Fishery Data Series No. 99-32

Dolly Varden and Cutthroat Trout Populations in Auke Lake, Southeast Alaska, during 1998

by

Judith L. Lum,

J. Douglas Jones,

Kurt Kondzela,

and

Sidney G. Taylor

November 1999

Alaska Department of Fish and Game **Division of Sport Fish**

Symbols and Abbreviations

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Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
metric ton	mt
milliliter	ml
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
ounce	oz
pound	lb
quart	qt
yard	yd

Spell out acre and ton.

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
hour (spell out for 24-hour clock)	h
minute	min
second	s

Spell out year, month, and week.

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

All commonly accepted abbreviations.	e.g., Mr., Mrs., a.m., p.m., etc.
All commonly accepted professional titles.	e.g., Dr., Ph.D., R.N., etc.
and	&
at	@
Compass directions:	
east	E
north	N
south	S
west	W
Copyright	©
Corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
et alii (and other people)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.,
id est (that is)	i.e.,
latitude or longitude	lat. or long.
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
number (before a number)	# (e.g., #10)
pounds (after a number)	# (e.g., 10#)
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S. state and District of Columbia abbreviations	use two-letter abbreviations (e.g., AK, DC)

Mathematics, statistics, fisheries

alternate hypothesis	H_A
base of natural logarithm	e
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	F, t, χ^2, etc.
confidence interval	C.I.
correlation coefficient	R (multiple)
correlation coefficient	r (simple)
covariance	cov
degree (angular or temperature)	°
degrees of freedom	df
divided by	÷ or / (in equations)
equals	=
expected value	E
fork length	FL
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
mideye-to-fork	MEF
minute (angular)	'
multiplied by	x
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
standard length	SL
total length	TL
variance	Var

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Judith L. Lum
Division of Sport Fish, Douglas

J. Douglas Jones
Division of Sport Fish, Douglas

Kurt Kondzela
Division of Sport Fish, Douglas

and
Sidney G. Taylor
National Marine Fisheries Service, Auke Bay

Alaska Department of Fish and Game
Division of Sport Fish
P. O. Box 240020
Douglas, AK 99824-0020

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Judith L. Lum, J. Douglas Jones, and Kurt Kondzela
Alaska Department of Fish and Game, Division of Sport Fish
P. O. Box 240020, Douglas, AK 99824-0020, USA

Sidney G. Taylor
National Marine Fisheries Service
Alaska Fisheries Science Center
Auke Bay Laboratory
11305 Glacier Hwy.
Juneau, AK 99801-8626

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ABSTRACT

The Auke Creek weir near Juneau, Alaska, was operated in 1998 to intercept and enumerate migrating Dolly Varden *Salvelinus malma*, sea-run cutthroat trout *Oncorhynchus clarki*, and other species. Abundance for downstream migrant Dolly Varden from March through June was 7,532 and upstream counts from July though early November totalled 4,993, 66% of the emigrating population. Estimated mean fork length of downstream Dolly Varden was 261 mm (SD = 87 mm, SE = 2 mm). Abundance for downstream cutthroat trout in the spring was 374, and the upstream count in the fall was 361. Mean fork length of downstream cutthroat trout was 278 mm (SD = 53 mm) and of upstream cutthroat trout was 282 mm (SD = 58 mm). In the spring, 237 cutthroat trout were successfully PIT (Passive Integrated Transponder) tagged prior to release. The estimated abundance of cutthroat trout ≥180 mm residing in Auke Lake during July was 247 (SE = 59).

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 funded and operated the NMFS Auke Creek weir on the outlet of Auke Lake, near Juneau, Alaska. The weir has provided consistent, long-term information on all emigrating and immigrating species, and provides the most complete long-term database for several species at any single site in Southeast Alaska. Results are used as indicators for local stocks, help guide management decisions for the Juneau area, and are used 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 strategies, age composition, maturity, timing, and growth of species present in the Auke Lake system.

A weir has been operated at Auke Creek since 1963. The present permanent structure was installed during the spring of 1980. The weir 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 also captures chinook salmon *O. tshawytscha* returning to Auke Creek as a result of a sport fishing enhancement program in the Juneau area. The weir is converted on June 30 to count upstream migrants and is operated through November. The Auke Creek weir operations and fish counts for 1998 are reported in their entirety in the annual report for the weir (Taylor and Lum *Unpublished*).

Auke Creek weir is the only site in Southeast Alaska where long-term data collections exist for sea-run cutthroat trout. The size of the resident (non-sea-run) cutthroat trout population in the lake is also of interest. Baseline information on cutthroat trout at Auke Creek is important considering the impact directed fisheries can have on these populations (Behnke 1979, Spense 1990, Wright 1992).

Auke Lake supports a small sport fishery for cutthroat trout (Table 2). Cutthroat trout are taken through the ice during the winter and from the beach or small boats during the remainder of the year. Anecdotal historical information suggests that the cutthroat fishery in Auke Lake was more productive than at present. A strategic planning exercise identified improvement of the cutthroat trout fishery in Auke Lake as an important strategy to help satisfy the demand for cutthroat trout fisheries along the Juneau roadside (Schwan 1990).

ADF&G attempted to estimate the size of the cutthroat trout population in Auke Lake in October 1991, but had little success due to low catch rates. Unpublished data are also available from 1997, when a UAF student under the supervision of NMFS and ADF&G initiated a similar study late in the spring and estimated the

Table 1.–Average number of migrant fish of all species counted at Auke Creek, 1980–1998.

Annual average	Pink salmon	Coho salmon	Sockeye salmon	Chum salmon	Chinook salmon	Dolly Varden	Cutthroat trout	Steelhead
Emigrating	108,476	6,622	16,349	4,684	—	6,442	256	12 [a]
Immigrating	10,106	699	5,481	664	191	5,349 [a]	414 [a]	3 [a]

[a] Average of only 1997 and 1998 weir counts.

abundance of resident cutthroat trout, without respect to size, at 694 (SE = 157). As tagged fish from this study were recovered in marine waters by sport anglers during the following summers, it is clear that Auke Lake is used as rearing area for sea-run, as well as resident cutthroat trout.

Dolly Varden populations along the Juneau roadside declined severely 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. Populations have improved in recent years but not to historical levels so the restrictions remain in place. This project gives us annual counts of the spring emigration to use as an indicator of the relative abundance of local populations of Dolly Varden.

The purpose of this report is to summarize weir studies of Dolly Varden and cutthroat trout in 1998, along with a study to estimate abundance of cutthroat trout residing in Auke Lake. The objectives of this project were to: (1) count all Dolly Varden and cutthroat trout emigrating from Auke Lake from March 1 through June 30; (2) estimate the size composition of emigrating Dolly Varden and sea-run cutthroat trout; (3) count all sea-run Dolly Varden and cutthroat trout that enter Auke Lake from June 30 through November 15; (4) measure all marked Dolly Varden and cutthroat trout that enter Auke Lake from June 30 through November 15; and (5) estimate the abundance of resident cutthroat trout in Auke Lake in July and August.

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 five

Table 2.–Estimates of sport fishing effort, total catch, and harvest of cutthroat trout and Dolly Varden in the Auke Lake drainage, 1990–1997. (Unpublished estimates from A. L. Howe, Alaska Department of Fish and Game, Anchorage, personal communication. All estimates for Auke Lake were derived from low sample sizes and are considered imprecise).

				Cutthroat trout		Dolly Varden[a]	
Year	No. anglers	No. trips	No. days	Catch	Harvest	Catch	Harvest
1990	34	34	34	17	17	0	0
1991	16	33	23	0	0	0	0
1992	75	87	75	73	0	0	0
1993	50	325	271	391	224	49	0
1994[b]	–	–	–	–	–	–	–
1995	29	32	29	26	0	0	0
1996	59	485	485	1,070	0	405	0
1997	47	63	63	20	0	46	0

[a] Auke Lake closed to the harvest of Dolly Varden.
[b] – indicates no estimates made.

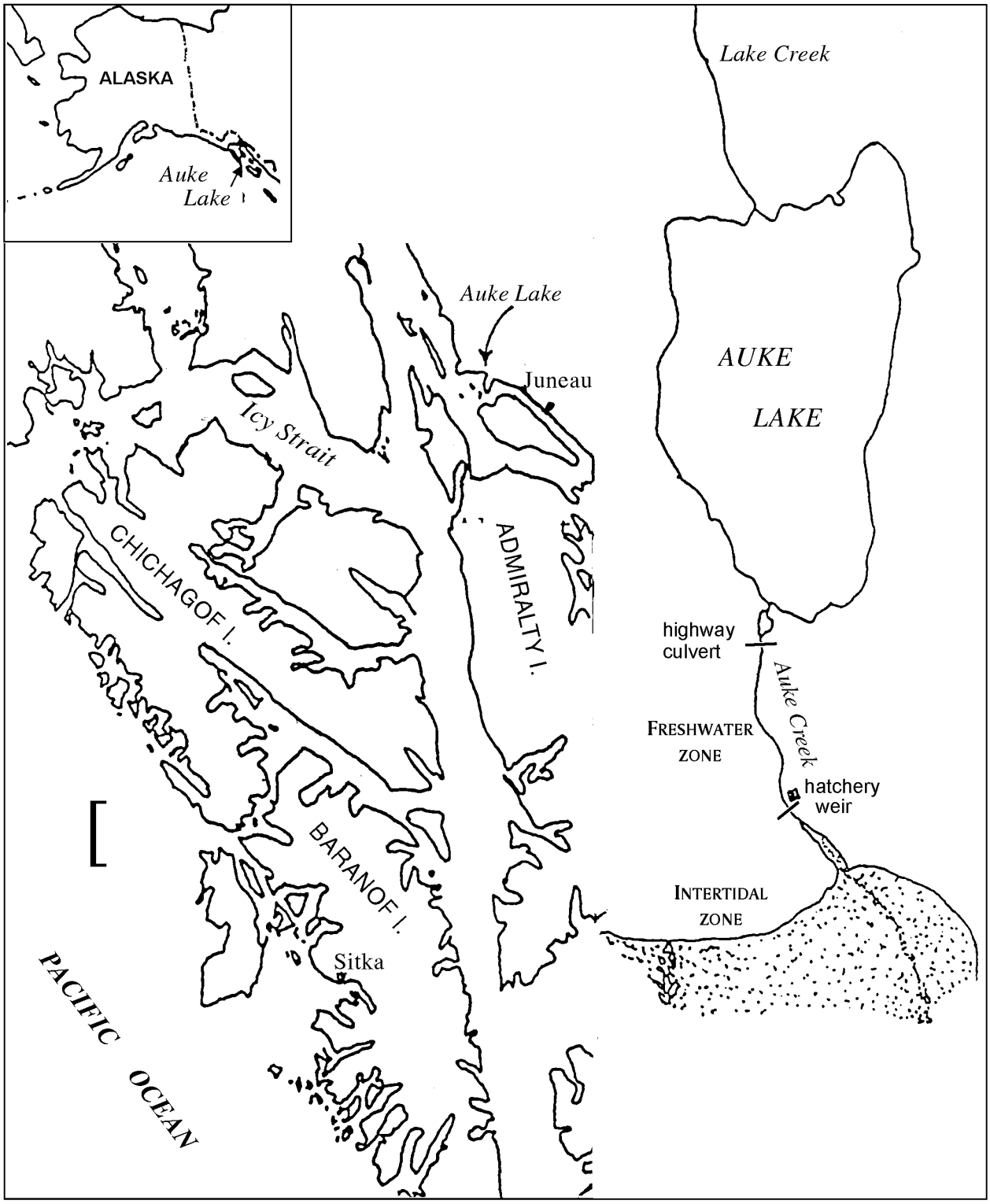

Figure 1.–The Auke Lake system in northern Southeast Alaska and location of the Auke Creek weir.

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 1998, the weir was operated from March 1 through June 30 to intercept all emigrating salmonids. During the spring emigration, Auke Creek was diverted through five inclined aluminum traps with 3-mm perforations that allowed most of the water to spill. Fish were diverted through a 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 external marks. Length composition was estimated by using a systematic sampling procedure. Every 10th Dolly Varden passed downstream was measured to the nearest 5 mm from the tip of snout to fork of tail (FL).

Average length of migrant Dolly Varden collected at the weir over time was estimated:

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

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:

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

where s^2 is the sample variance, and a finite population correction $\left(fpc = 1 - \frac{n}{N}\right)$ is included because of the high sampling rates.

All emigrating cutthroat trout were counted, measured to the nearest millimeter in FL, examined for external marks or tags, and, if adipose clipped, were checked for VI (visual implant) or PIT (passive integrated transponder) tags. 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. Examination of weir mortalities carrying a PIT tag during fall showed no scarring or cysting, good placement of the PIT tag, and no migration of the tag into the body cavity or out through the skin.

All emigrating cutthroat trout were PIT tagged, and, if not already clipped, adipose finclipped prior to release in 1998. Possible external marks on cutthroat trout in 1998 included: (1) right ventral marked hatchery fish released in 1983 and 1991; (2) left ventral marked 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 when emigrating from Auke Lake in 1994, 1995, and 1996; and (5) adipose clipped and PIT tagged fish marked while emigrating in 1997.

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. 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 was operated through November 15. In addition to the normal weir structure, which only stops adult salmon, two

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, and prevented larger salmon from entering the trout traps. Two panels, 16 × 38 inches in size and made out of perforated aluminum, with rectangular slots (0.5 × 4 inches), were fitted to the upstream side of each weir panel to prevent the movement of smaller fish through the existing weir panels.

All immigrating species were counted and released upstream. Dolly Varden were examined for external marks. 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, marked on the anal fin with a blue photonic dye, and released upstream from the weir. Early in the immigration, cutthroat trout were placed back downstream to reduce mortalities caused by low streamflow and high creek temperatures. Immigrant cutthroat trout were not PIT tagged because upstream tagging in 1996 resulted in 56% 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.

Three 10-day sampling trips were conducted to capture fish in Auke Lake, with a 5-day break between each trip. The marking event was from July 8 to 17 (period 1), and the second event for the Petersen mark/recapture estimate occurred over two periods, July 22 to 31 (period 2) and August 5 to 14 (period 3). 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 right ventral fin, respectively. Fish captured during the second sampling event also received a shallow lower caudal clip (trip 2) or a shallow upper caudal clip (trip 3) to prevent double sampling in the event of tag loss. Area of capture, gear type, and trap number were recorded for each fish. Any previously tagged fish recaptured were treated as usual except "recapture" was recorded in the comments. Mortality status and other comments were also recorded. Additionally, catch, trap number, trap depth, and number 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 each fish.

Cutthroat trout were captured with baited large minnow traps with a funnel opening (1 m long x 0.5 m wide) and with hook-and-line gear. Bait for traps consisted of whole salmon eggs that had been disinfected in iodophor solution, fresh salmon eggs collected from mortalities at the weir, "Power Bait", and corn and tuna fish.

Traps were uniformly distributed over the bottom of the lake and at varying depths in areas ≤15 m (50 ft) deep. Depths were determined by a fathometer. 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. Thus, by trapping to 15 m, an attempt was made to insure that most of the 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 eight 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 each 10-day trip, 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 second trip, the geographic order in which the areas were fished was similar, to insure relatively constant hiatus between sampling

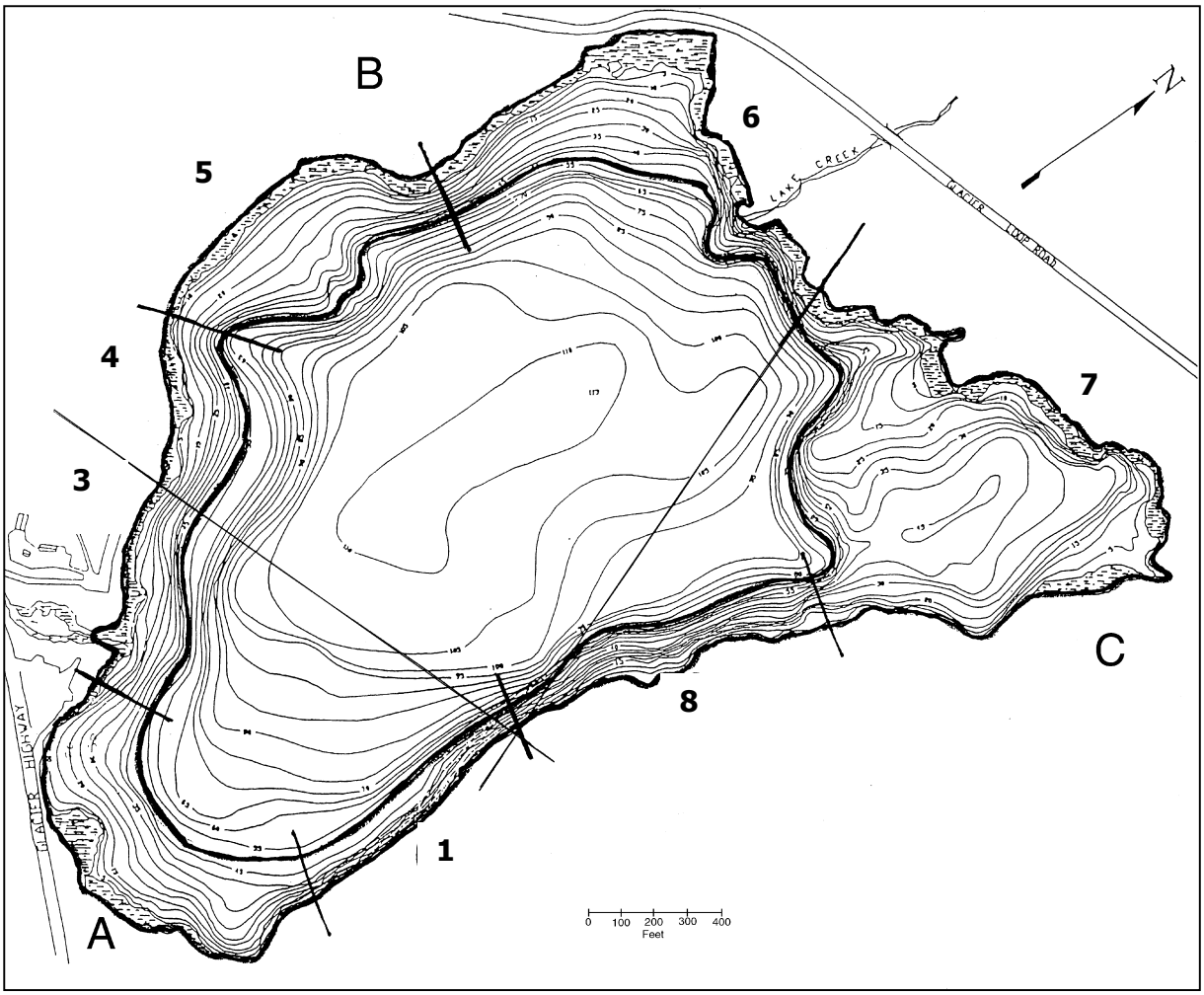

Figure 2.–Bathymetric map of Auke Lake in northern Southeast Alaska, showing location of sampling areas in 1998.

events by area of the lake. Fifteen traps were fished each night.

During data analysis, the study areas were pooled into three 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).

Four assumptions are necessary for accurate estimation of abundance in a closed population (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 occurred well after the spawning season (Harding 1995, Lum et al. 1998) and a weir was operated on the outlet of the lake, significant immigration was also unlikely. Possible emigration from Auke Lake during the sampling period would also be detected at the weir. Assumption 4 was assured because of double marking 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 was 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 (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 when 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* (ie. large or small fish) was calculated as:

$$\hat{p}_{a,i} = \frac{n_{a,i}}{n_i}$$

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

$$V[\hat{p}_{a,i}] = \frac{\hat{p}_{a,i}(1 - \hat{p}_{a,i})}{n_i - 1}$$

The estimated abundance of length group *a* in the population ($\hat{N}_a$) is

$$\hat{N}_a = \sum_i \hat{p}_{a,i} \hat{N}_i$$

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):

$$\text{var}[\hat{N}_a] = \sum_i \begin{bmatrix} \text{var}(\hat{p}_{a,i})\hat{N}_i^2 + \text{var}(\hat{N}_i)\hat{p}_{a,i}^2 \\ -\text{var}(\hat{p}_{a,i})\,\text{var}(\hat{N}_i) \end{bmatrix}$$

If the population estimate was unstratified by size class, then the two equations above simplify to only one $\hat{N}$, and no further calculations are required. Given size stratification, however, the estimated fraction of the population that belongs to length group a ($\hat{p}_a$) is:

$$\hat{p}_a = \frac{\hat{N}_a}{\sum_i \hat{N}_i}$$

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

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

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

If size-selectivity could not be excluded with 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 1998 was 7,532, the fifth largest emigration on record for Auke Creek (Table 3 and Figure 3). The first Dolly Varden was captured on March 14 and the daily counts peaked on May 26 (Appendix A1). The midpoint of the migration was on May 1, the earliest on record with the exception of 1988 (Figure 4 and Table 3). The average mid-point date of the emigration for 1980–1997 was May 8, with a range between April 30 and May 24.

The upstream weir was installed on June 30. The Dolly Varden immigration began July 7, and the last was captured November 9, with the weir subsequently removed on November 14. A total of 4,991 fish passed upstream through the weir (Figure 4 and Appendix A2). Three adipose marked fish immigrating between September 1 and September 30 either lost their PIT tags or may have originated from marking studies at Windfall Lake or Chilkoot Lake (Jones and Harding 1998).

The average fork length of all emigrant Dolly Varden in 1998 was 260 mm (SD = 87, SE = 2 mm), with a range from 75 mm to 510 mm (n = 1,382). 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 374 cutthroat trout emigrated in 1998 including 336 wild fish and 38 lake-stocked fish identified by missing ventral fins. This is considerably greater than the annual average wild emigration from 1980-1997 of 251 cutthroat trout, with a range from 85 to 462 (Table 3). The total emigration of cutthroat trout from Auke Lake has been bolstered by releases of hatchery fish since 1983 (Figure 6). The first trout was captured March 16, and the last on June 29, with the midpoint of emigration on May 9 (Figure 7 and Appendix A1). The average historical median date of emigration is May 15 (1980–1997), 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 1998 ranged between 3° and 18°C.

Of the 374 emigrants in 1998, 135 had been tagged in 1997 during downstream migration. The remaining 239 fish were successfully PIT tagged and released, except for one which escaped before tagging and one which escaped before the tag could be read (Appendix A3). Obviously ripe cutthroat trout (gametes easily extruded during handling) were observed through May 13. Of the 374 emigrants, 97 (26%), including 42 females, were obviously sexually mature. Four cutthroat trout mortalities were recovered at the weir; two were recaptures from 1997, one was a newly tagged fish, and one was found dead prior to sampling.

The first cutthroat trout of a total of 361 immigrants returned on July 7. Most of the cutthroat trout (274 fish) migrated upstream in September, with the midpoint of the upstream migration on September 14 (Figure 7). There were 164 adipose marked cutthroat trout, 162 of which had a readable PIT tag, and one fish escaped without being examined (Appendix A4). It is not known if the two adipose marked fish without a readable tag lost their PIT tag, or had been clipped during studies before 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

Table 3.–Annual counts of downstream migrant, wild Dolly Varden and cutthroat trout at Auke Creek, 1980–1998 (hatchery-produced or lake-stocked cutthroat trout not included in this table).

Year	Dolly Varden	Midpoint of Dolly Varden emigration	Cutthroat trout	Midpoint of cutthroat trout emigration
1980	3,110	13 May	85	18 May
1981	6,461	5 May	157	14 May
1982	4,136	24 May	157	31 May
1983	3,718	7 May	149	15 May
1984	4,512	8 May	198	14 May
1985	3,052	14 May	112	21 May
1986	4,358	13 May	99	24 May
1987	6,443	6 May	250	17 May
1988	6,770	30 Apr	294	9 May
1989	7,230	8 May	259	18 May
1990	6,425	5 May	417	11 May
1991	5,579	17 May	237	20 May
1992	6,839	4 May	219	16 May
1993	5,074	8 May	174	14 May
1994	7,600	4 May	422	13 May
1995	11,732	9 May	412	13 May
1996	11,323	4 May	462	7 May
1997	10,506	7 May	418	12 May
Mean	6,382	8 May	251	15 May
1998	7,532	1 May	336	9 May

outmigrants indicated high one year VI tag loss of 69% and 60%, respectively.

Seven cutthroat trout mortalities were recovered, of which 3 were PIT tagged. The peak of mortalities occurred in early September in 12°C water and several had been wounded prior to passing the weir.

Length Distribution

The length of emigrating wild sea-run cutthroat trout averaged 276 mm (SD = 54 mm), and ranged from 168 to 429 mm. Lake-stocked (ventral finclips) emigrants averaged 308 mm (SD = 40 mm), and ranged from 238 to 388 mm. The weekly average length generally decreased over time (Figure 8).

Immigrants averaged 282 mm (SD = 58 mm), and ranged from 153 to 441 mm. Average lengths of immigrating cutthroat trout did not vary much over time (Figure 9). Because of poor water conditions during the period from July 5 to August 27, only a few fish were passed upstream. To prevent high mortalities due to handling, fish showing signs of freshwater intolerance were placed back downstream. The length of lake-stocked immigrants returning in the fall averaged 322 mm (SD = 16 mm), and

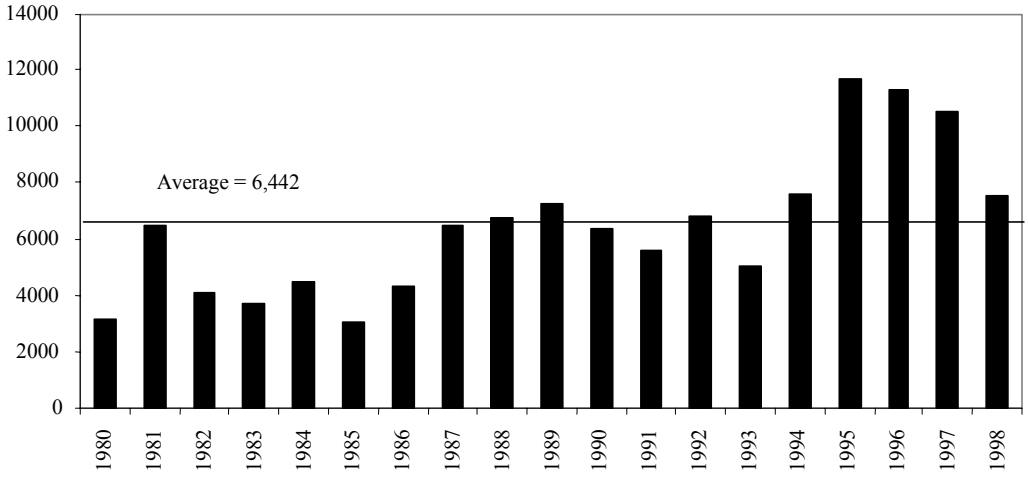

Figure 3.–Annual emigration of Dolly Varden at Auke Creek, 1980–1998.

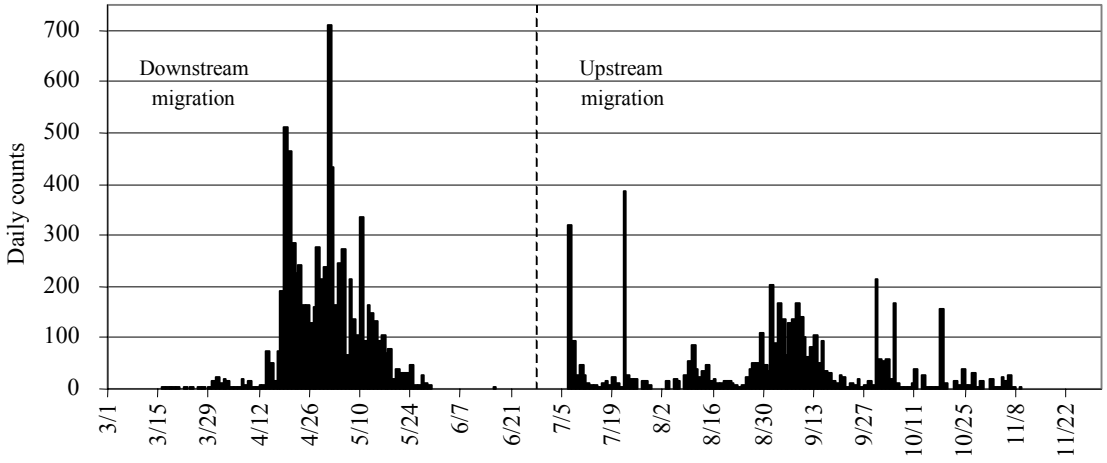

Figure 4.–The 1998 migration for Dolly Varden at Auke Creek. Spring downstream migration started March 14 and ended June 27. Fall upstream migration started July 7 and ended November 9. Vertical dashed line delineates when weir was converted to count upstream migrants.

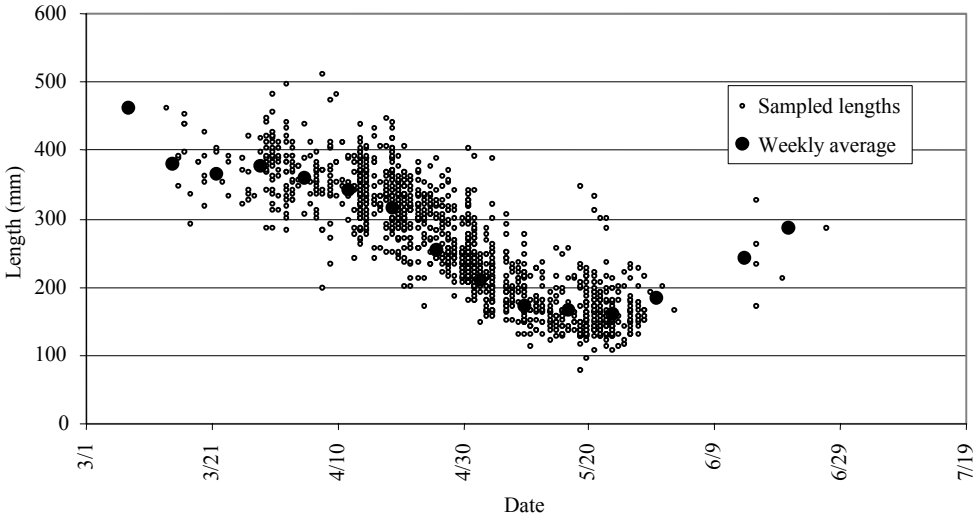

Figure 5.–Dolly Varden lengths (mm) over time during the downstream migration at Auke Creek, 1998. Average lengths for each migration week are overlaid upon sampled length data.

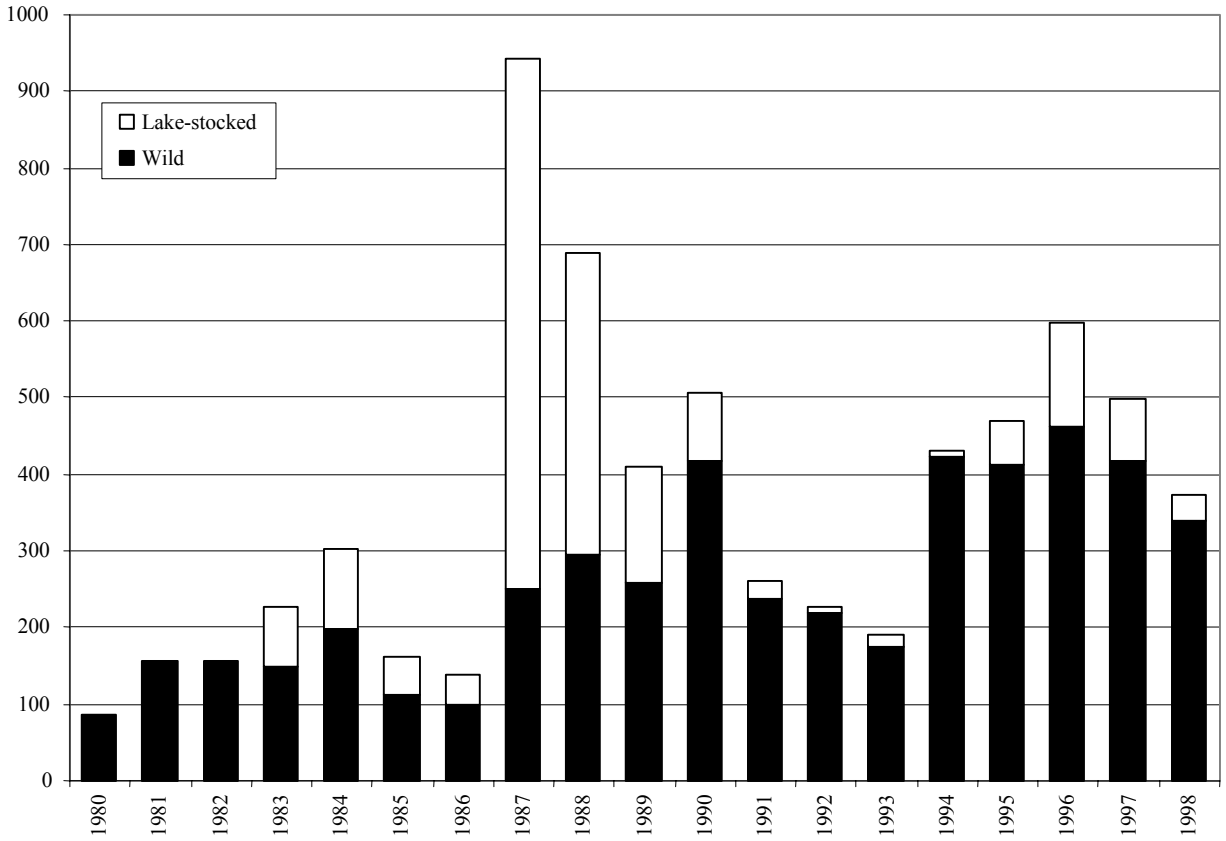

Figure 6.–Annual downstream cutthroat trout migration for Auke Creek, 1980–1998. Hatchery cutthroat trout were stocked in Auke Lake in 1983 (1,286 right ventral marked and 4,078 left ventral marked fish); 1986 (3,489 adipose marked fish); 1987 (1,719 adipose marked fish); 1991 (2,465 right ventral marked fish); and 1994 (3,098 left and right ventral marked fish).

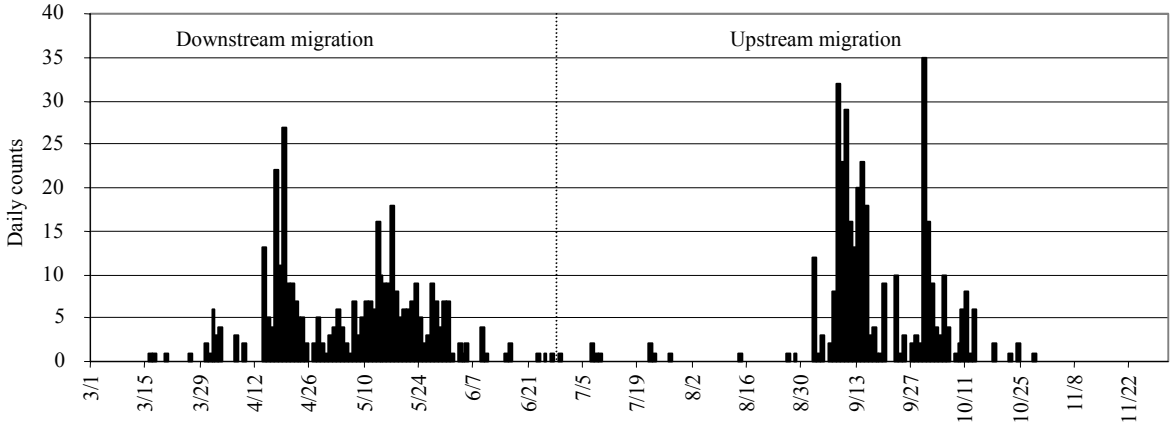

Figure 7.–The cutthroat trout migration for Auke Creek, 1998. Spring downstream migration started March 16 and ended June 29. Fall upstream migration started July 7 and ended October 28. The vertical dashed line delineates when the weir was converted to count upstream migrants.

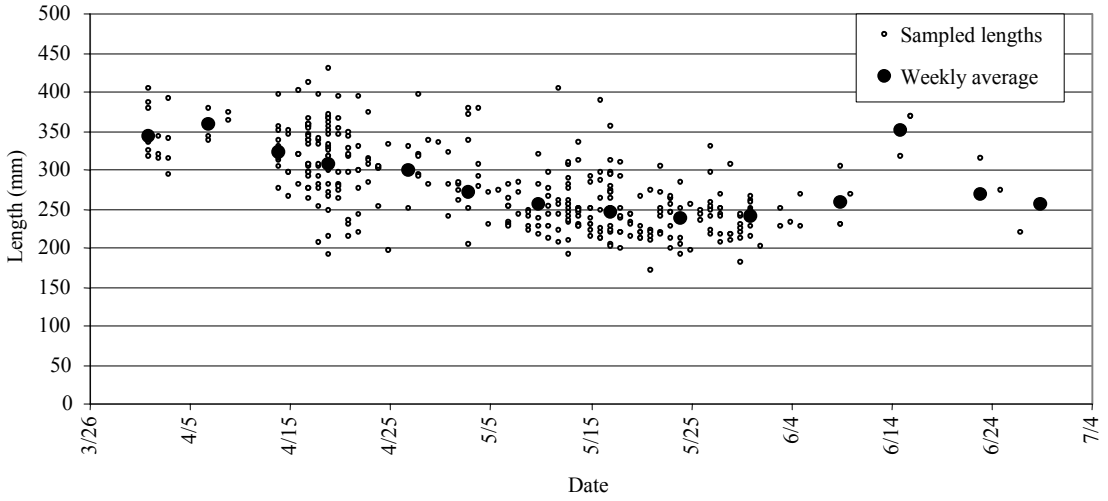

Figure 8.–Cutthroat trout lengths (mm) over time during the downstream migration at Auke Creek, 1998. Average lengths for each migration week are overlaid upon sampled length data.

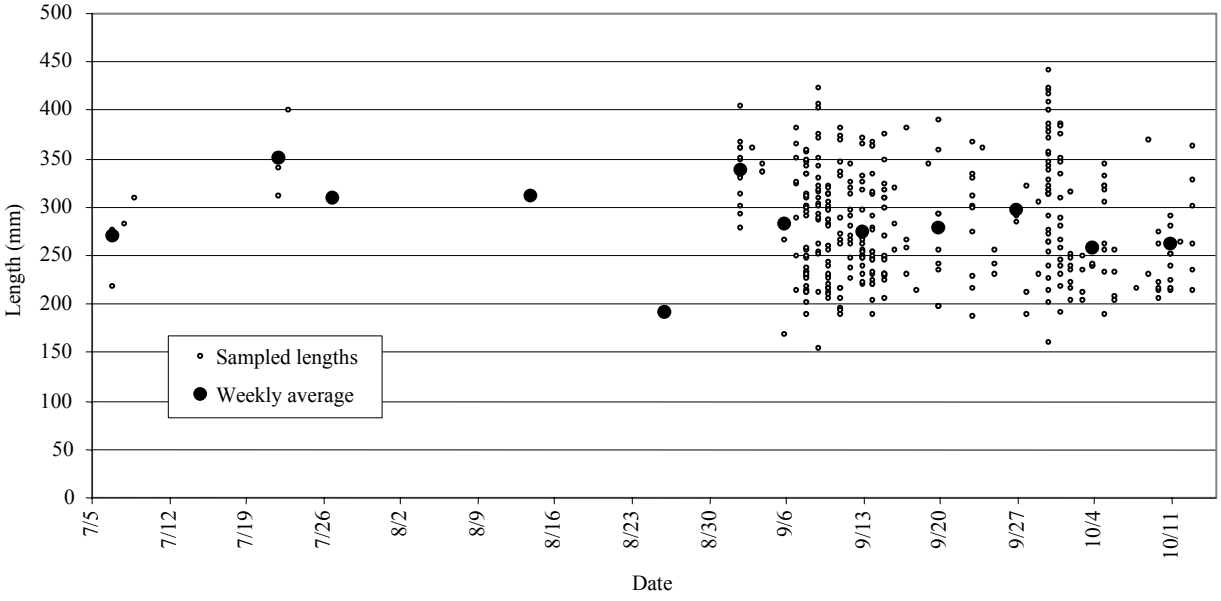

Figure 9.–Cutthroat trout lengths (mm) over time during the upstream migration at Auke Creek, 1998. Average lengths for each migration week are overlaid upon sampled length data.

ranged from 310 to 333 mm. The length frequency distributions for cutthroat trout measured at the weir during the spring and fall migrations are compared in Figure 10.

Marine Residence and Growth

Information gathered from PIT-tagged cutthroat trout that returned to Auke Creek showed that fish averaged 126 days out of the Auke Lake system, ranging from 59 to 197 days. During this time, average length increased 62 mm (range from 2 to 130 mm) and average daily growth rates ranged from about 0.1 to 0.8 mm/day, depending on initial size (Figures 11 and 12). The overall growth rate of 0.49 mm/day was similar to that (0.48 mm/day) observed in the fall of 1997 (Lum et al. 1998). Average increase in length in 1997 was slightly less than the increase in 1998 (57mm versus 62 mm), in part because fish in 1997 remained in saltwater for a slightly shorter average period (122 days) than in 1998 (126 days).

CUTTHROAT TROUT IN AUKE LAKE

Abundance

A total of 147 cutthroat trout were captured in Auke Lake during 1998 with 111 of these having a FL ≥180 mm (Table 4). Of the 147 caught, we PIT tagged 118 with the rest primarily being recaptures (Appendix A5). About 88% (130) of the fish were caught in large traps, and a wide variety of sizes were caught by both large traps and hook-and-line gear (Figure 13). Surface water temperatures during the sampling periods were abnormally high and generally ranged from 16 to 18°C.

In the first sampling event, 38 unmarked cutthroat trout between 180 mm and 326 mm FL were captured and tagged (Table 5). Three previously tagged fish were also captured in the lake in that period. Those three fish were PIT tagged at the weir during the 1997 spring migration, returned in the fall of 1997, but did not migrate out of the lake during the spring of 1998.

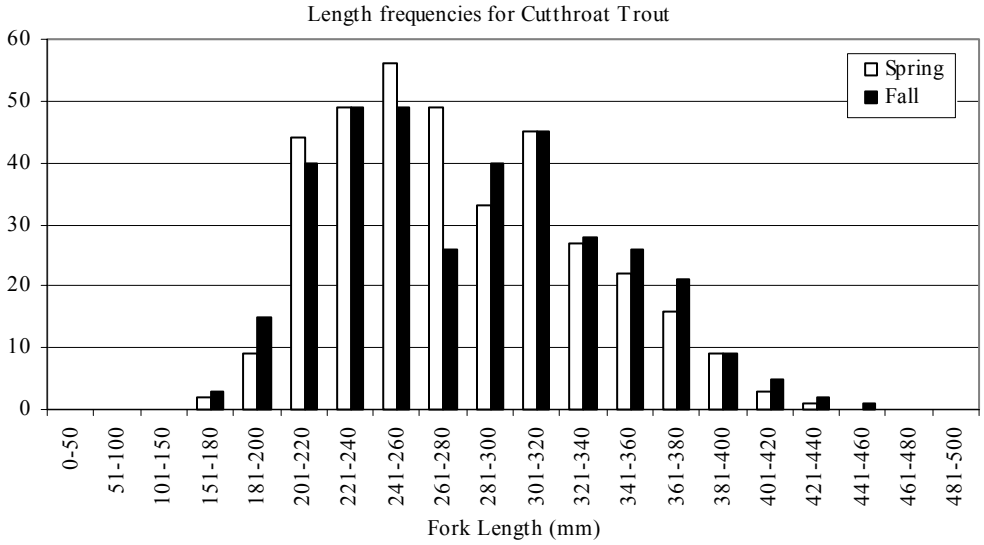

Figure 10.–Length frequency distributions of cutthroat trout captured at Auke Creek weir, spring emigration and fall immigration, 1998.

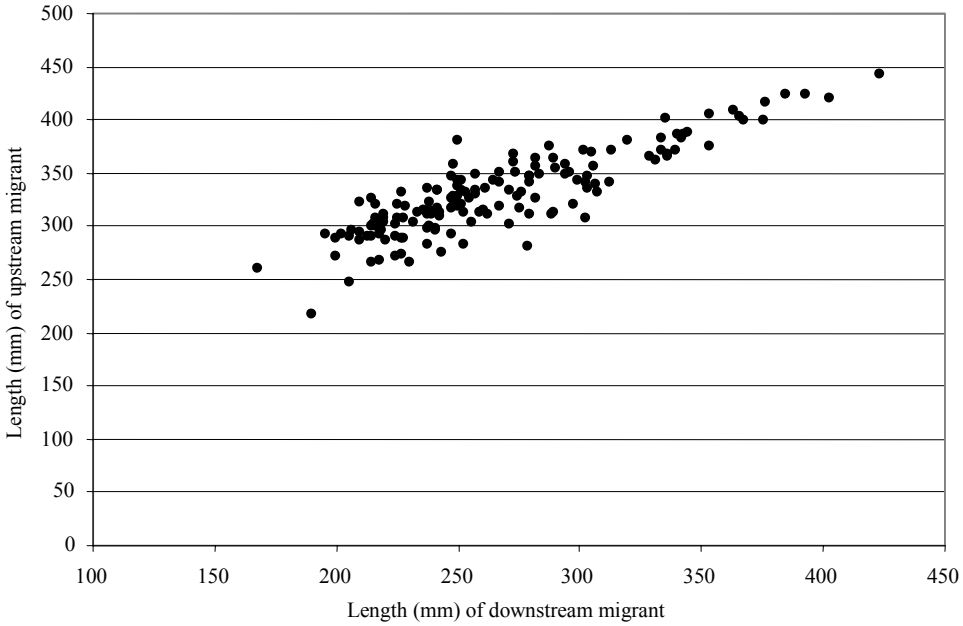

Figure 11.–Length (mm) of upstream migrant cutthroat trout plotted against their length at the time of downstream migration and tagging in the spring.

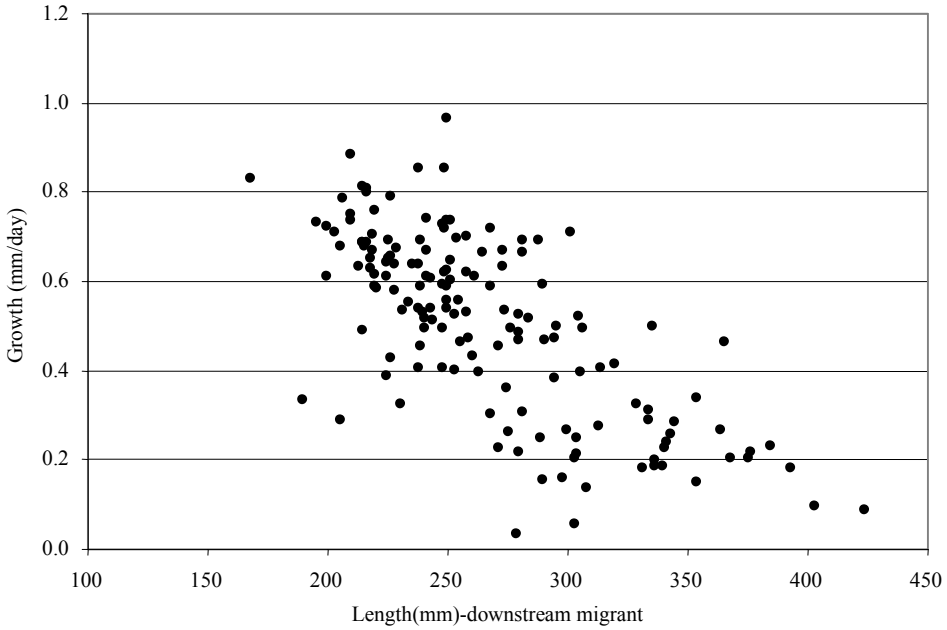

Figure 12.–Cutthroat trout growth (mm/day) during time between down- and upstream migration plotted against their size at the time of downstream migration and tagging, Auke Creek, 1998.

Table 4.–Sampling effort (hours) and cutthroat trout catch, and catch per unit effort (CPUE, fish per hour) by period, gear, and size class, Auke Lake, 1998.

			Size class					
	Gear	Effort	≥ 180 mm		< 180 mm		Combined	
Period[a]	type	(hours)	Catch	CPUE	Catch	CPUE	Catch	CPUE
1	Hook and line	20	8	0.400	1	0.050	9	0.450
	Large traps	3,240	36	0.011	9	0.003	45	0.014
2	Hook and line	20	5	0.250	0	0.000	5	0.250
	Large traps	3,240	42	0.013	15	0.005	57	0.018
3	Hook and line	20	1	0.050	2	0.100	3	0.150
	Large traps	3,240	19	0.006	9	0.003	28	0.009
Subtotal hook and line		60	14	0.233	3	0.050	17	0.283
Subtotal large traps		9,720	97	0.010	33	0.003	130	0.013
	Total all gear		111		36		147	

[a] Period 1 = July 8-July 17; Period 2 = July 22-July 31; Period 3 = August 5-August14.

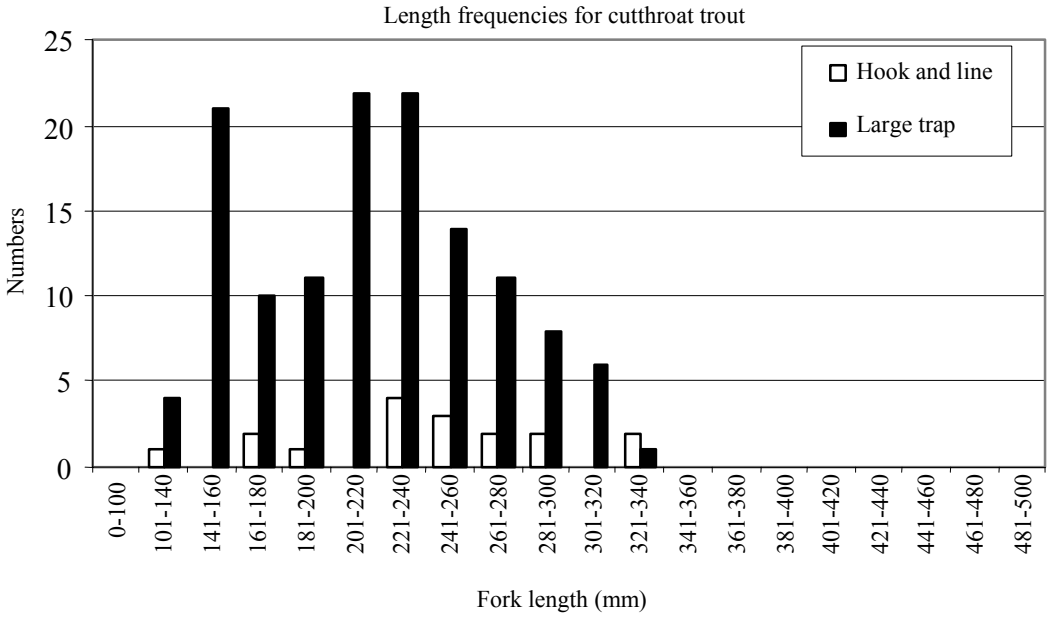

Figure 13.–Length frequency of cutthroat trout captured at Auke Lake by gear type, 1998.

Table 5.–Summary of tagging and recovery data for all cutthroat trout ≥180 mm used in the abundance experiment, Auke Lake, 1998. Marking event is period 1; recapture event includes periods 2 and 3.

	Marking event	Recapture event		
	Period 1 (7/8–7/17)	Period 2 (7/22–7/31)	Period 3 (8/5–8/14)	Periods 2 and 3 subtotal
Newly tagged fish released, ≥180 mm	38[a]	38	10	48
Recaptured fish		4	4	8
Recaptured sea-run fish [b]	3	1 [c]		1
Mortality during capture and handling			1	1
Total catch	41	43	15	58

[a] Includes one fish marked that measured 176 mm in period 1 and 180 mm in period 2.

[b] Originally PIT tagged at the Auke Creek weir in spring 1997, and ≥ 180 mm.

[c] One tagged fish was recaptured 4 times during period 2.

During the second sampling (recapture) event, 58 cutthroat trout between 180 mm FL and 339 mm FL were captured and inspected for marks; and of these, nine had been marked in the first sampling event (Table 5). The length frequency distributions of cutthroat trout recaptured during the second sampling event were not significantly different from the length of fish marked during event 1 (d_{max} = 0.19, P = 0.897; Figure 14), suggesting that no size selectivity occurred during the second sampling event. Thus, stratification based on size was not necessary (Appendix B1). All recaptures had an operational pit tag. The fraction of marked fish (m/c) sampled in the recovery event varied significantly (P=0.002, χ^2=12) by stratum; m/c was lower in area A (0.03) than in areas B (0.33) or C (0.43). However, fish marked in the different areas were recaptured at similar rates in the second sample (P=0.20, χ^2=3.2), so the pooled Petersen model was used to estimate abundance. We note though that this later test was weak due to small sample sizes (Table 6), and that

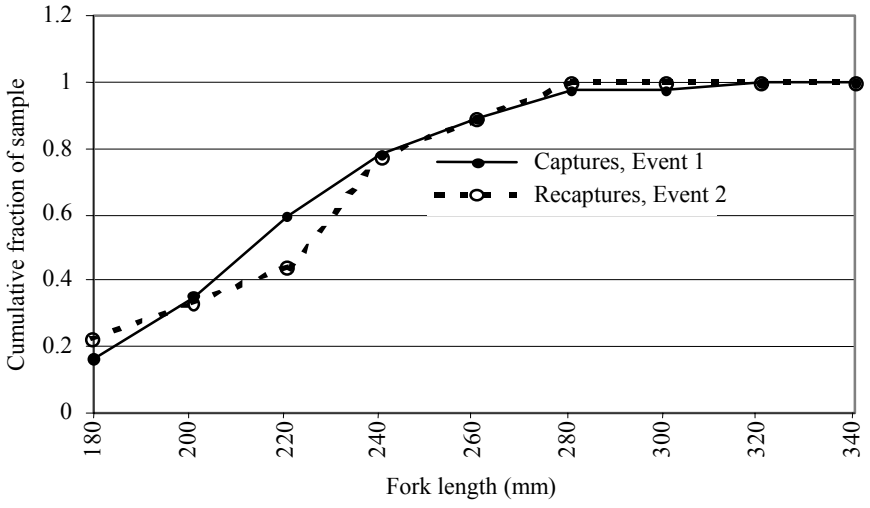

Figure 14.–Cumulative distribution of lengths of cutthroat trout marked versus lengths of cutthroat trout recaptured, Auke Lake, 1998.

Table 6.–Number of cutthroat trout marked by area (a_i), number of marked fish recaptured by area of recapture ($m_{i,j}$), and number of unmarked fish caught by area (u_j) during the second sampling event at Auke Lake, 1998.

Area where fish was marked	Total fish marked (ai)	Number of marked fish recaptured by area of recapture (mij)			
		A[a]	B[b]	C[c]	Total (all areas)
A	15[d]	0	1	0	1
B	7	0	1	1	2
C	19[e]	1	3[e]	2	6
Total	41	1	5	3	9
Unmarked fish caught (uj)		35	10	4	49
Total caught in recapture event		36	15	7	58

[a] Study zones 1, 2, and 3.

[b] Study zones 4, 5, and 6.

[c] Study zones 7 and 8.

[d] Count includes 2 fish previously tagged at the weir in 1997.

[e] Count includes 1 fish previously tagged at the weir in 1997.

the fractions recovered did "look" different, at 0.07 for fish marked in area A, as compared to 0.29 for B, and 0.32 for C. Unfortunately, a Darroch estimate of abundance could not be calculated because of the small sample size and lack of recoveries, so an unstratified Petersen model was used to estimate abundance. Abundance of cutthroat trout ≥180 mm FL in Auke Lake was estimated at 247 (SE = 59) using this model. Relative precision for the estimate was ± 47%, for a 95% confidence interval.

Three cutthroat trout were caught during the study that were PIT tagged at the weir during the spring of 1997. Another PIT tag from 1997 was also turned in by an angler who caught a tagged cutthroat trout in Auke Lake in 1998. These fish were PIT tagged in the spring 1997, returned in the fall of 1997, but chose not to migrate out of the lake in the spring of 1998. In 1997, 212 tagged cutthroat trout immigrated into the lake (Lum et al. 1998) and in 1998, 135 emigrated from the lake leaving 77 PIT tagged fish that either chose to remain in Auke Lake for the summer or died over the winter. Since an estimated 8 (3 tagged / 90 checked * total population of 247) PIT tagged fish ≥180 mm FL remained alive in the lake in 1998, estimated overwinter survival of the 212 fall 1997 immigrants carrying PIT tags was 67% ((135 + 8)/212). More importantly, this information gives a glimpse of the complex life history strategy of sea-run cutthroat trout (i.e, 8 of 143 = 6% did not emigrate).

Length composition

Cutthroat trout caught in the lake averaged 216 mm (SD = 48 mm) in length, and ranged from 122 to 339 mm. There was no significant difference between the distribution of lengths of fish captured in event 1 and the distribution of lengths of fish captured in event 2 (d_{max} = 0.11, P = 0.920; Figure 15), suggesting (along with previous KS results) that there was no size selectivity during either sampling event. Consequently, length data from both events were pooled to estimate length composition of cutthroat trout ≥180 mm FL (Table 7). By regulation, harvest of cutthroat trout in Auke Lake is restricted to fish ≥356 mm FL (14 inches TL), so our data suggest that none of the cutthroat trout in Auke Lake during July and August exceed the 14-inch minimum size limit.

DATA FILES

Data collected during the study have been archived at ADF&G offices in Juneau and Anchorage (Appendix A6).

CONCLUSIONS AND RECOMMENDATIONS

Sea-run populations of both Dolly Varden and cutthroat trout overwintering in Auke Lake have increased since the early 1980s. 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 out-migrating cutthroat trout has also provided valuable information on life history of this species and should also be continued.

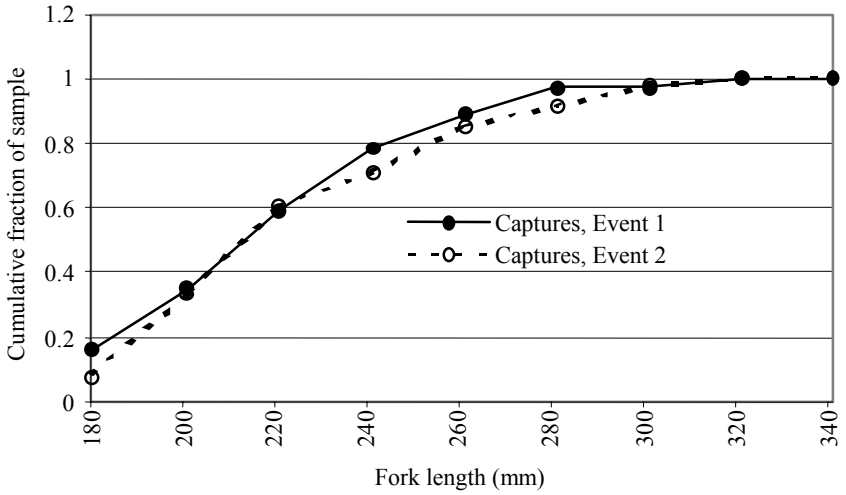

Figure 15.–Cumulative distribution of lengths of cutthroat trout marked versus lengths of cutthroat trout examined for marks, Auke Lake, 1998.

Estimating the population of cutthroat trout ≥180 mm residing in Auke Lake after the sea-run emigration was completed was difficult due to low catches. Because of the small numbers of recaptured fish, we were suspicious of our choice of the Petersen model as the appropriate abundance estimator. However, stratified (Darroch) type models of abundance yield only a slightly higher (7%) estimate than our Petersen estimate of 247 (about 2/3 of the 374 emigrants). Unfortunately, small sample sizes made the stratified models difficult to estimate and they did not fit the data well.

It has been suggested that along with the limitations of a small population, the high surface water temperature in Auke Lake during our sampling events may have negatively affected catch rates. Future sampling will be modified based on what we learned in 1998 to help alleviate these problems and give us a better estimate of the abundance of cutthroat trout in Auke Lake.

During the lake portion of this study, "Power bait", treated salmon eggs and fresh eggs collected at the weir were used as bait in the large traps. Power bait proved to be ineffective in attracting fish. Corn and canned tuna was also tried as bait, with the idea that the scent would attract more fish. Salmon eggs collected at the weir had the highest rate of success of the three bait options we tried. We recommend that salmon eggs be used as standard bait in subsequent studies.

Table 7.–Length composition and estimated abundance at length for cutthroat trout ≥180 mm FL, Auke Lake, 1998. Number sampled (n_k), proportion (p_k), abundance (N_k), and standard error (SE) are shown for each 20-mm length class.

Length, mm FL	n_k	p_k	SE(p_k)	N_k	SE(N_k)
180–200	12	0.13	0.027	32	6.7
201–220	20	0.21	0.033	53	8.3
221–240	23	0.25	0.035	60	8.7
241–260	15	0.16	0.030	39	7.4
261–280	12	0.13	0.027	32	6.7
281–300	7	0.075	0.021	18	5.3
301–320	3	0.032	0.014	8	3.5
321–340	2	0.021	0.012	5	2.9
Total	94			247	

ACKNOWLEDGMENTS

We would like to thank Scott McPherson for his help with the operational plan for this project. Bob Marshall helped with the operational plan and data analysis. Roger Harding helped with planning, sampling, and data analysis, and Paul Suchanek and Alma Seward with editorial expertise.

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APPENDICES

Appendix A1.–Daily counts of downstream migrant salmonids at Auke Creek weir, 1998.

	Daily counts							
	Water temp	Pink salmon fry	Coho salmon smolts	Sockeye salmon smolts	Chum salmon fry	Dolly Varden	Cut-throat trout	Steel-head
March 1	3.2	0	0	0	0	0	0	0
2	3.2	0	0	0	0	0	0	0
3	3.2	38	0	0	0	0	0	0
4	3.3	166	0	0	3	0	0	0
5	3.2	149	0	0	3	0	0	0
6	3.2	139	0	0	3	0	0	0
7	3.1	100	0	0	3	0	0	0
8	3.0	134	0	0	8	0	0	0
9	3.2	105	0	0	3	0	0	0
10	3.4	89	0	0	3	0	0	0
11	3.3	83	0	0	2	0	0	0
12	3.2	215	0	0	11	0	0	0
13	3.4	105	0	0	8	0	0	0
14	4.0	64	0	0	2	1	0	0
15	4.0	319	0	0	11	0	0	0
16	3.9	894	0	0	18	3	1	0
17	3.8	742	0	0	15	4	1	0
18	3.7	679	0	0	15	2	0	0
19	4.1	618	0	0	21	2	0	0
20	4.0	1024	0	0	15	5	1	0
21	4.2	874	0	0	9	0	0	0
22	4.3	1075	0	0	15	3	0	0
23	4.4	1177	0	0	14	1	0	0
24	4.3	944	0	0	15	3	0	0
25	4.4	1468	0	0	21	0	0	0
26	4.4	2048	0	0	21	3	1	0
27	4.5	3104	0	0	20	5	0	0
28	4.5	2082	0	0	22	1	0	0
29	4.2	2085	0	0	21	2	0	0
30	4.3	4045	0	0	25	14	2	0
31	4.6	3718	0	0	27	24	1	0
April 1	4.5	3820	0	0	40	11	6	0
2	4.5	2597	0	0	22	18	3	0
3	4.6	3160	0	0	17	14	4	0
4	4.6	1589	0	0	40	4	0	0
5	4.8	2892	0	0	31	3	0	0
6	4.9	1802	0	0	16	5	0	0
7	4.8	3135	0	0	19	20	3	0
8	5.0	2015	0	0	24	9	0	0
9	4.9	1347	0	0	22	15	2	0
10	5.0	1729	0	0	21	5	0	0
11	5.0	1610	0	0	11	5	0	0
12	5.0	1711	0	0	17	6	0	0
13	5.2	1120	0	0	12	9	0	0
14	5.4	1905	0	0	18	73	13	0
15	5.6	464	0	0	11	50	5	0
16	5.8	471	0	0	10	15	4	0
17	5.2	685	0	0	22	74	22	0
18	5.6	152	0	0	9	191	11	0
19	5.8	62	0	0	4	513	27	0
20	5.8	71	0	0	4	463	9	0

-continued-

Appendix A1.–Page 2 of 3.

	Daily counts							
	Water temp	Pink salmon fry	Coho salmon smolts	Sockeye salmon smolts	Chum salmon fry	Dolly Varden	Cut-throat trout	Steel-head
April 21	5.9	15	0	0	2	284	9	0
22	6.0	48	0	0	6	227	7	0
23	5.8	34	0	0	1	244	5	0
24	6.0	16	0	0	1	164	5	0
25	6.3	29	2	1	0	164	2	0
26	6.0	7	3	0	1	130	0	0
27	5.9	5	1	0	0	160	2	0
28	6.0	4	4	0	0	278	5	0
29	6.0	4	5	0	0	214	2	0
30	6.2	0	5	0	0	238	1	0
May 1	10.9	1	7	0	0	712	3	0
2	10.9	0	23	1	0	433	4	0
3	10.8	0	24	1	0	165	6	0
4	11.6	2	59	2	0	248	4	0
5	12.0	0	103	4	0	272	2	0
6	10.0	0	96	5	0	68	1	0
7	10.0	0	243	7	0	214	7	0
8	10.2	0	225	3	0	138	3	1
9	10.8	0	508	8	0	105	5	1
10	10.5	0	306	30	0	336	7	4
11	10.3	0	185	4	0	94	7	0
12	11.8	0	574	68	0	165	6	1
13	12.0	0	373	84	0	148	16	3
14	12.0	0	298	132	0	133	10	0
15	13.5	0	232	227	0	94	9	0
16	13.3	0	331	444	0	106	9	0
17	13.4	0	456	726	0	72	18	0
18	14.2	0	490	939	0	79	8	1
19	13.1	0	204	1700	0	21	5	0
20	13.0	0	270	448	0	41	6	1
21	12.6	0	354	919	0	31	6	1
22	12.3	0	198	1584	0	33	7	1
23	12.2	0	434	3509	0	31	9	0
24	12.3	0	242	2264	0	47	5	0
25	14.0	0	138	982	0	7	2	0
26	15.0	0	325	3867	0	6	3	1
27	16.0	0	275	2156	0	26	9	0
28	17.1	0	172	1163	0	12	7	0
29	18.0	0	96	268	0	6	4	0
30	18.2	0	53	215	0	1	7	0
31	18.0	0	10	47	0	0	7	0
June 1	16.8	0	6	13	0	1	1	0
2	18.0	0	13	7	0	0	0	0
3	16.8	0	5	33	0	1	2	0
4	17.4	0	2	50	0	1	1	0
5	17.7	0	1	42	0	0	2	0
6	17.5	0	2	20	0	0	0	0
7	17.3	0	1	30	0	0	0	0
8	17.8	0	1	1	0	0	0	0
9	18.0	0	2	130	0	0	4	0
10	17.3	0	8	4	0	0	1	0
11	17.0	0	3	4	0	0	0	0
12	16.3	0	7	4	0	0	0	0
13	16.2	0	3	10	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	Cut-throat trout	Steel-head
June 14	16.0	0	1	0	0	0	0	0
15	15.9	0	2	14	0	0	1	0
16	16.1	0	12	46	0	4	2	0
17	16.4	0	12	34	0	0	0	0
18	17.1	0	9	33	0	0	0	0
19	18.3	0	3	40	0	0	0	0
20	18.1	0	0	25	0	1	0	0
21	17.8	0	0	3	0	0	0	0
22	17.2	0	0	19	0	0	0	0
23	17.2	0	3	4	0	0	1	0
24	16.8	0	1	4	0	0	0	0
25	17.8	0	4	24	0	0	1	0
26	17.9	0	2	50	0	0	0	0
27	18.3	0	2	7	0	1	1	0
28	18.2	0	1	10	0	0	0	0
29	18.3	0	0	19	0	0	1	0
30	18.7	0	0	8	0	0	0	0
Totals		60,785	7,430	22,496	735	7,532	374	15

Appendix A2.–Daily counts of upstream migrant salmonids at Auke Creek weir, 1998. 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	Cut-throat trout	Steel-head
July 1	19.0	0	0	0	0	0	0	0	0
2	19.5	0	0	0	0	0	0	0	0
3	21.0	0	0	0	0	0	0	0	0
4	-	0	0	0	0	0	0	0	0
5	20.3	0	0	0	0	0	0	0	0
6	19.5	0	0	0	0	0	0	0	0
7	18.8	599	0	0	0	0	322	2	0
8	18.2	168	0	0	0	0	94	1	0
9	17.9	159	0	0	0	0	26	1	0
10	17.3	102	0	0	0	0	46	0	0
11	17.0	183	0	0	0	0	27	0	0
12	17.0	120	0	0	0	0	12	0	0
13	17.6	18	0	0	0	0	9	0	0
14	17.2	67	0	0	0	0	8	0	0
15	17.1	36	0	0	0	0	5	0	0
16	16.9	6	0	0	0	0	11	0	0
17	17.3	20	0	0	0	0	17	0	0
18	17.0	26	0	0	0	0	8	0	0
19	17.2	14	0	0	0	0	22	0	0
20	17.2	2	0	0	0	0	10	0	0
21	18.8	2	0	0	0	0	3	0	0
22	16.0	172	1	0	0	4	385	2	0
23	16.0	18	1	0	0	2	27	1	0
24	16.0	18	0	0	0	0	18	0	0
25	15.5	28	1	1	0	6	18	0	0
26	16.0	10	0	0	0	0	1	0	0
27	17.0	25	0	0	0	0	15	1	0
28	-	2	0	0	0	0	17	0	0
29	17.8	23	0	0	0	0	9	0	0
30	-	13	0	0	0	0	1	0	0
31	18.0	0	0	0	0	0	0	0	0
Aug. 1	18.0	2	0	0	0	0	1	0	0
2	-	0	0	0	0	0	0	0	0
3	17.3	12	0	0	0	0	15	0	0
4	17.8	0	0	0	0	0	0	0	0
5	18.0	1	0	0	0	0	20	0	0
6	18.0	0	0	0	0	0	15	0	0
7	17.1	0	0	0	0	0	0	0	0
8	16.2	89	40	2	0	0	28	0	0
9	15.2	48	75	10	0	18	54	0	0
10	15.1	18	92	32	0	30	85	0	0
11	15.0	8	16	24	0	2	40	0	0
12	16.2	1	8	20	0	7	22	0	0
13	16.2	2	7	15	0	3	37	0	0
14	16.3	1	5	7	0	0	47	1	0
15	16.5	5	8	14	0	0	14	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	Cut-throat trout	Steel-head
Aug. 16	16.0	4	11	7	0	0	21	0	0
17	15.7	2	17	10	0	0	12	0	0
18	15.1	2	61	9	0	0	12	0	0
19	15.0	3	129	14	0	0	17	0	0
20	15.0	0	73	7	0	1	17	0	0
21	15.1	1	70	2	0	2	11	0	0
22	14.8	1	48	6	0	2	7	0	0
23	14.7	4	217	10	0	3	4	0	0
24	14.5	1	195	2	0	16	7	0	0
25	-	9	508	4	0	41	25	0	0
26	13.8	3	257	4	0	77	38	1	0
27	13.1	3	263	6	0	65	51	0	0
28	13.3	1	168	9	0	40	51	1	0
29	12.8	5	158	6	0	16	110	0	0
30	12.4	0	71	3	0	14	48	0	0
31	13.2	0	34	1	0	8	35	0	0
Sept. 1	12.8	0	73	2	0	29	203	0	0
2	12.0	1	63	7	0	12	88	12	0
3	12.0	1	46	2	0	3	167	1	0
4	11.6	0	21	2	0	7	137	3	0
5	11.8	1	25	5	0	4	65	0	0
6	12.0	0	36	4	0	2	128	2	0
7	12.2	1	11	0	0	0	137	8	0
8	11.8	1	21	0	0	1	168	32	0
9	11.3	0	11	0	0	0	142	23	0
10	11.9	0	7	0	0	0	100	29	0
11	11.2	0	2	0	0	0	62	16	0
12	11.0	3	11	0	0	0	83	13	0
13	11.0	0	11	0	59	1	104	20	0
14	11.0	1	4	0	70	0	51	23	0
15	11.6	0	2	0	62	0	95	18	0
16	11.4	0	0	0	45	0	35	3	0
17	11.3	0	0	0	8	0	31	4	0
18	11.3	0	0	0	3	0	14	1	0
19	11.4	0	0	0	1	0	10	1	0
20	11.6	0	1	0	2	0	27	9	0
21	11.8	1	0	0	0	0	25	0	0
22	11.8	1	0	0	0	0	4	0	0
23	11.9	0	0	0	1	0	13	10	0
24	11.7	0	0	0	7	0	6	1	0
25	11.8	0	0	0	17	0	19	3	0
26	11.8	0	0	0	20	0	5	0	0
27	11.8	0	0	0	68	0	8	2	0
28	11.2	0	0	0	23	0	17	3	0
29	11.2	0	0	0	53	0	7	2	0
30	11.0	0	0	0	91	0	216	35	0
Oct. 1	10.8	0	0	0	219	0	59	16	0
2	10.2	0	0	0	37	0	55	9	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	Cut-throat trout	Steel-head
Oct. 3	10.0	0	0	0	19	0	60	4	0
4	-	0	0	0	16	0	19	3	0
5	10.2	0	0	0	3	0	168	10	0
6	9.9	0	0	0	7	0	12	4	0
7	9.9	0	0	0	4	0	5	0	0
8	9.8	0	0	0	5	0	3	1	0
9	9.5	0	0	0	8	0	4	2	0
10	9.6	0	0	0	1	0	11	6	1
11	9.0	0	0	0	0	0	40	8	0
12	9.0	0	0	0	1	0	0	1	0
13	9.0	0	0	0	0	0	27	6	0
14	8.9	0	0	0	0	0	5	0	0
15	8.9	0	0	0	0	0	3	0	0
16	9.0	0	0	0	3	0	3	0	0
17	8.9	0	0	0	0	0	4	0	0
18	8.6	0	0	0	5	0	155	2	0
19	8.3	0	0	0	1	0	12	0	0
20	8.3	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
21	7.9	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
22	7.6	0	0	0	1	0	14	1	0
23	8.0	0	0	0	0	0	8	0	0
24	-	0	0	0	1	0	38	2	0
25	-	0	0	0	0	0	6	0	0
26	7.8	0	0	0	0	0	8	0	0
27		0	0	0	1	0	32	0	0
28	7.0	0	0	0	0	0	4	1	0
29	7.0	0	0	0	0	0	16	0	0
30	6.7	0	0	0	0	0	1	0	0
31	-	0	0	0	0	0	0	0	0
Nov. 1	-	0	0	0	0	0	20	0	0
2	6.6	0	0	0	0	0	5	0	0
3	6.5	0	0	0	0	0	4	0	0
4	6.7	0	0	0	0	0	23	0	0
5	6.3	0	0	0	0	0	14	0	0
6	6.0	0	0	0	0	0	26	0	0
7	6.0	0	0	0	0	0	2	0	0
8	-	0	0	0	0	0	0	0	0
9	5.1	0	0	0	0	0	3	0	0
10	5.0	0	0	0	0	0	0	0	0
11	-	0	0	0	0	0	0	0	0
12	5.0	0	0	0	0	0	0	0	0
13	5.0	0	0	0	0	0	0	0	0
14	9.8	0	0	0	0	0	0	0	0
Total		2,068	2,879	247	862	416	4,991	361	1

[a] The counting weir was closed on October 21-22 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, 1998. Codes used for tagging: NA = data not available, AD = adipose finclip, LV = left ventral fin clip, RV = right ventral fin clip, AVI = anal fin-visual implant tag, EVI = eye tissue-visual implant tag.

					New fish		Recaptured fish				
Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	PIT tag code	Finclip	Tag type	Tag num.	PIT tag code	Finclip	Comments
3/16/98	3.9	1	370	M			AVI	YM2	412D6E051A	AD	Ripe
3/17/98	3.8	2	424	F					412D56377F	AD	Ripe
3/20/98	4.0	3	341	M					412D590942	AD	Ripe
3/26/98	4.4	4	374	F					412D665C2F	AD	Ripe
3/30/98	4.3	5	304	M					412C78303D	AD	Ripe; Bad right eye
3/30/98	4.3	6	333	M					412D5E293E	AD	Ripe
3/31/98	4.6	7	324	M	412D1F0219	AD					Ripe
4/1/98	4.2	8	315	M					412D0A234D	AD	Not Ripe
4/1/98	4.2	9	334	F					412D0B450D	AD	Not Ripe
4/1/98	4.2	10	376	F			AVI	BR4	412D6E1E35	AD	Not Ripe
4/1/98	4.2	11	385	F			EVI	JK4	412D05384A	AD	Not Ripe
4/1/98	4.2	12	403	M					412D721149	AD	Ripe
4/1/98	4.2	13	324	M					412D5F7B19	AD	Ripe
4/2/98	4.5	14	319	M					412D0C4746	AD	Ripe
4/2/98	4.5	15	342	M					412D0B4E5C	AD	Not Ripe
4/2/98	4.5	16	312	M	4112622B3A	AD					Ripe
4/3/98	4.3	17	293	M					NA	AD	Ripe; Released , PIT# not recorded
4/3/98	4.3	18	390	M	4113115375	AD					Ripe
4/3/98	4.3	19	339	M	4112707370	AD					Ripe
4/3/98	4.3	20	313	F	41127D6810	AD					Not Ripe
4/7/98	4.6	21	377	M					412D166D37	AD	Not Ripe
4/7/98	4.6	22	342	M					412C7B6B18	AD	Not Ripe
4/7/98	4.6	23	336	M	41127A075E	AD					Ripe
4/9/98	4.7	24	371	F					412D5E5445	AD	Not Ripe
4/9/98	4.7	25	362	M					412D671A6C	AD	Ripe
4/14/98	6.5	26	396	F					412E0C3672	AD	
4/14/98	6.5	27	311	M	4113013B25		AD		NA	AD	Ripe
3/16/98	5.2	28	344	M			AVI	YM3	412D6E051A	AD	Ripe
3/17/98	5.3	29	344	F					412D56377F	AD	Ripe
3/20/98	5.3	30	343	M					412D590943	AD	Ripe
4/14/98	6.5	31	354	F					412D1D280F	AD	
4/14/98	6.5	32	318	F					412D516144	AD	
4/14/98	6.5	33	337	F					412E333C53	AD	
4/14/98	6.5	34	275	M	411273252A	AD				LV	Ripe

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Appendix A3.–Page 2 of 11. (NA = data not available, AD = adipose finclip, LV = left ventral finclip, RV = right ventral finclip, AVI = anal fin-visual implanttag, EVI = eye tissue-visual implant tag.)

					New fish		Recaptured fish				
Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	PIT tag code	Finclip	Tag type	Tag num.	PIT tag code	Finclip	Comments
4/14/98	6.5	35	328	M					412D060121	AD	Ripe
4/14/98	6.5	36	313	M	411231240F	AD				LV	Ripe
4/14/98	6.5	37	320	M	411270076E	AD					Ripe
4/14/98	6.5	38	316	F					412D0D3D24	AD	
4/15/98	6.7	39	295	M					412D754854	AD	Ripe
4/15/98	6.7	40	295	F					412D621232	AD	Ripe
4/15/98	6.7	41	263	F	41126B3262	AD				LV	Ripe
4/15/98	6.7	42	349	M					412D7B5D2F	AD	Ripe
4/15/98	6.7	43	343	F	41123E211E	AD					Ripe
4/16/98	7.0	44	318	M	41125C167F	AD				LV	Ripe
4/16/98	7.0	45	280	F	4112343B22	AD				LV	Ripe
4/16/98	7.0	46	400	F			AVI	Y87	412D63506B	AD	Ripe
4/16/98	7.0	47	317	M					412D663009	ADLV	Ripe
4/17/98	6.5	48	262	M	4113023C58	AD					Ripe
4/17/98	6.5	49	355	F	4112467A05	AD					Ripe
4/17/98	6.5	50	305	F	41120A5577	AD					
4/17/98	6.5	51	295	F	4112703A6C	AD				LV	Ripe
4/17/98	6.5	52	289	F	4112592323	AD				LV	
4/17/98	6.5	53	336	M	41131E7049	AD					Ripe
4/17/98	6.5	54	294	F	41131C4E3B	AD			NA	AD	
4/17/98	6.5	55	355	M					412D595337	AD	Ripe
4/17/98	6.5	56	337	M					412C7B627D	AD	Ripe
4/17/98	6.5	57	356	F					412E2C1B19	AD	
4/17/98	6.5	58	410	F			EVI		412D7A2F0B	AD	EVI unreadable
4/17/98	6.5	59	303	M					412D73424D	AD	Ripe
4/17/98	6.5	60	364	M					412D6C066A	ADLV	Ripe
4/17/98	6.5	61	351	M					412E082339	AD	Ripe
4/17/98	6.5	62	357	F					412D655E68	AD	Ripe
4/17/98	6.5	63	332	M					412C7E021F	AD	Ripe
4/17/98	6.5	64	275	M					412D581574	AD	Ripe
4/17/98	6.5	65	357	F					412E017B3B	AD	
4/17/98	6.5	66	304	M					412C786A48	AD	Ripe
4/17/98	6.5	67	275	M					412D7D0426	AD	Ripe
4/17/98	6.5	68	343	F					412D5D2B79	AD	Ripe

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Appendix A3.–Page 3 of 11. (NA = data not available, AD = adipose finclip, LV = left ventral finclip, RV = right ventral finclip, AVI = anal fin-visual implanttag, EVI = eye tissue-visual implant tag.)

					New fish		Recaptured fish				
Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	PIT tag code	Finclip	Tag type	Tag num.	PIT tag code	Finclip	Comments
4/17/98	6.5	69	342	F					412D225A6C	AD	
4/18/98	6.9	70	394	F					412D734A0B	AD	Ripe
4/18/98	6.9	71	330	F					412D637C34	AD	Ripe
4/18/98	6.9	72	290	M					412D572018	AD	Ripe
4/18/98	6.9	73	337	F					412D23584C	AD	Ripe
4/18/98	6.9	74	280	F			EVI	J21	412D5A7B01	AD	Ripe
4/18/98	6.9	75	274	M					412D571F2E	AD	Ripe
4/18/98	6.9	76	303	M					412D13300B	AD	Ripe
4/18/98	6.9	77	251	M	41127B0C1B	AD				LV	Ripe; Green dot from '97 lake study
4/18/98	6.9	78	304	F	4112684518	AD				LV	Ripe
4/18/98	6.9	79	338	F	41117D5A4A	AD					Ripe
4/18/98	6.9	80	206	M	4111266A1E	AD					Ripe
4/19/98	7.0	81	329	F					412D003E7C	AD	
4/19/98	7.0	82	245	?					412C7D6F69	AD	
4/19/98	7.0	83	280	F					412D085617	AD	
4/19/98	7.0	84	315	M					412D75706F	AD	Ripe
4/19/98	7.0	85	366	F					412D65541A	ADLV	Ripe
4/19/98	7.0	86	364	F			EVI	J40	412D645137	AD	
4/19/98	7.0	87	308	F					412D602F57	AD	
4/19/98	7.0	88	355	F			EVI	J78	412D63163C	AD	Ripe
4/19/98	7.0	89	325	M					412D24400B	AD	Ripe
4/19/98	7.0	90	302	M					412C784617	AD	Ripe
4/19/98	7.0	91	359	F					412D6F1049	AD	Ripe
4/19/98	7.0	92	305	F					412D0E1B74	AD	
4/19/98	7.0	93	297	F					412D256C40	AD	
4/19/98	7.0	94	429	F			EVI	SF2	412D7F1A57	AD	Ripe
4/19/98	7.0	95	364	M			EVI	JK6	412C7D460F	ADLV	Ripe
4/19/98	7.0	96	344	F					412E04384D	ADLV	
4/19/98	7.0	97	316	F					412D192271	AD	
4/19/98	7.0	98	263	F					412D1C372E	AD	
4/19/98	7.0	99	332	M					412D231247	AD	
4/19/98	7.0	100	322	F					412D0F2276	AD	
4/19/98	7.0	101	368	F	4112685F14	AD	EVI	F73			Ripe
4/19/98	7.0	102	348	F	4112707144	AD				RV	

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Appendix A3.–Page 4 of 11. (NA = data not available, AD = adipose finclip, LV = left ventral finclip, RV = right ventral finclip, AVI = anal fin-visual implanttag, EVI = eye tissue-visual implant tag.)

					New fish		Recaptured fish				
Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	PIT tag code	Finclip	Tag type	Tag num.	PIT tag code	Finclip	Comments
4/19/98	7.0	103	268	F	41125E1202	AD				LV	Ripe
4/19/98	7.0	104	299	F	4113012624	AD				LV	Ripe
4/19/98	7.0	105	190	F	4112787F78	AD					Ripe
4/19/98	7.0	106	212	M	4112685F14	AD					
4/19/98	7.0	107	?	?						AD	ESCAPED
4/20/98	6.7	108	344	M					412C7D6022	AD	Ripe
4/20/98	6.7	109	352	F					412D674D66	AD	Ripe
4/20/98	6.7	110	364	F					412D5B6737	AD	Ripe
4/20/98	6.7	111	392	F					412D5F216C	AD	
4/20/98	6.7	112	273	M					412D123526	AD	Ripe
4/20/98	6.7	113	280	M	4113137628	AD				LV	Ripe
4/20/98	6.7	114	295	F	41134E5801	AD				LV	Ripe
4/20/98	6.7	115	277	M	4113151639	AD					Ripe
4/20/98	6.7	116	262	F	41131D2613	AD				LV	Ripe
4/21/98	7.3	117	340	F	4112317B43	AD			NA	AD	Ripe
4/21/98	7.3	118	345	F					412C7D5348	AD	
4/21/98	7.3	119	325	F					412C77663C	AD	
4/21/98	7.3	120	316	F					412D19403F	AD	
4/21/98	7.3	121	318	F					412D6E7D58	AD	
4/21/98	7.3	122	227	?	41127D4813	AD					
4/21/98	7.3	123	214	M	4113463B3B	AD					Ripe
4/21/98	7.3	124	295	M	41126B286E	AD					Ripe
4/21/98	7.3	125	234	?	41120C426F	AD					
4/22/98	8.0	126	393	F			EVI	D18	412D67747E	AD	
4/22/98	8.0	127	328	F					412D6C5160	AD	
4/22/98	8.0	128	297	F					412D672B32	AD	
4/22/98	8.0	129	298	F					412D72763E	AD	Ripe
4/22/98	8.0	130	240	M	4112512F28	AD					Ripe
4/22/98	8.0	131	218	M	41127A1B7C	AD					Ripe
4/22/98	8.0	132	275	F	4113045638	AD					
4/23/98	8.5	133	373	F					412D6D1434	AD	
4/23/98	8.5	134	314	M					412D012838	AD	Ripe
4/23/98	8.5	135	282	F					412D5F0E24	AD	Ripe
4/23/98	8.5	136	305	F					412D0A5B0F	AD	

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Appendix A3.–Page 5 of 11. (NA = data not available, AD = adipose finclip, LV = left ventral finclip, RV = right ventral finclip, AVI = anal fin-visual implanttag, EVI = eye tissue-visual implant tag.)

					New fish		Recaptured fish				
Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	PIT tag code	Finclip	Tag type	Tag num.	PIT tag code	Finclip	Comments
4/23/98	8.5	137	310	F	4113032554	AD					
4/24/98	8.9	138	300	F	4113100837	AD					
4/24/98	8.9	139	303	F	4112761B27	AD					
4/24/98	8.9	140	300	F	41125D3351	AD					Ripe
4/24/98	8.9	141	251	F	41125D4276	AD				LV	
4/24/98	8.9	142	303	F	4112635F30	AD					
4/25/98	8.5	143	331	F					412E025D65	ADLV	
4/25/98	8.5	144	196	?	41126B4052	AD					
4/27/98	8.9	145	329	F					412D214409	ADLV	
4/27/98	8.9	146	248	?	4113203A05	AD					Very Silver
4/28/98	9.0	147	319	F					412D74091A	AD	
4/28/98	9.0	148	394	F					412E002B28	AD	
4/28/98	9.0	149	292	F					412D0E5448	ADLV	
4/28/98	9.0	150	289	F	4113031975	AD				LV	
4/28/98	9.0	151	315	?	41122C561C	AD					Silver
4/29/98	9.4	152	280	?					412D19632B	AD	
4/29/98	9.4	153	337	F					412D6A510B	ADLV	Ripe
4/30/98	10.2	154	333	F					412E01590C	ADLV	Ripe
5/1/98	10.9	155	321	F	4112391E57	AD					Ripe
5/1/98	10.9	156	279	F	41373C2F5A	AD					Ripe
5/1/98	10.9	157	239	F	413737616F	AD					Ripe
5/2/98	10.9	158	279	F					412D133625	AD	
5/2/98	10.9	159	272	F	41376D146F	AD				LV	Ripe; Blue dot
5/2/98	10.9	160	283	?	413733095F	AD					Silver
5/2/98	10.9	161	258	?	4137403434	AD					Silver
5/3/98	10.8	162	368	F					412D1D4C6F	AD	Spent
5/3/98	10.8	163	336	M					412D6D4B78	AD	
5/3/98	10.8	164	378	F	413754750E	AD				LV	Ripe
5/3/98	10.8	165	268	F	4137782545	AD				LV	Ripe
5/3/98	10.8	166	249	?	4137164662	AD					
5/3/98	10.8	167	203	?	4137237448	AD					
5/4/98	11.6	168	305	F					412D013C5C	AD	Spent; Mink bite on tail
5/4/98	11.6	169	276	?					412D1F2C72	AD	Silver
5/4/98	11.6	170	377	?					412D5E3C79	AD	Silver

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Appendix A3.–Page 6 of 11. (NA = data not available, AD = adipose finclip, LV = left ventral finclip, RV = right ventral finclip, AVI = anal fin-visual implanttag, EVI = eye tissue-visual implant tag.)

					New fish		Recaptured fish				
Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	PIT tag code	Finclip	Tag type	Tag num.	PIT tag code	Finclip	Comments
5/4/98	11.6	171	290	F	41372E7D62	AD					Ripe
5/5/98	12.0	172	268	M					412D066541	AD	
5/5/98	12.0	173	227	?	413725795C	AD					
5/6/98	10.0	174	272	F			EVI	J12	412D001223	AD	
5/7/98	10.0	175	232	?	413729264B	AD					Silver; deciduous scales
5/7/98	10.0	176	251	?	41373E5C2E	AD					
5/7/98	10.0	177	229	?	4137542509	AD					
5/7/98	10.0	178	226	?	4137485F48	AD					
5/7/98	10.0	179	262	?	4137236721	AD					Silver
5/7/98	10.0	180	252	?	4137493259	AD					
5/7/98	10.0	181	280	M					412C7B6667	AD	
5/8/98	10.2	182	282	?	4137303C68	AD					Silver
5/8/98	10.2	183	268	?					4136513428	AD	Retag, Silver
5/8/98	10.2	184	242	?	41365A0F20	AD					Silver, hook in throat
5/9/98	10.8	185	247	?	41373C7A64	AD					Silver
5/9/98	10.8	186	244	M	4137493554	AD					
5/9/98	10.8	187	226	?	4137627330	AD					
5/9/98	10.8	188	220	?	413742773D	AD					
5/9/98	10.8	189	238	F	41373A341E	AD				LV	
5/10/98	10.5	190	318	M					412C7A4349	AD	
5/10/98	10.5	191	280	?					412D0E386E	AD	
5/10/98	10.5	192	215	?	4137786B54	AD					
5/10/98	10.5	193	255	?	41374A5F2F	AD					
5/10/98	10.5	194	236	?	4137294405	AD					
5/10/98	10.5	195	225	?	4137277753	AD					
5/10/98	10.5	196	?	?	ESCAPE				ESCAPE	NA	
5/11/98	10.3	197	295	M					412D136B5D	AD	
5/11/98	10.3	198	242	?	41374A5901	AD					
5/11/98	10.3	199	265	?	4137403723	AD					
5/11/98	10.3	200	225	?	4137673046	AD					
5/11/98	10.3	201	274	?	4137482629	AD					
5/11/98	10.3	202	210	?	4136523924	AD					
5/11/98	10.3	203	252	?	4137442B0D	AD					
5/12/98	11.8	204	402	?	4137395700	AD				AD	

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Appendix A3.–Page 7 of 11. (NA = data not available, AD = adipose finclip, LV = left ventral finclip, RV = right ventral finclip, AVI = anal fin-visual implanttag, EVI = eye tissue-visual implant tag.)

					New fish		Recaptured fish				
Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	PIT tag code	Finclip	Tag type	Tag num.	PIT tag code	Finclip	Comments
5/12/98	11.8	205	242	?	413726204D	AD					Silver
5/12/98	11.8	206	258	?	4137282837	AD					Silver
5/12/98	11.8	207	253	?	41373B4E7C	AD					Silver
5/12/98	11.8	208	220	?	41375D7363	AD					Silver
5/12/98	11.8	209	206	?	4137327430	AD					Silver
5/13/98	12.0	210	305	?					412D7A103D	AD	Silver
5/13/98	12.0	211	304	?					412D780A56	AD	Silver
5/13/98	12.0	212	280	?					412D19057F	AD	Silver
5/13/98	12.0	213	232	?	4137612C0F	AD					Silver
5/13/98	12.0	214	274	?	41376F7646	AD					Silver
5/13/98	12.0	215	253	?	4136631603	AD					Silver
5/13/98	12.0	216	233	?	41375E4B2B	AD					Silver, Gill sticking out from gill plate
5/13/98	12.0	217	288	?	4137481777	AD					Silver
5/13/98	12.0	218	260	?	4137561A58	AD					Silver
5/13/98	12.0	219	307	?	4137333C1B	AD					Silver
5/13/98	12.0	220	244	?	4137265B18	AD					Silver
5/13/98	12.0	221	239	?	4136662452	AD					Silver
5/13/98	12.0	222	248	?	4137476678	AD					Silver
5/13/98	12.0	223	191	?	4137292823	AD					Silver
5/13/98	12.0	224	254	?	4137436674	AD					Silver
5/13/98	12.0	225	207	M	4137582F20	AD					Ripe
5/14/98	12.0	226	334	M			EVI	JH3	412D7B0A25	AD	Spent
5/14/98	12.0	227	310	?					412D64271D	AD	Silver
5/14/98	12.0	228	244	?	4137401C71	AD					Silver
5/14/98	12.0	229	238	?	41372E297F	AD					Silver
5/14/98	12.0	230	228	?	41373A3127	AD					Silver
5/14/98	12.0	231	225	?	4137362E49	AD					Silver
5/14/98	12.0	232	248	?	41374A5769	AD					Silver
5/14/98	12.0	233	250	?	41373C5970	AD					Silver
5/14/98	12.0	234	245	?	41377D6A6F	AD					Silver
5/14/98	12.0	235	225	?	4137607E28	AD					Silver
5/15/98	13.5	236	250	?	4137253357	AD					Silver
5/15/98	13.5	237	290	?	4137464356	AD					Silver
5/15/98	13.5	238	236	?	41375C5374	AD					Silver

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Appendix A3.–Page 8 of 11. (NA = data not available, AD = adipose finclip, LV = left ventral finclip, RV = right ventral finclip, AVI = anal fin-visual implanttag, EVI = eye tissue-visual implant tag.)

					New fish		Recaptured fish				
Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	PIT tag code	Finclip	Tag type	Tag num.	PIT tag code	Finclip	Comments
5/15/98	13.5	239	227	?	41372A190E	AD					Silver
5/15/98	13.5	240	214	?	41377A2138	AD					Silver
5/15/98	13.5	241	283	?	413732786C	AD					Silver
5/15/98	13.5	242	227	?	4137396F3B	AD					Silver
5/15/98	13.5	243	220	?	41375E2846	AD					Silver
5/15/98	13.5	244	249	?	413728312C	AD					Silver
5/16/98	13.3	245	388	?	412D0A0059					ADLV	Silver
5/16/98	13.3	246	296	?	41365F6B58	AD					Silver
5/16/98	13.3	247	284	?	4136721930	AD					Silver
5/16/98	13.3	248	261	?	413725174E	AD					Silver
5/16/98	13.3	249	245	?	4137630B66	AD					Silver
5/16/98	13.3	250	223	?	4137387400	AD					Silver
5/16/98	13.3	251	210	?	4137432B72	AD					Silver
5/16/98	13.3	252	211	?	41376E7771	AD					Silver
5/16/98	13.3	253	219	?	4137635F7B	AD					Silver
5/17/98	13.4	254	217	?	4136514202	AD					Silver
5/17/98	13.4	255	242	?	413779082D	AD					Silver
5/17/98	13.4	256	292	?	4137500425	AD					Silver
5/17/98	13.4	257	220	?	413747644C	AD					
5/17/98	13.4	258	270	?	41376A7367	AD					Silver
5/17/98	13.4	259	273	?	4137520755	AD					Silver
5/17/98	13.4	260	226	?	4137263033	AD					Silver
5/17/98	13.4	261	250	?	4137702B7A	AD					Silver
5/17/98	13.4	262	250	?	41376E091D	AD					Silver
5/17/98	13.4	263	268	?	4137591315	AD					Silver
5/17/98	13.4	264	203	?	413736426F	AD					Silver
5/17/98	13.4	265	200	?	4137286B59	AD					
5/17/98	13.4	266	296	?					412C7B392B	AD	Silver
5/17/98	13.4	267	277	?					412D061545	AD	
5/17/98	13.4	268	354	?			EVI	JH8	412D1F710A	AD	
5/17/98	13.4	269	261	?					412D782330	AD	Silver
5/17/98	13.4	270	309	?					412D0C404B	AD	Silver
5/17/98	13.4	271	293	?					412D200E16	AD	Silver

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Appendix A3.–Page 9 of 11. (NA = data not available, AD = adipose finclip, LV = left ventral finclip, RV = right ventral finclip, AVI = anal fin-visual implanttag, EVI = eye tissue-visual implant tag.)

					New fish		Recaptured fish				
Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	PIT tag code	Finclip	Tag type	Tag num.	PIT tag code	Finclip	Comments
5/18/98	14.2	272	250	?	41373C5718	AD					Silver
5/18/98	14.2	273	218	?	41374C665C	AD					Silver
5/18/98	14.2	274	217	?	4137684644	AD					Silver
5/18/98	14.2	275	235	?	41376C6F2E	AD					Silver
5/18/98	14.2	276	238	?	413762551D	AD					Silver
5/18/98	14.2	277	198	?	4137444105	AD					Silver
5/18/98	14.2	278	307	F					412D24423F	AD	spent
5/18/98	14.2	279	291	?					412D127252	AD	Silver
5/19/98	13.1	280	240	?	41374E1E79	AD					Silver
5/19/98	13.1	281	241	?	41374C031F	AD					Silver
5/19/98	13.1	282	213	?	41372D0C36	AD					Silver
5/19/98	13.1	283	232	?	4137277567	AD					Silver
5/19/98	13.1	284	228	?	41377D122D	AD					Silver
5/20/98	13.0	285	210	?	410A282C4A	AD					
5/20/98	13.0	286	265	?	4137397F45	AD					Silver
5/20/98	13.0	287	226	?	4137571A4C	AD					Silver
5/20/98	13.0	288	217	?	41373D7236	AD					Silver
5/20/98	13.0	289	219	?	413734603F	AD					Silver
5/20/98	13.0	290	210	?	4137235817	AD					Silver
5/21/98	12.6	291	273	?	4137311865	AD					
5/21/98	12.6	292	221	?	413753080A	AD					
5/21/98	12.6	293	207	?	4137474055	AD					
5/21/98	12.6	294	217	?	41372A4258	AD					
5/21/98	12.6	295	212	?	4137305359	AD					
5/21/98	12.6	296	168	?	41373E5246	AD					
5/22/98	12.3	297	303	?					412D241B5D	AD	
5/22/98	12.3	298	268	?	4137434560	AD					Silver
5/22/98	12.3	299	219	?	4137362A53	AD					Silver
5/22/98	12.3	300	249	?	4137365728	AD					Silver
5/22/98	12.3	301	238	?	413728400B	AD					Silver
5/22/98	12.3	302	244	?	4137606329	AD					Silver
5/22/98	12.3	303	216	?	41376C447C	AD					
5/23/98	12.2	304	209	?	41373C5853	AD					
5/23/98	12.2	305	243	?	4137784311	AD					Silver
5/23/98	12.2	306	254	?	4137262740	AD					Silver

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Appendix A3.–Page 10 of 11. (NA = data not available, AD = adipose finclip, LV = left ventral finclip, RV = right ventral finclip, AVI = anal fin-visual implanttag, EVI = eye tissue-visual implant tag.)

					New fish		Recaptured fish				
Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	PIT tag code	Finclip	Tag type	Tag num.	PIT tag code	Finclip	Comments
5/23/98	12.2	307	262	?	4136687247	AD					Silver
5/23/98	12.2	308	243	?	41374D0525	AD					Silver
5/23/98	12.2	309	261	?	4137452745	AD					Silver
5/23/98	12.2	310	197	?	41374F6B50	AD					Silver
5/23/98	12.2	311	225	?	4137585475	AD					Silver
5/23/98	12.2	312	263	?	41377C1623	AD					Silver
5/24/98	12.3	313	282	?	4137286C54	AD					Silver
5/24/98	12.3	314	191	?	41374F6C5D	AD					Silver
5/24/98	12.3	315	210	?	413772092A	AD					Silver
5/24/98	12.3	316	203	?	4137310269	AD					Silver
5/24/98	12.3	317	248	?	4137685852	AD					Silver
5/25/98	14.0	318	255	?	4137514448	AD					Silver
5/25/98	14.0	319	195	?	41376B3F56	AD					
5/26/98	15.0	320	246	?	41375E5D7B	AD					Silver
5/26/98	15.0	321	234	?	413749DA62	AD					Silver
5/26/98	15.0	322	240	?	41376E0B29	AD					Silver
5/27/98	16.0	323	329	?					412D736C26	AD	Silver
5/27/98	16.0	324	250	?	4137603F72	AD					Silver
5/27/98	16.0	325	245	?	413728623C	AD					Silver
5/27/98	16.0	326	239	?	4137375205	AD					Silver
5/27/98	16.0	327	221	?	4137594708	AD					Silver
5/27/98	16.0	328	215	?	41372A2301	AD					Silver
5/27/98	16.0	329	294	?	4137444D59	AD					Silver
5/27/98	16.0	330	252	?	41374E6221	AD					Silver
5/27/98	16.0	331	257	?	4136581D0D	AD					Silver
5/28/98	17.1	332	249	?	41364E1075	AD					Silver
5/28/98	17.1	333	215	?	4137402569	AD					Silver
5/28/98	17.1	334	205	?	41373D307B	AD					Silver
5/28/98	17.1	335	241	?	41372C7A08	AD					Silver
5/28/98	17.1	336	267	?	41374F1708	AD					Silver
5/28/98	17.1	337	238	?	41373C682E	AD					Silver
5/28/98	17.1	338	250	?	41377D3E72	AD					Silver
5/29/98	18.0	339	306	?	4137255C66	AD					Silver
5/29/98	18.0	340	215	?	41376C785D	AD					Silver

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Appendix A3.–Page 11 of 11. (NA = data not available, AD = adipose finclip, LV = left ventral finclip, RV = right ventral finclip, AVI = anal fin-visual implanttag, EVI = eye tissue-visual implant tag.)

					New fish		Recaptured fish				
Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	PIT tag code	Finclip	Tag type	Tag num.	PIT tag code	Finclip	Comments
5/29/98	18.0	342	208	?	4137445E30	AD					Silver
5/29/98	18.0	341	215	?	4137463C19	AD					Silver
5/30/98	18.2	343	238	?	41372F1C2F	AD					Silver
5/30/98	18.2	344	217	?	41374D7C44	AD					Silver
5/30/98	18.2	345	222	?	4137254C18	AD					Silver
5/30/98	18.2	346	228	?	4137621269	AD					Silver
5/30/98	18.2	347	179	?	41366A490C	AD					
5/30/98	18.2	348	240	?	41375A523C	AD					
5/30/98	18.2	349	210	?	413743605A	AD					
5/31/98	18.0	350	263	?					412D185D2A	AD	
5/31/98	18.0	351	250	?	4137607A32	AD					
5/31/98	18.0	352	225	?	4137343C64	AD					
5/31/98	18.0	353	247	?	4137391074	AD					Silver
5/31/98	18.0	354	258	?	41373C6765	AD					Silver
5/31/98	18.0	355	256	?	41375D623E	AD					Silver
5/31/98	18.0	356	213	?	413777133E	AD					Silver
6/1/98	16.8	357	200	?	413725457D	AD					Silver
6/3/98	16.8	358	226	?	41373F0B30	AD					Silver
6/3/98	16.8	359	248	?	413761633D	AD					Silver
6/4/98	17.4	360	231	?	4137416B6C	AD					Silver
6/5/98	17.7	361	267	?	41372A7011	AD					Silver
6/5/98	17.7	362	225	?	4137452571	AD					Silver
6/9/98	18.0	363	259	?	41373D7418	AD					Silver
6/9/98	18.0	364	227	?	41377C0F38	AD					Silver
6/9/98	18.0	365	302	?	41375F7F58	AD					Silver
6/9/98	18.0	366	227	?	4137715D44	AD					Silver
6/10/98	17.3	367	266	?	4137472869	AD					Silver
6/15/98	15.9	368	315	?					412D1D5F06	AD	Silver
6/16/98	15.1	369	366	?					412D72040E	AD	Spent
6/16/98	15.1	370	366	?					412D6F127D	ADLV	Spent, badly eroded tail
6/23/98	17.2	371	313	?					412D247242	AD	
6/25/98	17.8	372	272	?	41373F422C	AD					Silver
6/27/98	18.3	373	218	?	41372D2C35	AD					
6/29/98	18.3	374	253	?	41373D0125	AD					Silver

Appendix A4.–PIT tagging information from fall recoveries of immigrant cutthroat trout at Auke Creek weir, 1998. 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.

					New fish		Recaptured fish				
Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	PIT tag code	Finclip	Tag type	Tag num.	PIT tag code	Finclip	Comments
7/7/98	18.8	1	274				PIT		4137493554	AD	
7/7/98	18.8	2	216				PIT		4112787F7B	AD	
7/8/98	18.2	3	281				PIT		41373C2F5A	AD	
7/9/98	17.9	4	307				PIT		4112635F30	AD	
7/22/98	16.0	5	310				PIT		4113031975	AD/LV	
7/22/98	16.0	6	339				PIT		412D24423F	AD	
7/23/98	16.0	7	399				PIT/AVI	BR4	412D6E1E35	AD	
7/27/98	17.0	8	308							NM	BDA
8/14/98	16.3	9	310							AD	BDA
8/26/98	14.8	10	190							NM	
8/28/98	13.0	11					PIT		4137436674	AD	NO MEASURE, NO BDA
9/2/98	12.0	12	330				PIT		412D061545	AD	BDA
9/2/98	12.0	13	348				PIT		412D754854	AD	BDA
9/2/98	12.0	14	328				PIT		413728312C	AD	BDA
9/2/98	12.0	15	365				PIT		412E333C53	AD	BDA
9/2/98	12.0	16	350				PIT		41365F6B58	AD	BDA
9/2/98	12.0	17	402				PIT		412D72040E	AD	BDA
9/2/98	12.0	18	360				PIT		412D156144	AD	BDA
9/2/98	12.0	19	291				PIT		41126B4052	AD	BDA
9/2/98	12.0	20	312				PIT		41373B4E7C	AD	BDA
9/2/98	12.0	21	359							NM	BDA
9/2/98	12.0	22	300							NM	BDA
9/2/98	12.0	23	276							NM	BDA
9/3/98	12.0	24	359				PIT		412D123526	AD	BDA
9/4/98	11.6	25	335				PIT		4137236721	AD	BDA
9/4/98	11.6	26	342				PIT		4137403723	AD	BDA
9/4/98	11.6	27	334				PIT		41372E297F	AD	BDA
9/6/98	12.0	28	265				PIT		41372A2301	AD	BDA
9/6/98	12.0	29	168							NM	BDA
9/7/98	12.2	30	212							NM	BDA
9/7/98	12.2	31	288							NM	BDA

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Appendix A4.–Page 2 of 11. (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.)

					New fish		Recaptured fish				
Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	PIT tag code	Finclip	Tag type	Tag num.	PIT tag code	Finclip	Comments
9/7/98	12.2	32	349				PIT		4137591315	AD	BDA
9/7/98	12.2	33	363				PIT		4137303C68	AD	BDA
9/7/98	12.2	34	380				PIT		411270076E	AD	BDA
9/7/98	12.2	35	247				PIT		4111266A1E	AD	BDA
9/7/98	12.2	36	322							NM	BDA
9/7/98	12.2	37	325							NM	BDA
9/8/98	11.8	38	298				PIT		413737616F	AD	BDA
9/8/98	11.8	39	345				PIT		4113203A05	AD	BDA
9/8/98	11.8	40	356				PIT		4137286C54	AD	BDA
9/8/98	11.8	41	313				PIT		4137294405	AD	BDA
9/8/98	11.8	42	307				PIT		4137684644	AD	BDA
9/8/98	11.8	43	348				PIT		4137403434	AD	BDA
9/8/98	11.8	44	358				PIT		4137164662	AD	BDA
9/8/98	11.8	45	289				PIT		4137343C64	AD	BDA
9/8/98	11.8	46	333				PIT		41365A0F20	AD	BDA
9/8/98	11.8	47	300				PIT	EVI?	412D001223	AD	BDA
9/8/98	11.8	48	300				PIT		4137635F7B	AD	BDA
9/8/98	11.8	49	298				PIT		4137786B54	AD	BDA
9/8/98	11.8	50	293				PIT		410A282C4A	AD	BDA
9/8/98	11.8	51	310				PIT		413762551D	AD	BDA
9/8/98	11.8	52	332				PIT		4137493259	AD	BDA
9/8/98	11.8	53	340				PIT		412C7B6667	AD	BDA
9/8/98	11.8	54	255							NM	BDA
9/8/98	11.8	55	236							NM	BDA
9/8/98	11.8	56	188							NM	BDA
9/8/98	11.8	57	245							NM	BDA
9/8/98	11.8	58	231							NM	BDA
9/8/98	11.8	59	213							NM	BDA
9/8/98	11.8	60	210							NM	BDA
9/8/98	11.8	61	228							NM	BDA
9/8/98	11.8	62	231							NM	BDA
9/8/98	11.8	63	226							NM	BDA
9/8/98	11.8	64	230							NM	BDA
9/8/98	11.8	65	257							NM	BDA

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Appendix A4.–Page 3 of 11. (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.)

					New fish		Recaptured fish				
Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	PIT tag code	Finclip	Tag type	Tag num.	PIT tag code	Finclip	Comments
9/8/98	11.8	66	217							NM	BDA
9/8/98	11.8	67	210							NM	BDA
9/8/98	11.8	68	248							NM	BDA
9/8/98	11.8	69	200							NM	BDA
9/9/98	11.3	70	341				PIT		4136513428	AD	BDA
9/9/98	11.3	71	260				PIT		41373E5246	AD	BDA
9/9/98	11.3	72	315				PIT		413726204D	AD	BDA
9/9/98	11.3	73	292				PIT		41374C665C	AD	BDA
9/9/98	11.3	74	400				PIT		412D6D4B78	AD	BDA
9/9/98	11.3	75	422				PIT	EVI?	412D05384A	AD	BDA
9/9/98	11.3	76	375				PIT		412D5A2174	AD	BDA
9/9/98	11.3	77	328				PIT		411273252A	AD	BDA
9/9/98	11.3	78	321				PIT		4136662452	AD	BDA
9/9/98	11.3	79	404				PIT		412D1D280F	AD	BDA
9/9/98	11.3	80	370				PIT		412D012838	AD	BDA
9/9/98	11.3	81	307				PIT		4137485F48	AD	BDA
9/9/98	11.3	82	317				PIT		4137365728	AD	BDA
9/9/98	11.3	83	285				PIT		413743605A	AD	BDA
9/9/98	11.3	84	287				PIT		4137715D44	AD	BDA
9/9/98	11.3	85	?						ESCAPED	AD/LV	NO BDA, NO MEASURE
9/9/98	11.3	86	350							NM	BDA
9/9/98	11.3	87	252							NM	BDA
9/9/98	11.3	88	301							NM	BDA
9/9/98	11.3	89	250							NM	BDA
9/9/98	11.3	90	300							NM	BDA
9/9/98	11.3	91	211							NM	BDA
9/9/98	11.3	92	153							NM	BDA
9/10/98	11.9	93	320				PIT		412D72763E	AD	BDA
9/10/98	11.9	94	318				PIT		41376E091D	AD	BDA
9/10/98	11.9	95	312				PIT		41120C426F	AD	BDA
9/10/98	11.9	96	297				PIT		41374C031F	AD	BDA
9/10/98	11.9	97	312				PIT		412D572018	AD	BDA
9/10/98	11.9	98	303				PIT		41375D623E	AD	BDA
9/10/98	11.9	99	286				PIT		413753080A	AD	BDA

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Appendix A4.–Page 4 of 11. (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.)

					New fish		Recaptured fish				
Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	PIT tag code	Finclip	Tag type	Tag num.	PIT tag code	Finclip	Comments
9/10/98	11.9	100	300				PIT		4137277753	AD	BDA
9/10/98	11.9	101	295				PIT		4137474055	AD	BDA
9/10/98	11.9	102	282				PIT		41373D0125	AD	BDA
9/10/98	11.9	103	311				PIT		4113137628	AD	BDA
9/10/98	11.9	104	228							NM	BDA
9/10/98	11.9	105	230							NM	BDA
9/10/98	11.9	106	215							NM	BDA
9/10/98	11.9	107	258							NM	BDA
9/10/98	11.9	108	210							NM	BDA
9/10/98	11.9	109	204							NM	BDA
9/10/98	11.9	110	238							NM	BDA
9/10/98	11.9	111	295							NM	BDA
9/10/98	11.9	112	220							NM	BDA
9/10/98	11.9	113	279							NM	BDA
9/10/98	11.9	114	215							NM	BDA
9/10/98	11.9	115	208							NM	BDA
9/10/98	11.9	116	214							NM	BDA
9/10/98	11.9	117	285							NM	BDA
9/10/98	11.9	118	259							NM	BDA
9/10/98	11.9	119	241							NM	BDA
9/10/98	11.9	120	225							NM	BDA
9/10/98	11.9	121	255							NM	BDA
9/11/98	11.2	122	345				PIT		412D0E386E	AD	BDA
9/11/98	11.2	123	331				PIT		4137262740	AD	BDA
9/11/98	11.2	124	371				PIT	EVI?	412D7B0A25	AD	BDA
9/11/98	11.2	125	381				PIT		412D0B450D	AD	BDA
9/11/98	11.2	126	271				PIT		4137286B59	AD	BDA
9/11/98	11.2	127	335				PIT		412C786A48	AD	BDA
9/11/98	11.2	128	368				PIT		412D7A103D	AD	BDA
9/11/98	11.2	129	288				PIT		4137621269	AD	BDA
9/11/98	11.2	130	204							NM	BDA
9/11/98	11.2	131	265							NM	BDA
9/11/98	11.2	132	215							NM	BDA

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Appendix A4.–Page 5 of 11. (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.)

					New fish		Recaptured fish				
Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	PIT tag code	Finclip	Tag type	Tag num.	PIT tag code	Finclip	Comments
9/11/98	11.2	133	215							NM	BDA
9/11/98	11.2	134	188							NM	BDA
9/11/98	11.2	135	194							NM	BDA
9/11/98	11.2	136	192							NM	BDA
9/11/98	11.2	137	260							NM	BDA
9/12/98	11.0	138	325				PIT		412D5F0E24	AD	BDA
9/12/98	11.0	139	311				PIT		41375E2846	AD	BDA
9/12/98	11.0	140	318				PIT		412C776F69	AD	BDA
9/12/98	11.0	141	296				PIT		41372C7A08	AD	BDA
9/12/98	11.0	142	343				PIT		4137442B0D	AD	BDA
9/12/98	11.0	143	289				PIT		4137327430	AD	BDA
9/12/98	11.0	144	235							NM	BDA
9/12/98	11.0	145	245							NM	BDA
9/12/98	11.0	146	260							NM	BDA
9/12/98	11.0	147	265							NM	BDA
9/12/98	11.0	148	225							NM	BDA
9/12/98	11.0	149	278							NM	NO BDA
9/12/98	11.0	150	269							NM	BDA
9/13/98	11.0	151	370				PIT		41375F7F58	AD	BDA
9/13/98	11.0	152	267				PIT		41372D2C35	AD	BDA
9/13/98	11.0	153	295				PIT		4137362A53	AD	BDA
9/13/98	11.0	154	364				PIT		412D736C26	AD	BDA
9/13/98	11.0	155	325				PIT		41374A5F2F	AD	BDA
9/13/98	11.0	156	330				PIT		413725795C	AD	BDA
9/13/98	11.0	157	269							NM	BDA
9/13/98	11.0	158	247							NM	BDA
9/13/98	11.0	159	260							NM	BDA
9/13/98	11.0	160	245							NM	BDA
9/13/98	11.0	161	317							NM	BDA
9/13/98	11.0	162	253							NM	BDA
9/13/98	11.0	163	255							NM	BDA
9/13/98	11.0	164	265							NM	BDA
9/13/98	11.0	165	245							NM	BDA

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Appendix A4.–Page 6 of 11. (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.)

					New fish		Recaptured fish				
Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	PIT tag code	Finclip	Tag type	Tag num.	PIT tag code	Finclip	Comments
9/13/98	11.0	166	218							NM	BDA
9/13/98	11.0	167	221							NM	BDA
9/13/98	11.0	168	237							NM	BDA
9/13/98	11.0	169	252							NM	BDA
9/13/98	11.0	170	230							NM	BDA
9/14/98	11.0	171	312				PIT		41374D0525	AD	BDA
9/14/98	11.0	172	362				PIT		4137464356	AD	BDA
9/14/98	11.0	173	313				PIT		413725174E	AD	BDA
9/14/98	11.0	174	315				PIT		4137685852	AD	BDA
9/14/98	11.0	175	289				PIT		41376C785D	AD	BDA
9/14/98	11.0	176	333				PIT		41376D146F	AD/LV	BDA
9/14/98	11.0	177	277							NM	BDA
9/14/98	11.0	178	224							NM	BDA
9/14/98	11.0	179	203							NM	BDA
9/14/98	11.0	180	187							NM	BDA
9/14/98	11.0	181	218							NM	BDA
9/14/98	11.0	182	218							NM	BDA
9/14/98	11.0	183	230							NM	BDA
9/14/98	11.0	184	253							NM	BDA
9/14/98	11.0	185	245							NM	BDA
9/14/98	11.0	186	252							NM	BDA
9/14/98	11.0	187	231							NM	BDA
9/14/98	11.0	188	365							NM	BDA
9/14/98	11.0	189	244							NM	BDA
9/14/98	11.0	190	247							NM	BDA
9/14/98	11.0	191	275							NM	BDA
9/14/98	11.0	192	244							NM	BDA
9/14/98	11.0	193	361							NM	BDA
9/15/98	11.6	194	317				PIT		4137542509	AD	BDA
9/15/98	11.6	195	307				PIT		41373A3127	AD	BDA
9/15/98	11.6	196	298				PIT		41373D7236	AD	BDA
9/15/98	11.6	197	347				PIT		4136721930	AD	BDA
9/15/98	11.6	198	308				PIT		412D5B5922	AD	BDA

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Appendix A4.–Page 7 of 11. (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.)

					New fish		Recaptured fish				
Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	PIT tag code	Finclip	Tag type	Tag num.	PIT tag code	Finclip	Comments
9/15/98	11.6	199	297				PIT		41373C682E	AD	BDA
9/15/98	11.6	200	322				PIT		4136523924	AD	BDA
9/15/98	11.6	201	374				PIT		4137481777	AD	BDA
9/15/98	11.6	202	269							NM	BDA
9/15/98	11.6	203	230							NM	BDA
9/15/98	11.6	204	246							NM	BDA
9/15/98	11.6	205	223							NM	BDA
9/15/98	11.6	206	247							NM	BDA
9/15/98	11.6	207	227							NM	BDA
9/15/98	11.6	208	229							NM	BDA
9/15/98	11.6	209	244							NM	BDA
9/15/98	11.6	210	230							NM	BDA
9/15/98	11.6	211	205							NM	BDA
9/16/98	11.4	212	319				PIT		41374E6221	AD	BDA
9/16/98	11.4	213	282				PIT		41372F1C2F	AD	BDA
9/16/98	11.4	214	254							NM	BDA
9/17/98	11.3	215	265				PIT		4137416B6C	AD	BDA
9/17/98	11.3	216	229							NM	BDA
9/17/98	11.3	217	257							NM	BDA
9/17/98	11.3	218	380							NM	BDA
9/18/98	11.3	219	213							NM	BDA
9/19/98	11.4	220	342				PIT		4137702B7A	AD	BDA
9/20/98	11.6	221	292				PIT		413761633D	AD	BDA
9/20/98	11.6	222	357				PIT		412D136B5D	AD	BDA
9/20/98	11.6	223	388				PIT		412C7D5348	AD	BDA
9/20/98	11.6	224	292				PIT		413736426F	AD	BDA
9/20/98	11.6	225	255							NM	BDA
9/20/98	11.6	226	233							NM	BDA
9/20/98	11.6	227	197							NM	BDA
9/20/98	11.6	228	196							NM	BDA
9/20/98	11.6	229	239							NM	BDA
9/23/98	11.9	230	366				PIT		412C7B627D	AD	BDA
9/23/98	11.9	231	329				PIT		41373C6765	AD	BDA

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Appendix A4.–Page 8 of 11. (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.)

					New fish		Recaptured fish				
Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	PIT tag code	Finclip	Tag type	Tag num.	PIT tag code	Finclip	Comments
9/23/98	11.9	232	300				PIT		41376C447C	AD	BDA
9/23/98	11.9	233	309				PIT		4137784311	AD	BDA
9/23/98	11.9	234	272				PIT		41377C0F38	AD	BDA
9/23/98	11.9	235	332				PIT		41374A5901	AD	BDA
9/23/98	11.9	236	215							NM	BDA
9/23/98	11.9	237	297							NM	BDA
9/23/98	11.9	238	227							NM	BDA
9/23/98	11.9	239	186							NM	BDA
9/24/98	11.7	240	360				PIT		412D231247	AD	BDA
9/25/98	11.8	241	230							NM	BDA
9/25/98	11.8	242	255							NM	BDA
9/25/98	11.8	243	240							NM	BDA
9/27/98	11.8	244	283							NM	BDA
9/27/98	11.8	245	289							NM	BDA
9/28/98	11.2	246	187							NM	BDA
9/28/98	11.2	247	320							NM	BDA
9/28/98	11.2	248	211							NM	BDA
9/29/98	11.2	249	303				PIT		4137277567	AD	BDA
9/29/98	11.2	250	229							NM	BDA
9/30/98	11.0	251	311				PIT		412D185D2A	AD	BDA
9/30/98	11.0	252	320				PIT		4137263033	AD	BDA
9/30/98	11.0	253	398				PIT		412D1D4C6F	AD	BDA
9/30/98	11.0	254	312				PIT		41373D7418	AD	BDA
9/30/98	11.0	255	354				PIT		412D127252	AD	BDA
9/30/98	11.0	256	385				PIT		412D5D2B79	AD	BDA
9/30/98	11.0	257	290				PIT		413777133E	AD	BDA
9/30/98	11.0	258	336				PIT		4137253357	AD	BDA
9/30/98	11.0	259	160							NM	BDA
9/30/98	11.0	260	262							NM	BDA
9/30/98	11.0	261	226							NM	BDA
9/30/98	11.0	262	274							NM	BDA
9/30/98	11.0	263	263							NM	BDA
9/30/98	11.0	264	313				PIT		4137375205	AD	BDA

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Appendix A4.–Page 9 of 11. (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.)

					New fish		Recaptured fish				
Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	PIT tag code	Finclip	Tag type	Tag num.	PIT tag Code	Finclip	Comments
9/30/98	11.0	265	407				PIT		412D5B6737	AD	BDA
9/30/98	11.0	266	377				PIT		412C7D1D59	AD	BDA
9/30/98	11.0	267	420				PIT		412D721149	AD	BDA
9/30/98	11.0	268	415				PIT		412D166137	AD	BDA
9/30/98	11.0	269	311				PIT		41374E1E79	AD	BDA
9/30/98	11.0	270	370				PIT		4112317B43	AD	BDA
9/30/98	11.0	271	317				PIT		41125E1202	AD	BDA
9/30/98	11.0	272	340				PIT		412D247242	AD	BDA
9/30/98	11.0	273	441				PIT		412D56377F	AD	BDA
9/30/98	11.0	274	345				PIT		412D19057F	AD	BDA
9/30/98	11.0	275	270				PIT		4137452571	AD	BDA
9/30/98	11.0	276	355				PIT		4137255C66	AD	BDA
9/30/98	11.0	277	380				PIT		41373C5718	AD	BDA
9/30/98	11.0	278	327				PIT		41373C5970	AD	BDA
9/30/98	11.0	279	422				PIT		412D67747E	AD	BDA
9/30/98	11.0	280	398				PIT		NOT SCAN.	AD	BDA
9/30/98	11.0	281	316							NM	BDA
9/30/98	11.0	282	212							NM	BDA
9/30/98	11.0	283	252							NM	BDA
9/30/98	11.0	284	200							NM	BDA
9/30/98	11.0	285	237							NM	BDA
10/1/98	10.8	286	385				PIT		412D590942	AD	BDA
10/1/98	10.8	287	288				PIT		413725457D	AD	BDA
10/1/98	10.8	288	345				PIT		4112684518	AD	BDA
10/1/98	10.8	289	307				PIT		41375D7363	AD	BDA
10/1/98	10.8	290	265							NM	BDA
10/1/98	10.8	291	217							NM	BDA
10/1/98	10.8	292	237							NM	BDA
10/1/98	10.8	293	278							NM	BDA
10/1/98	10.8	294	190							NM	BDA
10/1/98	10.8	295	382				PIT		412D225A6C	AD	BDA
10/1/98	10.8	296	333				PIT		4137282837	AD	BDA
10/1/98	10.8	297	374				PIT		412D1F710A	AD	BDA

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Appendix A4.–Page 10 of 11. (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.)

					New fish		Recaptured fish				
Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	PIT tag code	Finclip	Tag type	Tag num.	PIT tag code	Finclip	Comments
10/1/98	10.8	298	350				PIT		4137482629	AD	BDA
10/1/98	10.8	299	230							NM	BDA
10/1/98	10.8	300	257							NM	BDA
10/1/98	10.8	301	244							NM	BDA
10/2/98	10.2	302	315				PIT		412D1F2C72	AD	BDA
10/2/98	10.2	303	203							NM	BDA
10/2/98	10.2	304	238							NM	BDA
10/2/98	10.2	305	221							NM	BDA
10/2/98	10.2	306	214							NM	BDA
10/2/98	10.2	307	251							NM	BDA
10/2/98	10.2	308	245							NM	BDA
10/2/98	10.2	309	315							NM	BDA
10/2/98	10.2	310	233							NM	BDA
10/3/98	10.0	311	248							NM	BDA
10/3/98	10.0	312	233							NM	BDA
10/3/98	10.0	313	210							NM	BDA
10/3/98	10.0	314	202							NM	BDA
10/4/98	10.0	315	238							NM	BDA
10/4/98	10.0	316	237							NM	BDA
10/4/98	10.0	317	240							NM	BDA
10/5/98	10.2	318	320				PIT		41374D7C44	AD	BDA
10/5/98	10.2	319	331				PIT		412D602F57	AD	WOUNDED; BDA
10/5/98	10.2	320	320				PIT		41377D3E72	AD	BDA
10/5/98	10.2	321	303				PIT		413747644C	AD	BDA
10/5/98	10.2	322	343				PIT		41125D3351	AD	BDA
10/5/98	10.2	323	232							NM	BDA
10/5/98	10.2	324	188							NM	BDA
10/5/98	10.2	325	260							NM	BDA
10/5/98	10.2	326	254							NM	BDA
10/5/98	10.2	327	317							NM	BDA
10/6/98	9.9	328	207							NM	BDA
10/6/98	9.9	329	232							NM	BDA
10/6/98	9.9	330	254							NM	BDA

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Appendix A4.–Page 11 of 11. (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.)

					New fish		Recaptured fish				
Date	Water temp.	No.	Fork length (mm)	Sex (M/F)	PIT tag code	Finclip	Tag type	Tag num.	PIT tag code	Finclip	Comments
10/6/98	9.9	331	203							NM	BDA
10/8/98	9.8	332	215							NM	BDA
10/9/98	9.5	333	367				PIT		4137311865	AD	BDA
10/9/98	9.5	334	230							NM	BDA
10/10/98	9.6	335	213							NM	BDA
10/10/98	9.6	336	222							NM	BDA
10/10/98	9.6	337	215							NM	BDA
10/10/98	9.6	338	204							NM	BDA
10/10/98	9.6	339	272							NM	BDA
10/10/98	9.6	340	260							NM	BDA
10/11/98	9.0	341	224							NM	BDA
10/11/98	9.0	342	250							NM	BDA
10/11/98	9.0	343	278							NM	BDA
10/11/98	9.0	344	251							NM	BDA
10/11/98	9.0	345	290							NM	BDA
10/11/98	9.0	346	213							NM	BDA
10/11/98	9.0	347	238							NM	BDA
10/11/98	9.0	348	215							NM	BDA
10/12/98	9.0	349	262							NM	BDA
10/13/98	9.0	350	233							NM	BDA
10/13/98	9.0	351	300							NM	BDA
10/13/98	9.0	352	260							NM	BDA
10/13/98	9.0	353	212							NM	BDA
10/13/98	9.0	354	326				PIT		4137463C19	AD	BDA
10/13/98	9.0	355	361						NO VI,NO PIT	AD	BDA
10/18/98	8.6	356	326				PIT		4137476678	AD	BDA
10/18/98	8.6	357	281							NM	BDA
10/22/98	7.6	358	341				PIT		412D73424D	AD	BDA
10/23/98	7.6	359	236							NM	BDA
10/23/98	7.6	360	190							NM	BDA
10/28/98	7.0	361	259							NM	BDA

Appendix A5.–Auke Lake cutthroat trout PIT tagging, 1998. 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, BDRV = blue dot on right ventral fin.

Date	Trip #	Area	Sample #	Length (mm)	New fish		Recaptured fish			Gear
					PIT #	2nd mark	PIT #	2nd mark	Other marks	
7/9/98	1	5	1	195	413727351E	AD1/2RV				LT
7/10/98	1	6	4	193	4137316942	AD1/2RV				LT
7/10/98	1	6	2	210	4137261030	AD1/2RV				LT
7/10/98	1	6	3	210	41374B7364	AD1/2RV				LT
7/10/98	1	6	1	224	4137252507	AD1/2RV				LT
7/10/98	1	6	5	247	4137273027	AD1/2RV				LT
7/11/98	1	7	3	140	413753216C	AD1/2RV				LT
7/11/98	1	7	2	145	4137474B04	AD1/2RV				LT
7/11/98	1	7	4	146	4137711B13	AD1/2RV				LT
7/11/98	1	7	5	148	41374C3833	AD1/2RV				LT
7/11/98	1	7	12	176	413741057E	AD1/2RV				LT
7/11/98	1	7	6	180	413728054B	AD1/2RV				LT
7/11/98	1	6	1	189	41365C6124	AD1/2RV				LT
7/11/98	1	7	8	210	4136683129	AD1/2RV				LT
7/11/98	1	7	11	221	4137271D5B	AD1/2RV				LT
7/11/98	1	7	10	263	4137395239	AD1/2RV				LT
7/11/98	1	7	9	284	41364D283D	AD1/2RV				LT
7/11/98	1	7	7	299			412D1E3802		AD	LT
7/12/98	1	7	10	138	4136711943	AD1/2RV				HL
7/12/98	1	7	11	253	4137343735	AD1/2RV				HL
7/12/98	1	7	7	142	4136552579	AD1/2RV				LT
7/12/98	1	7	2	214	41372C453E	AD1/2RV				LT
7/12/98	1	7	1	217	41365A1D6A	AD1/2RV				LT
7/12/98	1	7	8	223	4137236A5E	AD1/2RV				LT
7/12/98	1	7	3	226	41374F707F	AD1/2RV				LT
7/12/98	1	7	6	238	413645010C	AD1/2RV				LT
7/12/98	1	7	4	242	4137302C16	AD1/2RV				LT
7/12/98	1	7	9	243	413658712B	AD1/2RV				LT
7/12/98	1	7	5	244			4137273027	AD1/2RV		LT
7/13/98	1	8	2	250	4136612114	AD1/2RV				HL
7/13/98	1	1	5	275	41374D364F	AD1/2RV				HL
7/13/98	1	8	3	300	41365F2070	AD1/2RV				HL
7/13/98	1	8	4	326	4136634E42	AD1/2RV				HL
7/13/98	1	7	1	262	41366A5D68	AD1/2RV				LT
7/14/98	1	2	2	226	41366D1B40	AD1/2RV				LT
7/14/98	1	1	1	291	413646226B	AD1/2RV			LV	LT
7/15/98	1	2	2	197	41365C124A	AD1/2RV				LT
7/15/98	1	2	5	203	4137476E3E	AD1/2RV				LT
7/15/98	1	2	3	208	4137336274	AD1/2RV				LT
7/15/98	1	2	1	236	41366E3061	AD1/2RV				LT
7/15/98	1	2	4	292			412D5B5922		AD	LT
7/16/98	1	3	8	224	41365C7A76	AD1/2RV				HL
7/16/98	1	3	6	232	41373F5A14	AD1/2RV				HL
7/16/98	1	3	7	270	4137385E71	AD1/2RV				HL
7/16/98	1	3	1	187	4137301952	AD1/2RV				LT
7/16/98	1	3	4	199			413727351E	AD1/2RV		LT
7/16/98	1	3	3	243	4137496149	AD1/2RV				LT
7/16/98	1	3	5	246			4137273027	AD1/2RV		LT
7/16/98	1	3	2	247	413744443C	AD1/2RV				LT

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Appendix A5.–Page 2 of 3.

Date	Trip #	Area	Sample #	Length (mm)	New fish		Recaptured fish			Gear
					PIT #	2nd mark	PIT #	2nd mark	Other marks	
7/17/98	1	4	5	133	41374C4245	AD1/2RV				LT
7/17/98	1	3	2	156	41364B390B	AD1/2RV				LT
7/17/98	1	3	3	156	41372C4124	AD1/2RV				LT
7/17/98	1	3	4	196			41365C124A	AD1/2RV		LT
7/17/98	1	3	1	302			412D0C020G		AD	LT
7/22/98	2	5	1	235	413743751D	AD1/2RVLC				HL
7/23/98	2	5	2	226	41374C0008	AD1/2RVLC			LV	LT
7/23/98	2	5	3	246			4127273027	AD1/2RV		LT
7/23/98	2	5	1	300			412D1E3802		AD	LT
7/24/98	2	6	4	139	4136526272	AD1/2RVLC			BDRV	LT
7/24/98	2	6	2	180			413741057E	AD1/2RV	BDRV	LT
7/24/98	2	6	3	226	413750645F	AD1/2RVLC			BDRV	LT
7/24/98	2	5	1	315	41372E3064	AD1/2RVLC			LV	LT
7/25/98	2	6	2	201	41372E2717	AD1/2RVLC			BDRV	LT
7/25/98	2	7	1	309	4136685070	AD1/2RVLC			BDRV	LT
7/26/98	2	7	1	144	41374D2B4E	AD1/2RVLC			BDRV	LT
7/26/98	2	7	2	153	4136446162	AD1/2RVLC			BDRV	LT
7/26/98	2	7	3	156	4137236949	AD1/2RVLC			BDRV	LT
7/27/98	2	2	3	288	4137297D1D	AD1/2RVLC			BDRV	HL
7/27/98	2	2	4	339	413735602B	AD1/2RVLC			BDRV	HL
7/27/98	2	7	1	219	41372B191A	AD1/2RVLC			BDRV	LT
7/27/98	2	7	2	270			4137395239	AD1/2RV	BDRV	LT
7/28/98	2	2	2	200	413653510C	AD1/2RVLC			BDRV	HL
7/28/98	2	2	3	248	41374C3B24	AD1/2RVLC			BDRV	HL
7/28/98	2	2	1	214			4136683129	AD1/2RV	BDRV	LT
7/29/98	2	2	8	144	41365B170C	AD1/2RVLC			BDRV	LT
7/29/98	2	2	27	150	4137410350	AD1/2RVLC			BDRV	LT
7/29/98	2	2	7	151	4136690D1C	AD1/2RVLC			BDRV	LT
7/29/98	2	2	19	153	41374B112A	AD1/2RVLC			BDRV	LT
7/29/98	2	2	28	158	4137262A3F	AD1/2RVLC			BDRV	LT
7/29/98	2	2	21	165	413751510F	AD1/2RVLC			BDRV	LT
7/29/98	2	2	16	175	4136542F1F	AD1/2RVLC			BDRV	LT
7/29/98	2	2	9	183	41372D6529	AD1/2RVLC			BDRV	LT
7/29/98	2	2	20	193	413724786B	AD1/2RVLC			BDRV	LT
7/29/98	2	2	18	195	41366B2310	AD1/2RVLC			BDRV	LT
7/29/98	2	2	23	201	413733374A	AD1/2RVLC			BDRV	LT
7/29/98	2	2	25	202	4136635177	AD1/2RVLC			BDRV	LT
7/29/98	2	2	5	209	413748741A	AD1/2RVLC			BDRV	LT
7/29/98	2	2	6	210	413660072D	AD1/2RVLC			BDRV	LT
7/29/98	2	2	14	212			4136683129	AD1/2RV	BDRV	LT
7/29/98	2	2	4	218	41365F0B22	AD1/2RVLC			BDRV	LT
7/29/98	2	2	10	223	4137474A27	AD1/2RVLC			BDRV	LT
7/29/98	2	2	2	226			41374C0008	AD1/2RVLC	BDRV	LT
7/29/98	2	2	3	230	4137313945	AD1/2RVLC			BDRV	LT
7/29/98	2	2	26	230	4136721B04	AD1/2RVLC			BDRV	LT
7/29/98	2	2	22	232	4136682D08	AD1/2RVLC			BDRV	LT
7/29/98	2	2	11	239	4137483A0B	AD1/2RVLC			BDRV	LT
7/29/98	2	2	24	239	413723267B	AD1/2RVLC			BDRV	LT
7/29/98	2	2	1	262	413745280E	AD1/2RVLC			BDRV	LT
7/29/98	2	2	12	265	4137444F6D	AD1/2RVLC			BDRV	LT
7/29/98	2	2	13	270	413731460A	AD1/2RVLC			BDRV	LT

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Appendix A5.–Page 3 of 3. (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, BDRV = blue dot on right ventral fin.)

Date	Trip #	Area	Sample #	Length (mm)	New fish		Recaptured fish			Gear
					PIT #	2nd Mark	PIT #	2nd mark	Other marks	
7/29/98	2	2	15	273	41366C2775	AD1/2RVLC			BDRV	LT
7/29/98	2	2	17	312	4137307457	AD1/2RVLC			BDRV	LT
7/30/98	2	3	4	152	4136576A2C	AD1/2RVLC			BDRV	LT
7/30/98	2	3	3	153	41365B641F	AD1/2RVLC			BDRV	LT
7/30/98	2	3	5	206	41372A4555	AD1/2RVLC			BDRV	LT
7/30/98	2	3	6	217	4137250958	AD1/2RVLC			BDRV	LT
7/30/98	2	3	7	234	41372A0853	AD1/2RVLC			BDRV	LT
7/30/98	2	2	2	245	413645667B	AD1/2RVLC			BDRV	LT
7/30/98	2	2	1	248	41366E5635	AD1/2RVLC			BDRV	LT
7/31/98	2	3	4	151	4137264D48	AD1/2RVLC			BDRV	LT
7/31/98	2	4	7	169	41365A1A67	AD1/2RVLC			BDRV	LT
7/31/98	2	3	2	204	41364E512F	AD1/2RVLC			BDRV	LT
7/31/98	2	3	1	212	413730716E	AD1/2RVLC			BDRV	LT
7/31/98	2	3	3	225			413750645F	AD1/2RVLC	BDRV	LT
7/31/98	2	4	5	277	4137264A45	AD1/2RVLC			BDRV	LT
7/31/98	2	4	6	300			412D1E3802		AD-BDRV	LT
8/5/98	3	5	1	149			4136576A2C	AD1/2RVLC	BDRV	HL
8/5/98	3	5	2	177					MORT	HL
8/6/98	3	5	3	158	41372F531D	AD1/2RVUC			BDRV	LT
8/6/98	3	5	5	227	413657051D	AD1/2RVUC			BDRV	LT
8/6/98	3	5	4	252			413744443C	AD1/2RV	BDRV	LT
8/6/98	3	5	1	261	4137496B3B	AD1/2RVUC			BDRV	LT
8/6/98	3	5	2	302			412D1E3802		AD	LT
8/7/98	3	7	1	225	4136613667	AD1/2RVUC			BDRV	HL
8/8/98	3	7	2	225			4137271D5B	AD1/2RV	BDRV	LT
8/8/98	3	6	1	248			4137302C16	AD1/2RV	BDRV	LT
8/9/98	3	7	1	271			4137395239	AD1/2RV	BDRV	LT
8/10/98	3	7	5	122	41364A570D	AD1/2RVUC			BDRV	LT
8/10/98	3	7	1	172	41365D7307	AD1/2RVUC			BDRV	LT
8/10/98	3	7	4	200			4137316942	AD1/2RV	BDRV	LT
8/10/98	3	7	3	291	413657134D	AD1/2RVUC			BDRV	LT
8/10/98	3	7	2	322			41372E3064	AD1/2RVLC	ADLV-BDRV	LT
8/11/98	3	1	3	160	41366A271E	AD1/2RVUC			BDRV	LT
8/11/98	3	1	2	175	41374D2C43	AD1/2RVUC			BDRV	LT
8/11/98	3	2	4	178	4137464A33	AD1/2RVUC			BDRV	LT
8/11/98	3	2	5	204	4136661201	AD1/2RVUC			BDRV	LT
8/11/98	3	1	1	240			413723267B	AD1/2RVLC	BDRV	LT
8/12/98	3	2	2	159			41365B641F	AD1/2RVLC	BDRV	LT
8/12/98	3	2	3	252	4136597711	AD1/2RVUC			BDRV	LT
8/12/98	3	2	1	257	4137291521	AD1/2RVUC			BDRV	LT
8/13/98	3	2	1	153	41366A2855	AD1/2RVUC			BDRV	LT
8/13/98	3	2	2	277	4136726B00	AD1/2RVUC			BDRV	LT
8/13/98	3	3	3	285	41373C1D13	AD1/2RVUC			BDRV	LT
8/14/98	3	4	4	168	413738476A	AD1/2RVUC			BDRV	LT
8/14/98	3	3	1	202			413733374A	AD1/2RVLC	BDRV	LT
8/14/98	3	4	2	235	41373C7C4A	AD1/2RVUC			BDRV	LT
8/14/98	3	4	3	305			412D1E3802		AD	LT

Appendix A6.–List of computer data files for studies at Auke Creek weir and Auke Lake in 1998.

DATA FILE	DESCRIPTION
Cut98.xls	Excel file of length information for downstream and upstream cutthroat trout, Auke Creek weir, 1998.
Down1998.xls	Excel file of the counts of downstream migrant salmonids at Auke Creek weir, 1998.
Dv98.xls	Excel file of the lengths of marked and unmarked Dolly Varden moving downstream at Auke Creek weir, 1998.
grwct98.xls	Excel file of recovered tagged cutthroat trout with lengths and growth information for the 1998 field season.
Lake98.xls	Excel file of cutthroat trout PIT tagging information for the abundance study in Auke Lake, 1998.
pit98.xls	Excel file of PIT tagging information from spring tagging and fall recoveries of cutthroat trout at Auke Creek weir, 1998.
Up1998.xls	Excel file of the counts of upstream migrant salmonids at Auke Creek weir, 1998.

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_o**	**Accept H_o**
There is no size-selectivity during either sampling event.	
Case II: **Accept H_o**	**Reject H_o**
There is no size-selectivity during the second sampling event but there is during the first.	
Case III: **Reject H_o**	**Accept H_o**
There is size-selectivity during both sampling events.	
Case IV: **Reject H_o**	**Reject H_o**
There is size-selectivity during the second sampling event; the status of size-selectivity during the first event is unknown.	

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).