163	LT			41376A0C28	ADBDLV		
5/30/99	1	6	4	224	LT	41373F413B	AdBdLV				
5/30/99	1	6	5	194	LT			413734395D	ADBDLV		
5/30/99	1	6	6	234	LT			4137445D27	ADBDLV		
5/30/99	1	6	7	219	LT	41377B3548	ADBDLV				
5/30/99	1	6	8	205	LT	41365B524C	ADBDLV				
5/30/99	1	6	9	248	LT	4137650751	ADBDLV				
5/30/99	1	6	10	228	LT			4136466C7A	ADBDLV		
5/30/99	1	6	11	275	LT	4137501275	ADBDLV			BDA	
5/30/99	1	6	12	279	LT	41364E500C	ADBDLV				
5/30/99	1	6	13	172	LT	41365F631E	ADBDLV				
5/30/99	1	6	14	182	LT	41373D4248	ADBDLV				
5/30/99	1	6	15	189	LT			4137340D3A	ADBDLV		
5/30/99	1	6	16	274	LT	41374E3F59	ADBDLV				
5/30/99	1	6	17	195	LT	41374C5621	ADBDLV				
5/30/99	1	7	18	230	LT	41372A5B43	ADBDLV				
5/30/99	1	7	19	168	LT	4137697D7C	ADBDLV				
5/30/99	1	7	20	230	LT	413645375F	ADBDLV				
5/30/99	1	7	21	225	LT	4137332734	ADBDLV				
5/30/99	1	7	22	212	LT	4137311217	ADBDLV				
5/30/99	1	7	23	257	LT	41374A1D62	ADBDLV				
5/31/99	1	7	1	304	LT			413726027A	ADBDLV		
5/31/99	1	7	2	187	LT	4137316F6C	ADBDLV				
5/31/99	1	7	3	233	LT			41374C3E1D	ADBDLV		
5/31/99	1	7	4	178	LT	4137261F7B	ADBDLV				
5/31/99	1	7	5	166	LT	41373D5847	ADBDLV				

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Appendix A5.--Page 6 of 19. Codes used in tagging: AD = adipose finclip, RV = right ventral finclip, LV = left ventral finclip, LC = lower caudal finclip, UC = upper caudal finclip, LT = large trap, HL = hook and line gear, ½RV = half right ventral finclip, BDRV = blue dot on the right ventral fin, BDLV = blue dot on left ventral fin.

Date	Trip #	Area	Sample #	Length (mm)	Gear	New fish		Recaptured fish			Comments
						PIT #	2 nd mark	PIT #	2 nd mark	Other marks	
5/31/99	1	7	6	267	LT	41376E1311	ADBDLV				
5/31/99	1	7	7	212	LT	4137316330	ADBDLV				
5/31/99	1	7	8	331	LT	41364A2313	ADBDLV				
5/31/99	1	7	9	188	LT	41372E6D1C	ADBDLV				
5/31/99	1	7	10	215	LT	41365F5779	ADBDLV				
5/31/99	1	7	11	214	LT		BdLv	413724786B	Ad½RV	BDRV	Left Auke 6-22-99 (221 mm) Caudal?
5/31/99	1	7	12	206	LT	41373B225A	ADBDLV				
5/31/99	1	7	13	224	LT	41372F723D	ADBDLV				
5/31/99	1	7	14	281	LT	41372C4962	ADBDLV				Ripe male
5/31/99	1	7	15	193	LT	4136632A22	ADBDLV				
5/31/99	1	7	16	205	LT	413723410C	ADBDLV				
5/31/99	1	7	17	245	LT	41372D7763	ADBDLV				
5/31/99	1	7	18	279	LT	4137364E33	ADBDLV				
6/1/99	1	7	1	198	LT			41365D7307	Ad½RV	BDRV/AD/BDLV	
6/1/99	1	7	2	290	LT	4136674C7A	ADBDLV				Spent female
6/1/99	1	7	3	222	LT	41377B5D74	ADBDLV				
6/1/99	1	7	4	196	LT	41377F424D	ADBDLV				
6/1/99	1	7	5	202	LT	413771174F	ADBDLV				
6/1/99	1	7	6	182	LT	4137281535	ADBDLV				
6/1/99	1	7	7	219	LT			4136585D74	ADBDLV		
6/1/99	1	7	8	349	LT		BDLP	4112684518	AD	LV, BDA	spent fem.; blue dot/left pect fin
6/1/99	1	7	9	228	LT	4137296F57	ADBDLV				
6/1/99	1	7	10	270	LT	41372F7C55	ADBDLV				
6/1/99	1	7	11	197	LT	4137432023	ADBDLV				
6/1/99	1	7	12	260	LT	41365A0766	ADBDLV				
6/1/99	1	7	13	231	LT			4136655A4D	ADBDLV		
6/1/99	1	7	14	222	LT	413751533B	ADBDLV				
6/1/99	1	7	15	228	LT		BDLV	4136683129	Ad½RV	BDRV	Caudal?; female
6/1/99	1	7	16	210	LT	4137531F79	ADBDLV				
6/1/99	1	7	17	199	LT	413729330C	ADBDLV				
6/1/99	1	7	18	234	LT	413731017E	ADBDLV				
6/2/99	1	7	1	278	LT			4137364E33	ADBDLV		
6/2/99	1	8	2	245	LT			413768263E	ADBDLV		
6/2/99	1	8	3	203	LT	4136565C6B	ADBDLV				
6/2/99	1	8	4	178	LT			4137261F7B	ADBDLV		
6/2/99	1	8	5	253	LT	41364B2133	ADBDLV				
6/2/99	1	8	6	152	LT	4137547871	ADBDLV				

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Appendix A5.—Page 7 of 19. Codes used in tagging: AD = adipose finclip, RV = right ventral finclip, LV = left ventral finclip, LC = lower caudal finclip, UC = upper caudal finclip, LT = large trap, HL = hook and line gear, ½RV = half right ventral finclip, BDRV = blue dot on the right ventral fin, BDLV = blue dot on left ventral fin.

Date	Trip #	Area	Sample #	Length (mm)	Gear	New fish		Recaptured fish			Comments
						PIT #	2 nd mark	PIT #	2 nd mark	Other marks	
6/2/99	1	8	7	224	LT	41373A7770	ADBDLV				
6/2/99	1	8	8	184	LT		BDLV	4136552579	AD½RV		
6/2/99	1	8	9	229	LT			41373F0061	ADBDLV		
6/2/99	1	8	10	265	LT	413777256D	ADBDLV				
6/2/99	1	8	11	190	LT			4137291715	ADBDLV		
6/2/99	1	8	12	240	LT	413740744D	ADBDLV				
6/2/99	1	8	13	163	LT			41376A0C28	ADBDLV		
6/2/99	1	8	14	192	LT			41377E7529	ADBDLV		
6/2/99	1	1	15	193	LT			4136632A22	ADBDLV		
6/2/99	1	1	16	196	LT			41372D1137	ADBDLV		
6/2/99	1	1	17	245	LT	4137315179	ADBDLV				
6/2/99	1	1	18	202	LT		BDLV	41366A271E	Ad½RV	BDRV	Caudal?
6/2/99	1	1	19	183	LT			4137350E39	ADBDLV		
6/2/99	1	1	20	196	LT			41374C3833	Ad½RV	BDRV;BDLV	
6/2/99	1	1	21	169	LT	413742042E	ADBDLV				
6/2/99	1	1	22	181	LT			4137343501	ADBDLV		
6/2/99	1	1	23	195	LT	41373E1706	ADBDLV				
6/2/99	1	1	24	251	LT		BDLV	413750645F	Ad½RV	BDRV	LC
6/2/99	1	1	25	290	LT			413754742D	ADBDLV		ripe female
6/2/99	1	1	26	248	LT	41372C3120	ADBDLV				
6/7/99	2	2	1	230	HL	4137232A27	AD,BDLV,LC				
6/8/99	2	2	1	255	LT	4137693B2B	AD,BDLV,LC				
6/8/99	2	2	2	205	LT	413727517E	AD,BDLV,LC				
6/8/99	2	2	3	225	LT		LC	413751533B	ADBDLV		
6/8/99	2	2	4	191	LT	41373D0D79	AD,BDLV,LC				
6/8/99	2	2	5	282	LT	4137346506	AD,BDLV,LC				female spent
6/8/99	2	2	6	309	LT		LC	413649412E	ADBDLV		
6/8/99	2	2	7	244	LT	41374C654B	AD,BDLV,LC				
6/8/99	2	2	8	245	LT		LC	413746232C	ADBDLV		
6/8/99	2	2	9	212	LT		LC	4137531F79	ADBDLV		
6/8/99	2	2	10	200	LT	413732356A	AD,BDLV,LC				
6/8/99	2	2	11	195	LT	4136575100	AD,BDLV,LC				
6/8/99	2	2	12	299	LT	41372D3A65	AD,BDLV,LC				female spent
6/8/99	2	2	13	219	LT	41374F1312	AD,BDLV,LC				
6/8/99	2	2	14	200	LT		BDLV,LC	41364B390B	AD½RV		
6/8/99	2	2	15	129	LT		BDLV,LC				Did not PIT tag due to small size
6/8/99	2	2	16	188	LT	41374F2B29	AD,BDLV,LC				

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Appendix A5.—Page 8 of 19.

Codes used in tagging: AD = adipose finclip, RV = right ventral finclip, LV = left ventral finclip, LC = lower caudal finclip, UC = upper caudal finclip, LT = large trap, HL = hook and line gear, ½RV = half right ventral finclip, BDRV = blue dot on the right ventral fin, BDLV = blue dot on left ventral fin.

Date	Trip #	Area	Sample #	Length (mm)	Gear	New fish		Recaptured fish			Comments
						PIT #	2 nd mark	PIT #	2 nd mark	Other marks	
6/8/99	2	2	17	200	LT		LC	41372D1137	ADBDLV		
6/8/99	2	2	18	214	LT	4137456031	AD,BDLV,LC				
6/8/99	2	2	19	273	LT		LC	413776495F	ADBDLV		
6/8/99	2	2	20	250	LT	413751344C	AD,BDLV,LC				
6/8/99	2	2	21	264	LT	413738585F	AD,BDLV,LC				
6/8/99	2	2	22	218	LT		LC	4137353218	ADBDLV		
6/8/99	2	2	23	195	LT		LC	41377E7529	ADBDLV		
6/8/99	2	2	24	154	LT	4136725949	AD,BDLV,LC				
6/8/99	2	2	25	215	LT	413774381F	AD,BDLV,LC				
6/8/99	2	2	26	206	LT		LC	413729330C	ADBDLV		
6/8/99	2	2	27	250	LT		LC	41364F7B4A	ADBDLV		
6/8/99	2	2	28	239	LT	4137454325	AD,BDLV,LC				
6/8/99	2	2	29	230	LT		LC	4137436C06	ADBDLV		
6/8/99	2	2	30	242	LT		LC	413740744D	ADBDLV		
6/8/99	2	2	31	243	LT		BDLV,LC	4137476E3E	AD½RV		
6/8/99	2	2	32	245	LT	4136517A39	AD,BDLV,LC				
6/8/99	2	2	33	260	LT		LC	4137464275	ADBDLV		
6/8/99	2	2	34	210	LT		LC	4137317F12	ADBDLV		
6/8/99	2	2	35	234	LT		LC	41374B7364	AD½RV,UC	BDLV	
6/8/99	2	2	36	135	LT	4136677B0A	AD,BDLV,LC				
6/8/99	2	2	37	208	LT	41365A0552	AD,BDLV,LC				
6/8/99	2	2	38	264	LT	41374D7636	AD,BDLV,LC				
6/8/99	2	2	39	250	LT	4137451E5D	AD,BDLV,LC				
6/8/99	2	2	40	235	LT		BDLV,LC	413748741A	AD½RV,UC	BDRV	
6/8/99	2	3	41	235	HL		LC	41373C563B	ADBDLV		
6/9/99	2	2	1	288	LT		LC	41374B754A	ADBDLV		
6/9/99	2	2	2	219	LT		LC	4137394073	ADBDLV		
6/9/99	2	2	3	255	LT	4136574B0C	AD,BDLV,LC				male ripe
6/9/99	2	2	4	254	LT		LC	413750645F	AD½RV,LC?	BDRV,ADBDLV	
6/9/99	2	2	5	203	LT		LC	413760045E	ADBDLV		
6/9/99	2	2	6	196	LT		LC	413738164E	ADBDLV		
6/9/99	2	2	7	195	LT		LC	4137706937	ADBDLV		
6/9/99	2	2	8	202	LT		LC	41365D7307	AD½RV,UC?	BDRV,ADBDLV	
6/9/99	2	2	9	264	LT		LC	41374E1C4D	ADBDLV		
6/9/99	2	2	10	285	LT		LC	4137761B00	ADBDLV		
6/9/99	2	2	11	187	LT		BDLV,LC	4137474B04	AD½RV		
6/9/99	2	2	12	204	LT		LC	413771174F	ADBDLV		

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Appendix A5.—Page 9 of 19. Codes used in tagging: AD = adipose finclip, RV = right ventral finclip, LV = left ventral finclip, LC = lower caudal finclip, UC = upper caudal finclip, LT = large trap, HL = hook and line gear, ½RV = half right ventral finclip, BDRV = blue dot on the right ventral fin, BDLV = blue dot on left ventral fin.

Date	Trip #	Area	Sample #	Length (mm)	Gear	New fish		Recaptured fish			Comments
						PIT #	2 nd mark	PIT #	2 nd mark	Other marks	
6/9/99	2	2	13	209	LT	41364A3F31	AD,BDLV,LC				
6/9/99	2	2	14	178	LT	413745150C	AD,BDLV,LC				
6/9/99	2	2	15	261	LT		LC	41365A0766	ADBDLV		
6/9/99	2	2	16	168	LT		BDLV,LC	41365B170C	AD½RV,LC?		
6/9/99	2	2	17	266	LT	41372C015D	AD,BDLV,LC				
6/9/99	2	2	18	241	LT	41374F3125	AD,BDLV,LC				
6/9/99	2	2	19	195	LT		LC	41377F2845	ADBDLV		
6/9/99	2	2	20	179	LT	4137373746	AD,BDLV,LC				
6/9/99	2	2	21	272	LT	4136660168	AD,BDLV,LC				
6/9/99	2	2	22	191	LT		BDLV,LC	4137410350	AD½RV	BDRV	
6/9/99	2	2	23	183	LT	413739000A	AD,BDLV,LC				
6/9/99	2	2	24	181	LT		LC	41374D1062	ADBDLV		
6/9/99	2	2	25	205	LT	41365E7E0B	AD,BDLV,LC				
6/9/99	2	2	26	209	LT		LC	4136565C6B	ADBDLV		
6/9/99	2	2	27	295	LT	41373F685D	AD,BDLV,LC				
6/9/99	2	2	28	260	LT	4137431349	AD,BDLV,LC				
6/9/99	2	2	29	187	LT		LC	4137350E39	ADBDLV		
6/9/99	2	2	30	210	LT		BDLV,LC	4136542F1F	AD½RV,LC?	BDRV	
6/9/99	2	2	31	203	LT	4137475431	AD,BDLV,LC				
6/9/99	2	2	32	210	LT		LC	41372C7777	ADBDLV		
6/9/99	2	2	33	184	LT		LC	4137343501	ADBDLV		
6/9/99	2	2	34	244	LT		LC	41365C7A76	AD½RV	BDRV,ADBDLV	
6/9/99	2	2	35	306	LT		LC	413726027A	ADBDLV		
6/9/99	2	2	36	289	LT	4137485314	AD,BDLV,LC				
6/9/99	2	2	37	215	LT	4137361446	AD,BDLV,LC				
6/9/99	2	2	38	234	LT	4136561B1F	AD,BDLV,LC				
6/9/99	2	2	39	229	LT	41364B1D12	AD,BDLV,LC				
6/9/99	2	2	40	198	LT		LC	41373E577F	ADBDLV		
6/9/99	2	2	41	192	LT	4136527E50	AD,BDLV,LC				
6/9/99	2	2	42	217	LT		LC	41365F5779	ADBDLV		Left Auke 6-22-99 (221 mm)
6/9/99	2	2	43	186	LT		BDLV,LC	4136526272	AD½RV	BDRV	
6/9/99	2	2	44	248	LT		LC	4137234B7E	ADBDLV		
6/9/99	2	2	45	180	LT		LC	4137261F7B	ADBDLV		
6/9/99	2	2	46	274	LT		LC	4137382E75	ADBDLV		
6/9/99	2	2	47	193	LT	41364C206F	AD,BDLV,LC				
6/9/99	2	2	48	229	LT	4137435D58	AD,BDLV,LC				

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Appendix A5.—Page 10 of 19. Codes used in tagging: AD = adipose finclip, RV = right ventral finclip, LV = left ventral finclip, LC = lower caudal finclip, UC = upper caudal finclip, LT = large trap, HL = hook and line gear, ½RV = half right ventral finclip, BDRV = blue dot on the right ventral fin, BDLV = blue dot on left ventral fin.

Date	Trip #	Area	Sample #	Length (mm)	Gear	New fish		Recaptured fish			Comments
						PIT #	2 nd mark	PIT #	2 nd mark	Other marks	
6/9/99	2	5	49	303	HL	41373C4148	AD,BDLV,LC				
6/10/99	2	3	1	191	LT		LC	41366D782D	ADBDLV		
6/10/99	2	3	2	245	LT	41365D2C4B	AD,BDLV,LC				
6/10/99	2	3	3	243	LT	4137422114	AD,BDLV,LC				
6/10/99	2	3	4	199	LT	41366D790E	AD,BDLV,LC				
6/10/99	2	3	5	261	LT	413736326B	AD,BDLV,LC				
6/10/99	2	3	6	218	LT	41374A2905	AD,BDLV,LC				
6/10/99	2	3	7	239	LT	4136657505	AD,BDLV,LC				
6/10/99	2	3	8	226	LT		LC	41373C114F	ADBDLV		
6/10/99	2	3	9	170	LT		LC	4137697D7C	ADBDLV		
6/10/99	2	3	10	273	LT	41366C341C	AD,BDLV,LC				
6/10/99	2	3	11	197	LT		LC	41373E1706	ADBDLV		
6/10/99	2	3	12	208	LT		LC	4137490529	ADBDLV		
6/10/99	2	3	13	202	LT	41365D6557	AD,BDLV,LC				
6/10/99	2	3	14	209	LT		LC	41366A271E	AD½RV	BDRV,ADBDLV	
6/10/99	2	3		135	LT						released w/o mark or PIT tag
6/10/99	2	3	15	185	LT		LC	41372B1546	ADBDLV		
6/10/99	2	3	16	172	LT		LC	413742042E	ADBDLV		
6/10/99	2	3	17	212	LT	41366A1A1C	AD,BDLV,LC				
6/10/99	2	3		123	LT						released w/o mark or PIT tag
6/10/99	2	3	18	200	LT	41366C4B53	AD,BDLV,LC				
6/10/99	2	3		133	LT						released w/o mark or PIT tag
6/10/99	2	3	19	224	LT	4137481D05	AD,BDLV,LC				
6/10/99	2	3		109	LT						released w/o mark or PIT tag
6/10/99	2	3	20	203	LT	4136521458	AD,BDLV,LC			LV	hatchery
6/10/99	2	3	21	220	LT	41373F5066	AD,BDLV,LC				
6/10/99	2	3	22	285	LT		LC	413736751F	ADBDLV		
6/10/99	2	3	23	320	LT		LC	412D0C0206	AD		female spent
6/10/99	2	3	24	198	LT		BDLV,LC	413738476A	AD½RV	BDRV	
6/10/99	2	3	25	234	LT		LC	4136655A4D	ADBDLV		
6/10/99	2	3	26	237	LT	413661127E	AD,BDLV,LC				
6/10/99	2	3	27	232	LT		LC	4136466C7A	ADBDLV		
6/10/99	2	3	28	244	LT		LC	4137565170	ADBDLV		
6/10/99	2	3	29	236	LT		LC	41374C3E1D	ADBDLV		
6/10/99	2	3	30	249	LT		LC	4112684518	ADLV		BDA, spent female
6/10/99	2	3	31	298	LT		LC	413753080A	AD		BDA
6/10/99	2	3	32	208	LT		LC	41373B225A	ADBDLV		

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Appendix A5.-Page 11 of 19. Codes used in tagging: AD = adipose finclip, RV = right ventral finclip, LV = left ventral finclip, LC = lower caudal finclip, UC = upper caudal finclip, LT = large trap, HL = hook and line gear, ½RV = half right ventral finclip, BDRV = blue dot on the right ventral fin, BDLV = blue dot on left ventral fin.

Date	Trip #	Area	Sample #	Length (mm)	Gear	New fish		Recaptured fish			Comments
						PIT #	2 nd mark	PIT #	2 nd mark	Other marks	
6/10/99	2	3	33	251	LT		LC	4137544450	ADBDLV		
6/10/99	2	3	34	226	LT	4136667A3D	AD,BDLV,LC				
6/10/99	2	3	35	249	LT		LC	41373E5072	ADBDLV		
6/10/99	2	3	36	338	LT	41365E576D	AD,BDLV,LC				female
6/10/99	2	4	37	277	LT	4137443864	AD,BDLV,LC				
6/10/99	2	4	38	221	LT	41364D6B53	AD,BDLV,LC				
6/10/99	2	4	39	256	LT		LC	41377B0233	ADBDLV		
6/10/99	2	4	40	249	LT		LC	4137316B76	ADBDLV		
6/10/99	2	4	41	302	LT	4136706F7D	AD,BDLV,LC				
6/10/99	2	4	42	217	LT	413724702D	AD,BDLV,LC				
6/10/99	2	4	43	218	LT			41365F5779	ADBDLV,LC		
6/11/99	2	4	1	238	LT	4137362C7D	AD,BDLV,LC				
6/11/99	2	4	2	308	LT	4137505D47	AD,BDLV,LC				male ripe
6/11/99	2	4	3	302	LT	41364B2F5B	AD,BDLV,LC				
6/11/99	2	4	4	233	LT		LC	4137332734	ADBDLV		
6/11/99	2	4	5	262	LT			4137464275	ADBDLV,LC		
6/11/99	2	4	6	162	LT	4137435B76	AD,BDLV,LC				
6/11/99	2	4	7	143	LT	4136654E29	AD,BDLV,LC				
6/11/99	2	4	8	291	LT		LC	4136674C7A	ADBDLV		
6/11/99	2	5	9	262	LT		LC	4137341E53	ADBDLV		
6/11/99	2	5	10	239	LT	4137396C2C	AD,BDLV,LC				
6/11/99	2	5	11	180	LT			4137261F7B	ADBDLV,LC		
6/11/99	2	5	12	172	LT	4137320E46	AD,BDLV,LC				
6/11/99	2	5	13	255	LT	41374A1229	AD,BDLV,LC				
6/11/99	2	5	14	298	LT		LC	4136662571	ADBDLV		
6/11/99	2	5	15	158	LT	413668496B	AD,BDLV,LC				
6/11/99	2	5	16	244	LT		LC	41376C201C	ADBDLV		
6/11/99	2	5	17	192	LT	41374E7B3A	AD,BDLV,LC				
6/11/99	2	5	18	395	LT		BDLV,LC	41373C2F5A	AD		female ripe
6/11/99	2	5	19	242	LT	4137271C78	AD,BDLV,LC				
6/11/99	2	5	20	197	LT			41377E7529	ADBDLV,LC		
6/11/99	2	5	21	210	LT	4136631219	AD,BDLV,LC				
6/11/99	2	5	22	206	LT			413771174F	ADBDLV,LC		
6/11/99	2	5	23	226	LT		LC	41376A3F42	ADBDLV		
6/11/99	2	5	24	238	LT		LC	4137624B0B	ADBDLV		
6/11/99	2	5	25	248	LT		BDLV,LC	4136682D0B	AD½RV,LC?	BDRV	
6/11/99	2	5	26	259	LT		LC	4137255A48	ADBDLV		

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Appendix A5.—Page 12 of 19. Codes used in tagging: AD = adipose finclip, RV = right ventral finclip, LV = left ventral finclip, LC = lower caudal finclip, UC = upper caudal finclip, LT = large trap, HL = hook and line gear, ½RV = half right ventral finclip, BDRV = blue dot on the right ventral fin, BDLV = blue dot on left ventral fin.

Date	Trip #	Area	Sample #	Length (mm)	Gear	New fish		Recaptured fish			Comments
						PIT #	2 nd mark	PIT #	2 nd mark	Other marks	
6/11/99	2	5	27	226	LT			413751533B	ADBDLV,LC		
6/11/99	2	6	28	177	HL		LC	41365F631E	ADBDLV		
6/11/99	2	6	29	432	HL	4137503D3D	AD,BDLV,LC				
6/11/99	2	8	30	311	HL	4136576567	AD,BDLV,LC				
6/12/99	2	5	1	252	LT	4137291E70	AD,BDLV,LC				
6/12/99	2	5	2	252	LT			4137316B76	ADBDLV,LC		
6/12/99	2	5	3	215	LT		LC	4137236949	AD½RV,LC?	BDRV,BDLV	
6/12/99	2	5	4	236	LT	4136534A23	AD,BDLV,LC				
6/12/99	2	5	5	178	LT	4136623B6B	AD,BDLV,LC				
6/12/99	2	5	6	199	LT		LC	41374C3833	AD½RV	BDRV,BDLV	
6/12/99	2	5	7	218	LT			4137361446	ADBDLV,LC		
6/12/99	2	5	8	246	LT	4137506271	AD,BDLV,LC				
6/12/99	2	5	9	245	LT	41365A452B	AD,BDLV,LC				
6/12/99	2	5	10	216	LT		BDLV,LC	41365A1A67	AD½RV		
6/12/99	2	5	11	246	LT	41365F112E	AD,BDLV,LC				
6/12/99	2	5	12	211	LT			41364A3F31	ADBDLV,LC		
6/12/99	2	5	13	263	LT		LC	4137417043	ADBDLV		
6/12/99	2	5	14	285	LT		LC	413762272D	ADBDLV		
6/12/99	2	5	15	200	LT			41364B390B	AD½RV	BDRV,BDLV,LC	
6/12/99	2	5	16	174	LT		LC	413739231E	ADBDLV		
6/12/99	2	5	17	230	LT	4137264B66	AD,BDLV,LC				
6/12/99	2	5	18	276	LT	4136463B70	AD,BDLV,LC				
6/12/99	2	5	19	228	LT	4136726568	AD,BDLV,LC				
6/12/99	2	5	20	181	LT	413734332F	AD,BDLV,LC				
6/12/99	2	5	21	171	LT		LC	41373D5847	ADBDLV		
6/12/99	2	5	22	210	LT	41366E2526	AD,BDLV,LC				
6/12/99	2	5	23	171	LT		LC	4136636C75	ADBDLV		
6/12/99	2	5	24	212	LT		LC	4137740729	ADBDLV		
6/12/99	2	5	25	251	LT			4137234B7E	ADBDLV,LC		
6/12/99	2	5	26	225	LT			41374F1312	ADBDLV,LC		
6/12/99	2	5	27	187	LT	41372C2544	AD,BDLV,LC				
6/12/99	2	5	28	215	LT	4137471814	AD,BDLV,LC				
6/12/99	2	5	29	300	LT	413663394B	AD,BDLV,LC				
6/12/99	2	5	30	240	LT			4136657505	ADBDLV,LC		
6/12/99	2	5	31	260	LT			4137255A4B	ADBDLV,LC		
6/12/99	2	5	32	202	LT		LC	4137432023	ADBDLV		

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Appendix A5.–Page 13 of 19. Codes used in tagging: AD = adipose finclip, RV = right ventral finclip, LV = left ventral finclip, LC = lower caudal finclip, UC = upper caudal finclip, LT = large trap, HL = hook and line gear, ½RV = half right ventral finclip, BDRV = blue dot on the right ventral fin, BDLV = blue dot on left ventral fin.

Date	Trip #	Area	Sample #	Length (mm)	Gear	New fish		Recaptured fish		Other marks	Comments
						PIT #	2 nd mark	PIT #	2 nd mark		
6/12/99	2	5	33	177	LT			413745150C	ADBDLV,LC		
6/12/99	2	5	34	130	LT				BDLV,LC		released without PIT tag
6/12/99	2	5	35	194	LT			4136527E50	ADBDLV,LC		
6/12/99	2	6	36	280	LT		LC	4137364E33	ADBDLV		
6/12/99	2	6	37	205	LT		LC	41372F531D	AD½RV	BDRV,BDLV	
6/12/99	2	6	38	247	LT			41374C654B	ADBDLV,LC		
6/12/99	2	6	39	214	LT		BDLV,LC	413741057E	AD½RV	BDRV	
6/12/99	2	6	40	279	LT		LC	4137501275	ADBDLV		BDA
6/12/99	2	6	41	245	LT			413746232C	ADBDLV,LC		
6/12/99	2	6	42	270	LT		LC	41372F7C55			
6/12/99	2	6	43	216	LT			4137531F79	ADBDLV,LC		
6/12/99	2	6	44	253	LT		LC	NOT READ	ADBDLV		
6/12/99	2	6	45	220	LT			4137353218	ADBDLV,LC		
6/12/99	2	6	46	209	LT		LC	4137357C09	ADBDLV		
6/12/99	2	6	47	281	LT	413647027C	AD,BDLV,LC				
6/12/99	2	6	48	258	LT	41373C1761	AD,BDLV,LC				
6/13/99	2	6	1	260	LT	4137347C1D	AD,BDLV,LC				
6/13/99	2	6	2	208	LT	41373D770F	AD,BDLV,LC				
6/13/99	2	6	3	250	LT			4137451E5D	ADBDLV,LC		
6/13/99	2	6	4	259	LT	4136517665	AD,BDLV,LC				
6/13/99	2	6	5	191	LT	4137431670	AD,BDLV,LC				
6/13/99	2	6	6	226	LT			4137481D05	ADBDLV,LC		
6/13/99	2	6	7	235	LT		LC	413745080D	ADBDLV		
6/13/99	2	6	8	216	LT			4137531F79	ADBDLV,LC		
6/13/99	2	6	9	197	LT			41377F2845	ADBDLV,LC		
6/13/99	2	6	10	233	LT			41364B1D12	ADBDLV,LC		
6/13/99	2	6	11	152	LT	4137403868	AD,BDLV,LC				
6/13/99	2	6	12	215	LT			413741057E	AD½RV	BDRV,BDLV,LC	
6/13/99	2	6	13	221	LT		LC	4136585D74	ADBDLV		
6/13/99	2	6	14	194	LT	4137473F1A	AD,BDLV,LC				
6/13/99	2	6	15	230	LT		LC	4137296F57	ADBDLV		
6/13/99	2	6	16	257	LT			41374A1229	ADBDLV,LC		
6/13/99	2	6	17	208	LT			4137490529	ADBDLV,LC		
6/13/99	2	6	18	304	LT	4136534934	AD,BDLV,LC				
6/13/99	2	6	19	277	LT			4137443864	ADBDLV,LC		

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Appendix A5.—Page 14 of 19. Codes used in tagging: AD = adipose finclip, RV = right ventral finclip, LV = left ventral finclip, LC = lower caudal finclip, UC = upper caudal finclip, LT = large trap, HL = hook and line gear, ½RV = half right ventral finclip, BDRV = blue dot on the right ventral fin, BDLV = blue dot on left ventral fin.

Date	Trip #	Area	Sample #	Length (mm)	Gear	New fish		Recaptured fish			Comments
						PIT #	2 nd mark	PIT #	2 nd mark	Other marks	
6/13/99	2	6	20	308	LT			4137505D47	ADBDLV,LC		
6/13/99	2	6	21	303	LT			4136706F7D	ADBDLV,LC		female ripe
6/13/99	2	6	22	176	LT			41365F631E	ADBDLV,LC		
6/13/99	2	6	23	211	LT			41366A1A1C	ADBDLV,LC		
6/13/99	2	6	24	250	LT	4136675676	AD,BDLV,LC				
6/13/99	2	6	25	225	LT		LC	41377B5D74	ADBDLV		
6/13/99	2	6	26	202	LT		BDLV,LC	4137711B13	AD½RV	BDRV	
6/13/99	2	6	27	196	LT	413737761C	AD,BDLV,LC				
6/13/99	2	6	28	329	LT	413725645D	AD,BDLV,LC				
6/13/99	2	6	29	223	LT	4137325607	AD,BDLV,LC				
6/13/99	2	7	30	255	LT			4136574B0C	ADBDLV,LC		
6/13/99	2	7	31	222	LT			41365F5779	ADBDLV,LC		
6/13/99	2	7	32	199	LT		LC	41377F424D	ADBDLV		
6/13/99	2	7	33	312	LT			413649412E	ADBDLV,LC		
6/13/99	2	7	34	249	LT			4136517A39	ADBDLV,LC		
6/13/99	2	7	35	215	LT		LC	4137316330	ADBDLV		
6/13/99	2	7	36	186	LT		LC	41373D424B	ADBDLV		
6/14/99	2	7	1	261	LT	413726173D	AD,BDLV,LC				
6/14/99	2	7	2	187	LT		BDLV,LC	41374D2B4E	AD½RV	BDRV	
6/14/99	2	7	3	187	LT			4137342501	ADBDLV,LC		
6/14/99	2	7	4	390	LT	4137505C64	AD,BDLV,LC				
6/14/99	2	7	5	298	LT	4136716947	AD,BDLV,LC				
6/14/99	2	7	6	332	LT		LC	41364A2313	ADBDLV		
6/14/99	2	7	7	295	LT	41373A170A	AD,BDLV,LC				
6/14/99	2	7	8	330	LT			413725645D	ADBDLV,LC		
6/14/99	2	7	9	266	LT	41374D6D19	AD,BDLV,LC				
6/14/99	2	7	10	257	LT			4136574B0C	ADBDLV,LC		male ripe
6/14/99	2	7	11	213	LT			413729330C	ADBDLV,LC		
6/14/99	2	7	12	240	LT			41374C3E1D	ADBDLV,LC		
6/14/99	2	7	13	255	LT	413662403E	AD,BDLV,LC				
6/14/99	2	7	14	199	LT			41377F424D	ADBDLV,LC		
6/14/99	2	7	15	265	LT			4137341E53	ADBDLV,LC		
6/14/99	2	7	16	153	LT	41372E3250	AD,BDLV,LC				
6/14/99	2	7	17	189	LT			4137474B04	AD½RV	BDRV,BDLV,LC	
6/14/99	2	7	18	236	LT		LC	41372A5B43	ADBDLV		

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Appendix A5.-Page 15 of 19. Codes used in tagging: AD = adipose finclip, RV = right ventral finclip, LV = left ventral finclip, LC = lower caudal finclip, UC = upper caudal finclip, LT = large trap, HL = hook and line gear, ½RV = half right ventral finclip, BDRV = blue dot on the right ventral fin, BDLV = blue dot on left ventral fin.

Date	Trip #	Area	Sample #	Length (mm)	Gear	New fish		Recaptured fish		Other marks	Comments
						PIT #	2 nd mark	PIT #	2 nd mark		
6/14/99	2	7	19	262	LT			4137255A48	ADBDLV,LC		
6/14/99	2	7	20	195	LT			413738164E	ADBDLV,LC		
6/14/99	2	7	21	337	LT	41372C2E15	AD,BDLV,LC				male ripe
6/14/99	2	7	22	265	LT	4137794F59	AD,BDLV,LC				
6/14/99	2	7	23	223	LT			4137353218	ADBDLV,LC		
6/14/99	2	7	24	228	LT			4137296F57	ADBDLV,LC		
6/14/99	2	7	25	200	LT	41375F1069	AD,BDLV,LC				
6/14/99	2	7	26	211	LT			4137357C09	ADBDLV,LC		
6/14/99	2	7	27	267	LT	41375C555A	AD,BDLV,LC				
6/14/99	2	7	28	237	LT		LC	413731017E	ADBDLV		
6/14/99	2	7	29	262	LT		BDLV,LC	4136613667	AD½RV	BDRV	
6/14/99	2	7	30	282	LT		LC	41372C4962	ADBDLV		
6/14/99	2	7	31	255	LT	4137420F7F	AD,BDLV,LC				
6/14/99	2	7	32	187	LT	41374F583A	AD,BDLV,LC				
6/14/99	2	7	33	322	LT	4137423D36	AD,BDLV,LC				female
6/14/99	2	7	34	206	LT			4136521458	ADBDLV,LC		
6/14/99	2	7	35	308	LT			4137505D47	ADBDLV,LC		
6/14/99	2	7	36	290	LT	41372D7474	AD,BDLV,LC				
6/14/99	2	7	37	255	LT			4137693B2B	ADBDLV,LC		
6/14/99	2	7	38	285	LT	4137450665	AD,BDLV,LC				
6/14/99	2	7	39	246	LT		LC	41372E2717	AD½RV,LC?	BDRV,BDLV	
6/14/99	2	7	40	195	LT			41364C206F	ADBDLV,LC		
6/14/99	2	7	41	218	LT			41365A1A67	ADBDLV,LC		
6/14/99	2	7	42	190	LT			41366D782D	ADBDLV,LC		
6/14/99	2	7	43	240	LT			4137624B0B	ADBDLV,LC		
6/14/99	2	7	44	169	LT		LC	41376A0C28	ADBDLV		
6/14/99	2	7	45	283	LT	41377D7B32	AD,BDLV,LC				
6/14/99	2	7	46	253	LT			4137234B7E	ADBDLV,LC		
6/14/99	2	7	47	255	LT		LC	41372C3120	ADBDLV		
6/14/99	2	7	48	245	LT			413740744D	ADBDLV,LC		
6/14/99	2	7	49	175	LT			4137320E46	ADBDLV,LC		
6/14/99	2	7	50	305	LT	41373C3B3E	AD,BDLV,LC				
6/14/99	2	7	51	174	LT			413742042E	ADBDLV,LC		
6/14/99	2	7	52	179	LT	41373D1F33	AD,BDLV,LC				
6/14/99	2	7	53	205	LT			41372D1137	ADBDLV,LC		
6/14/99	2	7	54	297	LT	4138001F42	AD,BDLV,LC				
6/14/99	2	7	55	257	LT		BDLV,LC	4137343735	AD½RV		female ripe

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Appendix A5.—Page 16 of 19. Codes used in tagging: AD = adipose finclip, RV = right ventral finclip, LV = left ventral finclip, LC = lower caudal finclip, UC = upper caudal finclip, LT = large trap, HL = hook and line gear, ½RV = half right ventral finclip, BDRV = blue dot on the right ventral fin, BDLV = blue dot on left ventral fin.

Date	Trip #	Area	Sample #	Length (mm)	Gear	New fish		Recaptured fish			Comments
						PIT #	2 nd mark	PIT #	2 nd mark	Other marks	
6/14/99	2	7	56	237	LT			4136655A4D	ADBDLV,LC		
6/14/99	2	7	57	137	LT	41372C4A75	AD,BDLV,LC				
6/14/99	2	7	58	198	LT		LC	4136632a22	ADBDLV		
6/14/99	2	7	59	220	LT	41372D3223	AD,BDLV,LC				
6/14/99	2	7	60	263	LT			413736326B	ADBDLV,LC		
6/14/99	2	7	61	215	LT		LC	4137680855	ADBDLV		
6/14/99	2	7	62	272	LT		LC	41374E3F59	ADBDLV		
6/14/99	2	7	63	275	LT	4137260F05	AD,BDLV,LC				
6/14/99	2	7	64	204	LT			4137432023	ADBDLV,LC		
6/14/99	2	7	65	189	HL	41377E3647	AD,BDLV,LC				
6/15/99	2	7	1	227	LT			413751533B	ADBDLV,LC		
6/15/99	2	7	2	286	LT	413735267C	AD,BDLV,LC				
6/15/99	2	7	3	209	LT			41365E7E0B	ADBDLV,LC		
6/15/99	2	7	4	279	LT			4137364E33	ADBDLV,LC		
6/15/99	2	7	5	258	LT			4136574B0C	AD½RV	BDRV,BDLV,LC	male ripe
6/15/99	2	7	6	278	LT	4137412A36	AD,BDLV,LC				male ripe
6/15/99	2	7	7	237	LT		LC	413645375F	ADBDLV		
6/15/99	2	7	8	192	LT		LC	4137316F6C	ADBDLV		
6/15/99	2	7	9	200	LT			41374C3833	AD½RV	BDRV,BDLV,LC	
6/15/99	2	7	10	219	LT		LC	4137712E57	ADBDLV		
6/15/99	2	7	11	298	LT		BDLV,LC	413744443C	AD½RV	BDRV	
6/15/99	2	7	12	249	LT			41365F112E	ADBDLV,LC		
6/15/99	2	7	13	255	LT			4137291E70	ADBDLV,LC		
6/15/99	2	7	14	258	LT	413723244F	AD,BDLV,LC				
6/15/99	2	7	15	344	LT			4112684518	ADLV,LC	BDLP	
6/15/99	2	7	16	230	LT	4137654C79	AD,BDLV,LC				
6/15/99	2	7	17	200	LT			41373E577F	ADBDLV,LC		
6/15/99	2	7	18	284	LT			41372C4962	ADBDLV,LC		
6/15/99	2	7	19	250	LT			4137565170	ADBDLV,LC		
6/15/99	2	7	20	259	LT			41374A1229	ADBDLV,LC		
6/15/99	2	7	21	200	LT		LC	413751510F	AD½RV	BDRV,BDLV	
6/15/99	2	7	22	206	LT			413738476A	AD½RV	BDRV,BDLV,LC	
6/15/99	2	7	23	302	LT	4137344731	AD,BDLV,LC				
6/15/99	2	7	24	181	LT			4137261F7B	ADBDLV,LC		
6/15/99	2	7	25	251	LT		BDLV,LC	4137271D5B	AD½RV,LC?	BDRV	
6/15/99	2	7	26	218	LT	413726280B	AD,BDLV,LC				
6/15/99	2	7	27	229	LT			41376A3F42	ADBDLV,LC		

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Appendix A5.—Page 17 of 19. Codes used in tagging: AD = adipose finclip, RV = right ventral finclip, LV = left ventral finclip, LC = lower caudal finclip, UC = upper caudal finclip, LT = large trap, HL = hook and line gear, ½RV = half right ventral finclip, BDRV = blue dot on the right ventral fin, BDLV = blue dot on left ventral fin.

Date	Trip #	Area	Sample #	Length (mm)	Gear	New fish		Recaptured fish			Comments
						PIT #	2 nd mark	PIT #	2 nd mark	Other marks	
6/15/99	2	7	28	208	LT			41365D7307	AD½RV	BDRV,BDLV,LC	
6/15/99	2	7	29	193	LT			41374F2B29	ADBDLV,LC		
6/15/99	2	7	30	140	LT	41372B1B2E	AD,BDLV,LC				
6/15/99	2	7	31	182	LT			4137373746	ADBDLV,LC		
6/15/99	2	7	32	263	LT	413739500D	AD,BDLV,LC				
6/15/99	2	7	33	208	LT	4137441867	AD,BDLV,LC				
6/15/99	2	7	34	290	LT		LC	413768071E	ADBDLV		
6/15/99	2	7	35	260	LT	4137535C17	AD,BDLV,LC				
6/15/99	2	7	36	195	LT			41374E7B3A	ADBDLV,LC		
6/15/99	2	7	37	173	LT			413732E46	ADBDLV,LC		
6/15/99	2	7	38	237	LT			4136655A4D	ADBDLV,LC		
6/15/99	2	7	39	226	LT			41377B5D74	ADBDLV,LC		
6/15/99	2	7	40	253	LT	41372B3919	AD,BDLV,LC				
6/15/99	2	7	41	277	LT	4137484653	AD,BDLV,LC				female ripe
6/15/99	2	7	42	292	LT			4137485314	ADBDLV,LC		
6/15/99	2	7	43	192	LT			4137350E39	ADBDLV,LC		
6/15/99	2	7	44	218	LT			4137236949	AD½RV	BDRV,BDLV,LC	
6/15/99	2	7	45	218	LT			4137531F79	ADBDLV,LC		
6/15/99	2	7		128	LT		LC				released without PIT tag
6/15/99	2	7	46	190	LT		LC	4136552579	AD½RV	BDRV,BDLV	
6/15/99	2	7	47	251	LT			4136675676	ADBDLV,LC		
6/15/99	2	7	48	152	LT		LC	4137547871	ADBDLV		
6/15/99	2	7	49	242	LT	413761486F	AD,BDLV,LC				
6/15/99	2	7	50	189	LT		LC	41372A2135	ADBDLV		
6/15/99	2	7	51	248	LT			41365A452B	ADBDLV,LC		
6/15/99	2	7	52	253	LT			41364B2133	ADBDLV,LC		
6/15/99	2	7	53	247	LT			413746232C	ADBDLV,LC		
6/15/99	2	7		124	LT		LC				
6/15/99	2	7	54	178	LT			413745150C	ADBDLV,LC		
6/15/99	2	7	55	296	LT		LC	4137321569	ADBDLV		
6/15/99	2	7		129	LT		LC				
6/15/99	2	7	56	261	LT	4137276214	AD,BDLV,LC				
6/15/99	2	7	57	232	LT		LC	41372F723D	ADBDLV		
6/15/99	2	7	58	297	LT		LC	413754742D	ADBDLV		
6/15/99	2	7	59	282	LT	4137455A3E	AD,BDLV,LC				
6/15/99	2	7	60	255	LT			4137316D76	ADBDLV,LC		

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Appendix A5.—Page 18 of 19. Codes used in tagging: AD = adipose finclip, RV = right ventral finclip, LV = left ventral finclip, LC = lower caudal finclip, UC = upper caudal finclip, LT = large trap, HL = hook and line gear, ½RV = half right ventral finclip, BDRV = blue dot on the right ventral fin, BDLV = blue dot on left ventral fin.

Date	Trip #	Area	Sample #	Length (mm)	Gear	New fish		Recaptured fish			Comments
						PIT #	2 nd mark	PIT #	2 nd mark	Other marks	
6/15/99	2	7	61	245	LT			413740744D	ADBDLV,LC		
6/16/99	2	8	1	200	LT			41377F2845	ADBDLV,LC		
6/16/99	2	8	2	206	LT			413738476A	AD½RV	BDRV,BDLV,LC	
6/16/99	2	8	3	262	LT		LC	413730716E	AD½RV,LC?	BDRV,BDLV	
6/16/99	2	8	4	209	LT			41372F531D	AD½RV	BDRV,BDLV,LC	
6/16/99	2	8	5	205	LT			4137432023	AD½RV	BDLV,LC	
6/16/99	2	8	6	172	LT			41373D5847	ADBDLV,LC		
6/16/99	2	8	7	255	LT	41372F4E1C	AD,BDLV,LC				
6/16/99	2	8	8	229	LT			4136667A3D	ADBDLV,LC		
6/16/99	2	8	9	251	LT			4137451E5D	ADBDLV,LC		
6/16/99	2	8	10	246	LT			4137506271	ADBDLV,LC		
6/16/99	2	8	11	304	LT			4136706F7D	ADBDLV,LC		female ripe
6/16/99	2	8	12	272	LT	4137545A46	AD,BDLV,LC				
6/16/99	2	8	13	194	LT	41373D2126	AD,BDLV,LC				
6/16/99	2	7	14	200	LT			4136527E50	ADBDLV,LC		
6/16/99	2	7	15	250	LT			41365C7A76	AD½RV	BDRV,BDLV,LC	
6/16/99	2	7	16	196	LT			4137410350	AD½RV	BDRV,BDLV,LC	
6/16/99	2	7	17	299	LT			4138001F42	ADBDLV,LC		
6/16/99	2	7	18	299	LT			4136716947	ADBDLV,LC		
6/16/99	2	7	19	234	LT			4137436C06	ADBDLV,LC		
6/16/99	2	7	20	296	LT			413754742D	ADBDLV,LC		
6/16/99	2	7	21	232	LT			4137435D58	ADBDLV,LC		
6/16/99	2	7	22	239	LT			413731017E	ADBDLV,LC		
6/16/99	2	7	23	196	LT			41364C206F	ADBDLV,LC		
6/16/99	2	7	24	255	LT			41373E5072	ADBDLV,LC		
6/16/99	2	7	25	215	LT			413729330C	ADBDLV,LC		
6/16/99	2	7	26	192	LT		LC	4137281535	ADBDLV		
6/16/99	2	8	27	239	LT			41374C3E1D	ADBDLV,LC		
6/16/99	2	8	28	195	LT		LC	41372E6D1C	ADBDLV		
6/16/99	2	8	29	182	LT			4137261F78	ADBDLV,LC		
6/16/99	2	8	30	242	LT			4136657505	ADBDLV,LC		
6/16/99	2	8	31	246	LT			41365A452B	ADBDLV,LC		
6/16/99	2	8	32	224	LT			4136585D74	ADBDLV,LC		
6/16/99	2	8	33	262	LT			4137347C1D	ADBDLV,LC		
6/16/99	2	1	34	190	LT			41372B1546	ADBDLV,LC		
6/16/99	2	1	35	219	LT			4137361446	ADBDLV,LC		

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Appendix A5.–Page 19 of 19. Codes used in tagging: AD = adipose finclip, RV = right ventral finclip, LV = left ventral finclip, LC = lower caudal finclip, UC = upper caudal finclip, LT = large trap, HL = hook and line gear, ½RV = half right ventral finclip, BDRV = blue dot on the right ventral fin, BDLV = blue dot on left ventral fin.

Date	Trip #	Area	Sample #	Length (mm)	Gear	New fish		Recaptured fish			Comments
						PIT #	2 nd mark	PIT #	2 nd mark	Other marks	
6/16/99	2	1	36	207	LT		LC	4137254270	ADBDLV		
6/16/99	2	1	37	196	LT	4137304A42	AD,BDLV,LC				
6/16/99	2	1	38	215	LT	41373A7467	AD,BDLV,LC				
6/16/99	2	1	39	197	LT			413738164E	ADBDLV,LC		
6/16/99	2	1	40	228	LT	4137347162	AD,BDLV,LC				
6/16/99	2	1	41	261	LT			4136517665	ADBDLV,LC		male ripe
6/16/99	2	1	42	208	LT			413760045E	ADBDLV,LC		
6/16/99	2	1	43	240	LT	41375D6707	AD,BDLV,LC				
6/16/99	2	1	44	212	LT			41366A271E	AD½RV	BDRV,BDLV,LC	
6/16/99	2	1	45	203	LT			41372D1137	ADBDLV,LC		
6/16/99	2	1		122	LT		LC				
6/16/99	2	1	46	174	LT	41376B0826	AD,BDLV,LC				
6/16/99	2	1	47	187	LT	41376D7849	AD,BDLV,LC				
6/16/99	2	1	48	223	LT			41373F5066	ADBDLV,LC		
6/16/99	2	1	49	213	LT			41373B225A	ADBDLV,LC		
6/16/99	2	1	50	175	LT			413742042E	ADBDLV,LC		
6/16/99	2	1	51	246	LT		LC	41373D607C	ADBDLV		
6/16/99	2	1	52	200	LT			41377E7529	ADBDLV,LC		
6/16/99	2	1	53	199	LT			413737761C	ADBDLV,LC		
6/16/99	2	1	54	262	LT			41365A0766	ADBDLV,LC		

Appendix A6.–List of computer data files for studies at Auke Creek weir and Auke Lake during 1999.

DATA FILE	DESCRIPTION
CUT99.xls	Excel file of length information for downstream and upstream cutthroat trout, Auke Creek weir, 1999
Down1999.xls	Excel file of the counts of downstream migrant salmonids at Auke Creek weir, 1999
DV99.xls	Excel file of the lengths of marked & unmarked DV moving downstream at Auke Creek weir, 1999
ctgrw99.xls	Excel file of recovered tagged cutthroat trout with lengths and growth information for 1999 field season
Lake99.xls	Excel file of cutthroat trout PIT tagging information for the abundance study in Auke Lake, 1999
PIT99.xls	Excel file of PIT tagging information from spring tagging and fall recoveries of cutthroat trout at Auke Creek weir, 1999
Up1999.xls	Excel file of the counts of upstream migrant salmonids at Auke Creek weir, 1999

Appendix B1.—Detection of size-selective sampling (from Bernard and Hansen 1992).

Result of Hypothesis Test on Lengths of fish CAPTURED during the First Event and RECAPTURED during the Second Event	Result of Hypothesis Test on Lengths of fish CAPTURED during the First Event and CAPTURED during the Second Event
Case I: Accept H_0 There is no size-selectivity during either sampling event.	Accept H_0
Case II: Accept H_0 There is no size-selectivity during the second sampling event but there is during the first.	Reject H_0
Case III: Reject H_0 There is size-selectivity during both sampling events.	Accept H_0
Case IV: Reject H_0 There is size-selectivity during the second sampling event; the status of size-selectivity during the first event is unknown.	Reject H_0

Case I: Calculate one unstratified abundance estimate, and pool lengths, sexes, and ages from both sampling events to improve precision of proportions in estimates of composition.

Case II: Calculate one unstratified abundance estimate, and only use lengths, sexes, and ages from the second sampling event to estimate proportions in compositions.

Case III: Completely stratify both sampling events, and estimate abundance for each stratum. Add abundance estimates across strata to get a single estimate for the population. Pool lengths, ages, and sexes from both sampling events to improve precision of proportions in estimates of composition, and apply formulae to correct for size bias to the pooled data.

Case IV: Completely stratify both sampling events and estimate abundance for each stratum. Add abundance estimates across strata to get a single estimate for the population. Use lengths, ages, and sexes from only the second sampling event to estimate proportions in compositions, and apply formulae to correct for size bias to the data from the second event.

Whenever the results of the hypothesis tests indicate that there has been size-selective sampling (Case III or IV), there is still a chance that the bias in estimates of abundance from this phenomenon is negligible. Produce a second estimate of abundance by not stratifying the data as recommended above. If the two estimates (stratified and unbiased vs. biased and unstratified) are dissimilar, the bias is meaningful, the stratified estimate should be used, and data on compositions should be analyzed as described above for Cases III or IV. However, if the two estimates of abundance are similar, the bias is negligible in the UNSTRATIFIED estimate, and analysis can proceed as if there were no size-selective sampling during the second event (Cases I or II).