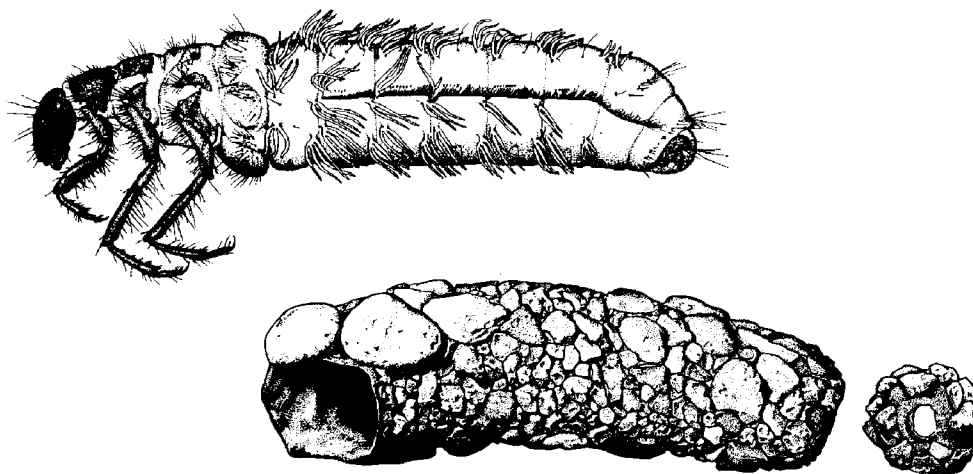


**Technical Report No. 98-1**

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# **Fisheries Use and Water Quality in the Fort Knox Mine Water Supply Reservoir**

by Alvin G. Ott and Phyllis Weber Scannell



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January 1998

Alaska Department of Fish and Game

Habitat and Restoration Division



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**FISHERIES USE AND WATER QUALITY IN THE FORT KNOX  
MINE WATER SUPPLY RESERVOIR**

**by**

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Director  
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## Table of Contents

Table of Contents .....	i
List of Tables .....	ii
List of Figures .....	iii
Acknowledgments.....	iv
Executive Summary .....	v
Introduction .....	1
Methods .....	4
Sampling Sites.....	4
Fish.....	4
Water Quality.....	6
Results and Discussion .....	7
Fort Knox Water Supply Reservoir, Water Quality.....	7
Fort Knox Water Supply Reservoir, Arctic Grayling .....	9
Fort Knox Water Supply Reservoir, Burbot.....	13
Literature Cited .....	20
Appendix 1 - Water Quality Water Supply Reservoir.....	21
Appendix 2 - Growth of Tagged Arctic Grayling (1997) .....	23
Appendix 3 - Growth of Tagged Burbot (1995 - 1997).....	24

## List of Tables

1. Catch of Arctic grayling in fyke nets fished in the Fort Knox water supply reservoir.....	10
2. Length (mm) of young-of-the-year (YOY) Arctic grayling captured with fyke-nets in late August/early September in the Fort Knox water supply reservoir.....	11
3. Catch of burbot in the water supply reservoir in 1996 and 1997 using minnow traps and hoop nets.....	14
4. Catch of burbot in unbaited fyke-nets fished in the Fort Knox water supply reservoir.....	15

## List of Figures

1. Fort Knox project location. ....	2
2. Fyke-net sample sites in the water supply reservoir. ....	5
3. Water quality sample sites in the Fort Knox water supply reservoir (1997). ....	8
4. The minimum, maximum, and mean growth of Arctic grayling in upper Fish Creek and the Fort Knox water supply reservoir from 1994 to 1997. ....	12
5. Length (minimum, mean, and maximum) of young-of-the-year burbot captured with fyke-nets in August 1996 and 1997. ....	16
6. Length (minimum, mean, and maximum) of age 1+ burbot captured with hoop and minnow traps in late May 1997 and with fyke-nets in late August 1997. ....	17
7. Length-frequency distribution of burbot caught in the water supply reservoir (1995-1997). ....	19

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## Executive Summary

Maximum pool elevation for the water supply reservoir will be 1021.0 ft. Water levels in the water supply reservoir reached a maximum elevation of 1,016.6 ft in July 1996 and 1015.3 ft in July 1997. Water levels decreased gradually during summer 1996 and remained fairly constant in summer 1997. Seepage flow, below the dam, has remained fairly constant at a rate of 1.5 to 2.0 cfs.

Anaerobic conditions were found in the middle of the water supply reservoir in September 1997. Dissolved oxygen was partially depleted even at a depth of 1 m. Dissolved oxygen was higher in the upper portion of the water supply reservoir. Water was mixed down to 5+ m and was stratified above or at 7 m. The lowest dissolved oxygen concentrations were found where the water was the deepest.

Catch rates for Arctic grayling (*Thymallus arcticus*) in fall 1997 were substantially less than fall 1996. Our late fall sampling with fyke-nets in 1996 and 1997 showed minimal survival of young-of-the-year spawned in spring 1996 and some survival of the fish spawned in spring 1997. Lack of access to stream habitats for spawning and predation by burbot probably explain poor young-of-the-year survival. Growth rates in the water supply reservoir continue to exceed those found prior to construction.

In May 1995, we conducted a mark/recapture experiment estimating the burbot (*Lota lota*) population at about 825 (Ott and Weber Scannell 1996). Our spring 1997 population estimate for burbot  $\geq 250$  mm was 622 (95% confidence interval 462 to 782) with an unknown number less than 250 mm. Catch rates in late August and early September of 1997 were substantially higher than in August 1996. In August 1996, and 1997 young-of-the-year burbot were present in fyke-net catches. In late August 1996 these fish averaged 122 mm and in late August/early September of 1997, this size group averaged 119 mm. We believe that spawning success was high in February/March 1994 as reflected by high catches of fish  $< 200$  mm in spring 1995, extremely poor for February/March 1995 as seen by the near total absence of fish between 200 and 250 mm in August of 1996, and high for 1996 based on an abundance of fish  $< 250$  mm in August 1997.

## Introduction

Fairbanks Gold Mining, Inc. (FGMI) began construction of the Fort Knox hard-rock gold mine in spring 1995. The mine is located in the headwaters of the Fish Creek drainage about 25 km northeast of Fairbanks (Figure 1). The project includes an open-pit mine, mill, tailing impoundment, water supply reservoir, and related facilities. A description of construction activities during 1995 and 1996 at the reservoir was presented by Ott and Weber Scannell (1996) and Ott and Townsend (1997). Water impoundment began in the water supply reservoir in November 1995. Construction of the dam and spillway was complete by July 1996 and the first official gold pour was made on December 20, 1996.

Water levels in the water supply reservoir reached a maximum elevation of 1,016.6 ft in July 1996; pumping then began to move water to the tailing impoundment. Ultimately, maximum pool elevation will be 1021.0 ft. Final water surface elevation was 1,011.9 ft in November 1996, when pumping ceased. Water levels continued to decrease slowly reaching a low of 1,009.5 ft on April 25, 1997. Maximum surface elevation reported after spring breakup in 1997 was 1,015.3 ft on June 6. In late August 1997, FGMI began pumping seepage water back to the water supply reservoir at a rate of about 800 gallons/minute. Water levels remained fairly constant throughout summer 1997 as indicated by an elevation of 1,014.3 ft recorded on October 10, 1997. Seepage flow below the dam has remained fairly constant at a rate of 1.5 to 2.0 cfs.

Our fisheries study was initiated in 1992 and focused on streams in and downstream of the project area (Weber Scannell and Ott 1993). In 1993, stream sampling continued and we began to collect fisheries data in abandoned settling ponds and mine cuts that would be flooded by the water supply reservoir (Weber Scannell and Ott 1994). In 1994, we established and sampled stream reaches above and below the area that would be flooded (Ott et al. 1995). Stream sampling continued in 1995 and we estimated the Arctic grayling (*Thymallus arcticus*) and burbot (*Lota lota*) population that would be available to colonize the water supply reservoir (Ott and Weber Scannell 1996). We estimated that there were about 1,700 Arctic grayling <150 mm

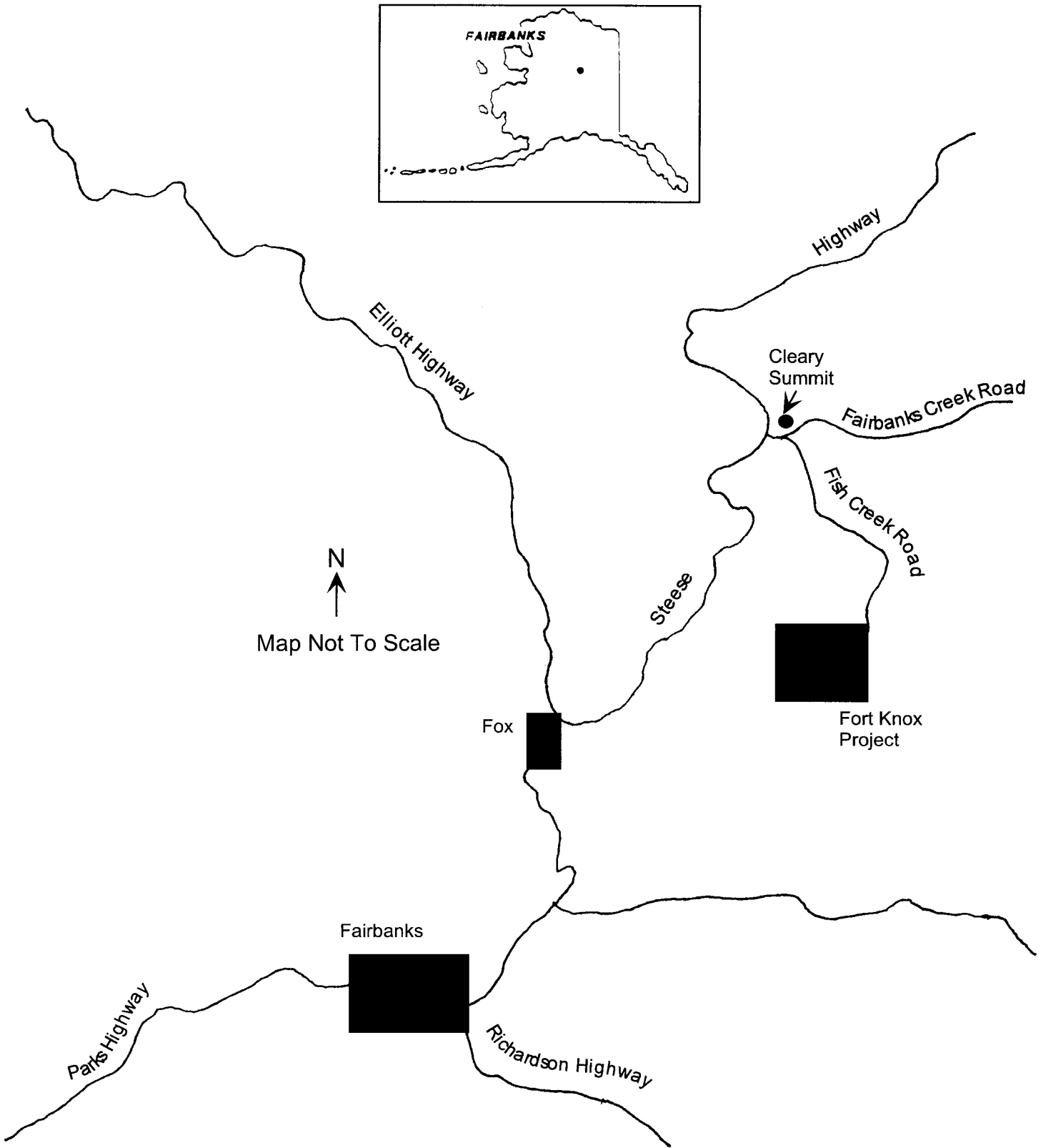


Figure 1. Fort Knox project location.

and 4,350  $\geq$ 150 mm in Fish Creek upstream of the freshwater dam. The number of burbot in upper Fish Creek drainage, mainly in Polar Ponds #1 and #2, was about 825. In 1996, we began to monitor fish use of the water supply reservoir by gathering information on growth, recruitment of young-of-the-year, and catch per unit of effort (Ott and Weber Scannell 1996). We continued to monitor fish use of the water supply reservoir in summer 1997 by conducting a mark/recapture experiment to estimate the burbot population, and by gathering data on growth and recruitment of young-of-the-year burbot and Arctic grayling. We also began to collect water quality data in the water supply reservoir. Our report summarizes data collection in 1997 and discusses these findings in relation to previous work.

## **Methods**

### ***Sampling Sites***

Baseline sampling sites (Upper Last Chance Creek, Bear Creek, and Lower Fish Creek) were established in 1994 to assess effects of the project on water quality and use of streams by fish. In 1997, water quality samples were not taken at these sites and fish sampling was not performed although visual observations were made in Upper Last Chance Creek.

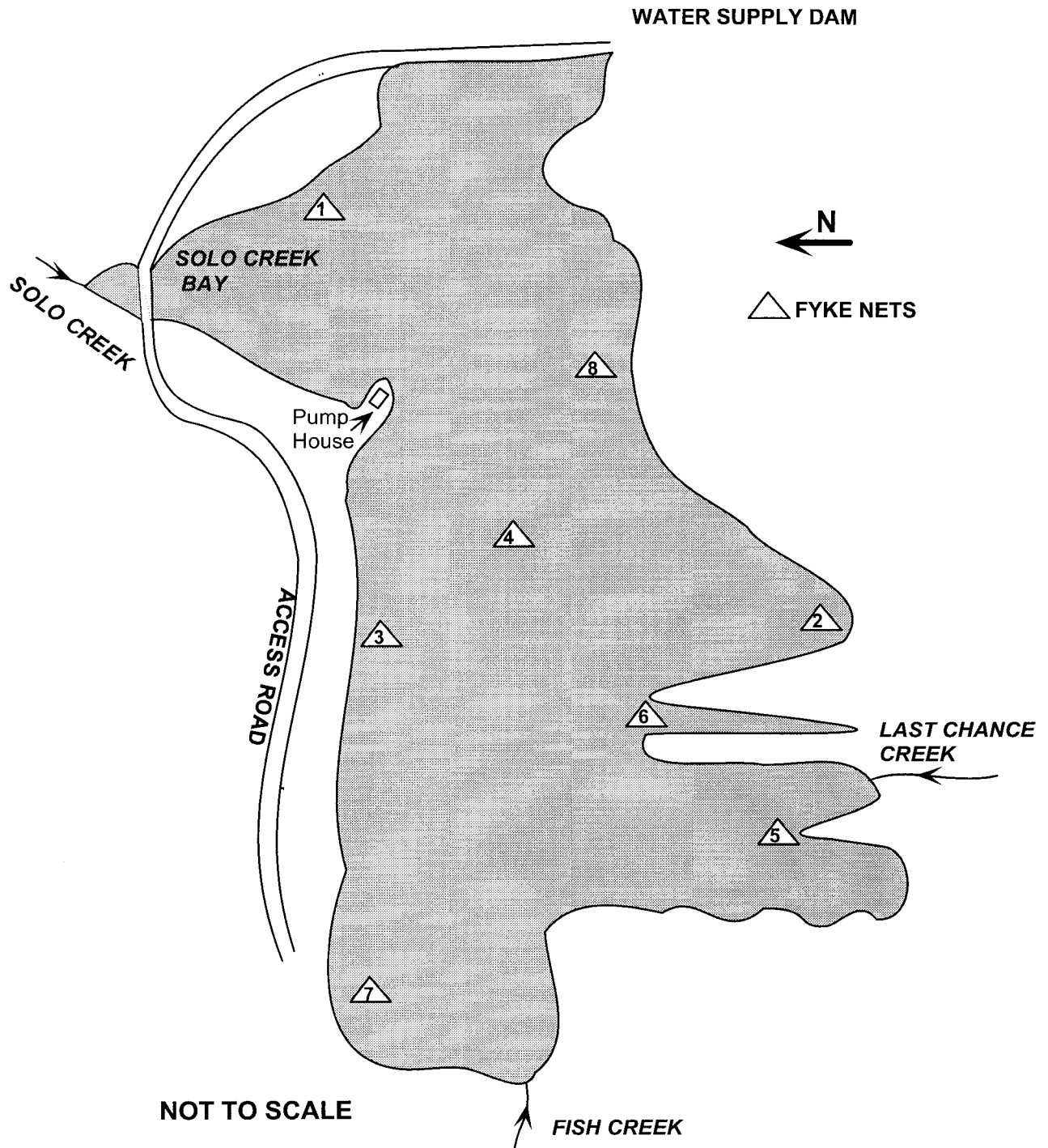
Baseline fyke-net sampling sites in the water supply reservoir were established in 1996. Five of the eight sample sites were fished in 1997 (Figure 2). The general area for each net site is fixed but location varies with water level. Fyke-nets have been fished at the following sites: Fyke-net #1 (Solo Creek Bay), #2 and #6 (Last Chance Bay), #3 (Pump Bay), #4 (Polar Pond Bay), #5 (Upper Last Chance Bay), #7 (Fish Bay), and #8 (Main Reservoir). The most frequently used net sites are Solo Bay (#1), Last Chance Bay (#2), Pump Bay (#3), Upper Last Chance Bay (#5), and Fish Bay (#7).

Hoop traps (small and large) and minnow traps were fished throughout the water supply reservoir. Gear types were mixed to ensure each area (e.g., Solo Bay) had a combination of minnow traps and large and small hoop traps.

### ***Fish***

We sampled fish by electrofishing, fyke-nets, hoop traps, minnow traps, and visual observation. In 1997, most fish were collected with hoop traps and fyke-nets. Arctic grayling were not marked in 1997. Some of the burbot collected during May and September were marked with a floy-tag and some, previously marked and injected with oxytetracycline, were retained for age validation studies being conducted by Mr. Matt Evenson (Sport Fish Division). A pulsed-DC (direct current) electrofishing system mounted on a 6.1 m-long boat (Clark 1995) was used to collect fish in September 1997.

Figure 2. Fyke-net sample sites in the water supply reservoir.



Two sizes of fyke-net were used. Net size (wings, mesh, and center leads) was the same except for entrance frames. Entrance frames were either 0.9 m<sup>2</sup> or 1.2 m<sup>2</sup>. Fyke-nets were 3.7 m long, had five hoops, a 1.8 m cod end, and 0.9 m by 7.6 m net wings attached to the entrance frame. The center lead was 30.4 m and was deployed to the maximum extent possible without submerging the top of the entrance frame. Nets were set with the center lead either perpendicular to or at an angle to shore, depending upon distance to deep water. Unbaited fyke-nets were fished 24 hr and reset or pulled.

We used minnow and hoop traps baited with salmon roe and fish to collect burbot in the water supply reservoir. Traps were fished 24 hr and rebaited if reset. Minnow traps were 42 cm long, 22 cm in diameter, of wire mesh construction, and had two 2.5 cm<sup>2</sup> openings on each end. Two sizes of hoop nets were used. Small traps were 1.6 m long with four hoops 54 cm in diameter. Netting was 8.5 mm bar mesh. The large traps were 3.05 m long with seven hoops. Hoop diameter tapered from 0.61 m at the entrance to 0.46 m at the cod end. Netting on the larger hoop traps was 25 mm bar mesh. All traps were kept stretched and open with spreader bars and each trap had one throat with the cod end tied.

We estimated the population size of burbot in the water supply reservoir with Chapman's modification of the Peterson mark-recapture technique (Chapman 1951). During the mark and recapture event, fish were captured with hoop nets and minnow traps. Formulas used to estimate the population, the variance of the estimate, and the 95% confidence interval (CI) were presented in our 1996 report (Ott and Weber Scannell 1996).

### ***Water Quality***

Temperature, dissolved oxygen, pH, specific conductivity, and turbidity were measured at depth with a Hydrolab Surveyor 4 meter and a Hydrolab Minisonde Multiprobe. Water was collected with a VanDorn water sample bottle. We also sampled for zooplankton with 2 m tows and filtered surface water samples for later chlorophyll-a analysis.

## Results and Discussion

### *Fort Knox Water Supply Reservoir, Water Quality*

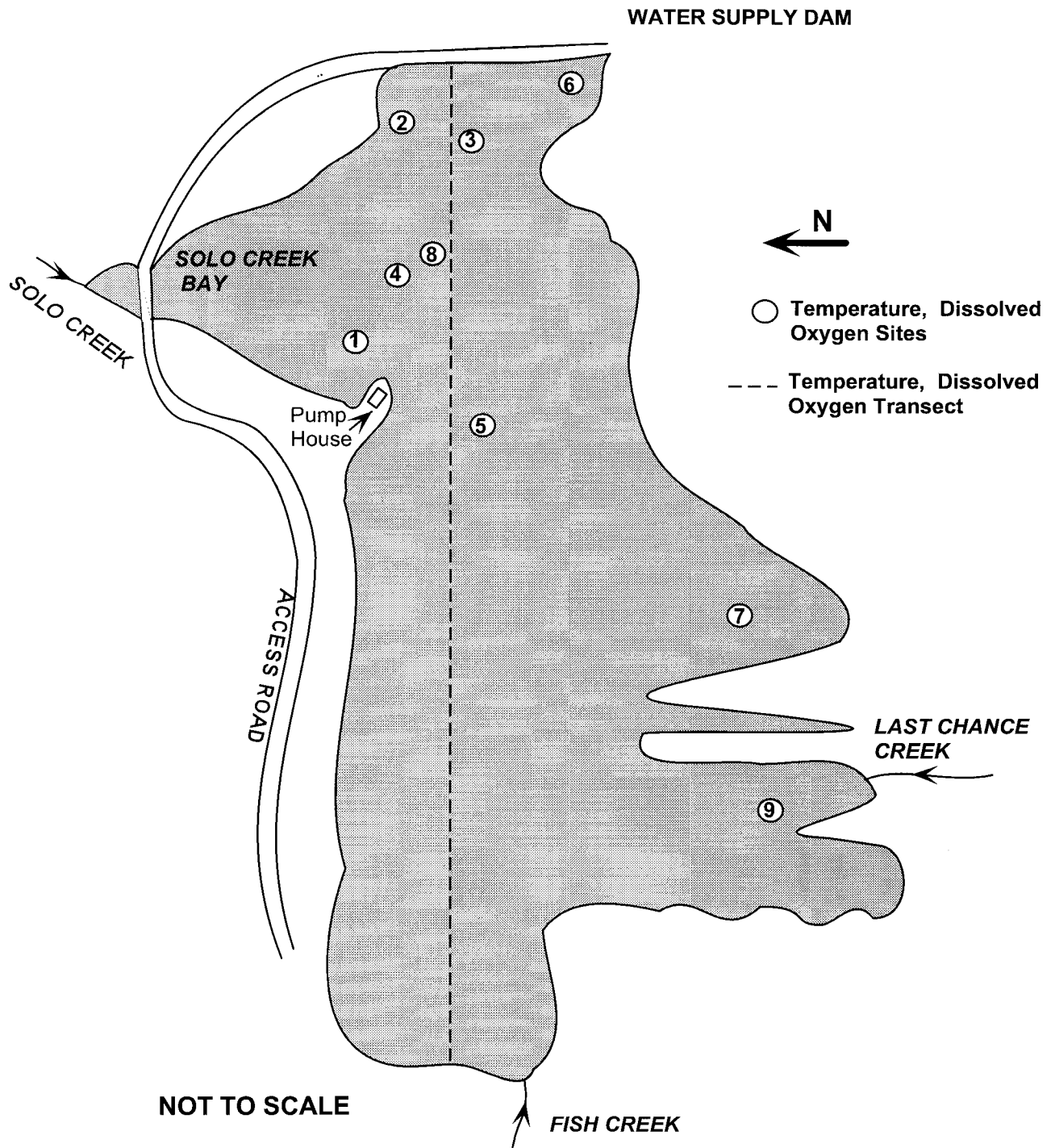
On September 6 and 7, 1997, the University of Alaska Fairbanks fish classes (Dr. Reynolds and Dr. Tyler and ten students) began a fisheries techniques class to sample the Fort Knox water supply reservoir. The intent is to conduct the field program using the same methods as an annual sample event. They ran a temperature/dissolved oxygen profile on a transect down the center of the water supply reservoir (Figure 3). Concentrations of dissolved oxygen ranged from 0 to 11 mg/L and water temperatures from 7 to 14°C. Surface water at the west end (upstream side) of the water supply reservoir was at saturation, but decreased with depth. Anaerobic conditions were first found in the middle of the water supply reservoir on the east-west transect at the pump house at a depth of 5 m. Anaerobic conditions continued east to a position about 100 m from the dam. Dissolved oxygen concentrations were partially depleted at this location even at a depth of 1 m.

We continued to sample water quality in the water supply reservoir on the 17th and 25th of September. Two sites were selected: Site 8 in the middle of the water supply reservoir (water depth 10.5 m) across from Solo Creek; and Site 9 near the inflow (water depth 3.5 m) from Last Chance Creek (Figure 3). Dissolved oxygen at the Last Chance Creek site was 7.6 mg/L at the surface and 4.8 mg/L at 3 m. Water at the Last Chance Creek site was mixed to the bottom. In the middle of the water supply reservoir, surface dissolved oxygen was measured at 6.4 mg/L and dropped to 0.25 mg/L. Water was mixed down to 5+ m and was stratified above or at 7 m.

On September 25, seven sites were selected and sampled (Figure 3). Results were similar to the previous week; the thermocline again occurred between 5 and 7 m. Dissolved oxygen ranged from 5.78 to 6.34 mg/L at the surface and from 0.0 to 5.4 at the bottom (Appendix 1). The lowest dissolved oxygen concentrations were found at Sites 6 and 4 where the water was deepest. We plan to continue water quality monitoring and collect water samples to measure both biological and chemical oxygen demand at depth during the winter of 1997/1998.



Figure 3. Water quality sample sites in the Fort Knox water supply reservoir (1997).



### ***Fort Knox Water Supply Reservoir, Arctic Grayling***

On May 21, 1997, after a 24 hr set, two fyke nets contained 386 (Pump Bay #3) and 254 (Solo Bay #1) Arctic grayling. Both male and female Arctic grayling were ripe, with milt evident and running eggs present. On May 29, 1997, we observed adult Arctic grayling spawning on a gravel shoal near the head of the original upper Last Chance Creek pond. We conducted a visual survey along the margins of the water supply reservoir in late July, but did not observe any young-of-the-year.

We believe that the extremely high catch in spring 1997 was due to timing - nets were fished at a time when adult fish were actively moving along the shoreline to find suitable spawning habitat. There are three tributaries to the water supply reservoir: Solo Creek which was not used for spawning before construction due to cold water temperatures in this north-facing permafrost drainage; Fish Creek where a barrier has been built to keep fish from the constructed wetland complex; and Last Chance Creek where a levee forced the creek out of the channel and over a 2 m high waterfall. Arctic grayling did not have access to stream spawning habitat in either 1996 or 1997.

During the last week of August, we fished five fyke nets (Solo Bay #1, Last Chance Bay #2, Pump Bay #3, Upper Last Chance Bay #5, and Fish Bay #7) for two days. We also fished the same nets for one day in early September (Table 1). Catch rates for Arctic grayling in fall 1997 were substantially less than fall 1996. In fall (late August/early September) 1997, young-of-the-year Arctic grayling were captured with fyke nets. The actual catch of young-of-the-year fish is higher than shown due to predation in the net by burbot. We are assuming, based on age at length data collected in spring 1996 (Ott and Townsend 1997), that most of the young-of-the-year in late fall are less than 100 mm. Hughes (1986) collected outmigrating fish from Badger Slough with a weir and reported that most fall outmigrants were young-of-the-year Arctic grayling less than 100 mm. Holmes (1985) found that the mean size of age 1 Arctic grayling in the Chena River was 97 mm. Mean length of young-of-the-year Arctic grayling in Badger Slough by the end of September was 84.3 mm (range 65 to 111 mm, SD = 9.0) (Wuttig 1997).

Table 1. Catch of Arctic grayling in fyke nets fished in the Fort Knox water supply reservoir.

Sample Date	Number of Nets	Number of Grayling (<150 mm)	Number of Grayling (>150 mm)	CPUE (AG/trap/day)
6/26/96	2	6	57	31.5
6/27/96	2	6	85	45.5
6/28/96	2	9	104	56.5
8/6/96	4	17	201	54.5
8/7/96	5	17	123	28.0
8/8/96	5	6	140	29.2
8/27/96	5	16	150	33.2
8/28/96	5	18	109	25.4
8/29/96	5	11	145	31.2
8/30/96	5	9	110	23.8
5/21/97	2	*	*	320.0
8/26/97	5	6	19	5.0
8/27/97	5	7	49	11.2
9/7/97	5	8	37	9.0

\*Arctic grayling were counted and released - measurements were not made due to the large number of fish. We did estimate that less than 10 of the 640 were small (i.e. <150 mm).

Young-of-the-year Arctic grayling collected in outlet streams in the Polar Pond complex in 1994 prior to flooding by the water supply reservoir averaged 70 mm (N= 26, 52 to 97 mm, SD = 12.5) on August 11. Assuming fish <100 mm are young-of-the-year, our late fall sampling with fyke-nets in 1996 and 1997 showed minimal survival of fish spawned in spring 1996 and some survival of the 1997 spring spawning population (Table 2). Access to suitable stream spawning habitats was not available in either 1996 or 1997. Water levels in summer 1996 began to decrease when pumping began from the water supply reservoir; however, water elevations were relatively stable with a gradual decrease throughout summer 1997. Assuming most Arctic grayling spawning occurred in shallow water habitat as observed in 1997, decreased water levels in 1996 may have had a negative impact on egg survival.

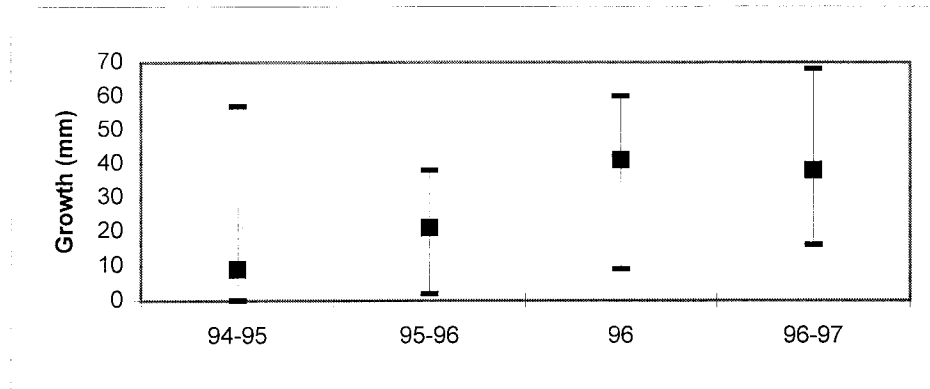
Table 2. Length (mm) of young-of-the-year (YOY) Arctic grayling captured with fyke-nets in late August/early September in the Fort Knox water supply reservoir.

Sample Year	Total Fish Caught	Number of Y-O-Y	Average Length (mm)	Range (mm)	SD
96	568	2	86	77-95	7.3
97	126	17	59	43-84	12.7

We continued to monitor growth of Arctic grayling and planned to conduct a mark/recapture population experiment in fall 1997. A population estimate was not made due to low catches in the fyke-nets. We did recapture Arctic grayling tagged in 1995 and 1996 (Appendix 2). Prior to flooding of the water supply reservoir, average annual growth for Arctic grayling collected in the Last Chance Creek complex was 9 mm. Annual growth increased to 21 mm from 1995 to 1996 when the water supply reservoir was beginning to fill. During summer 1996, fish tagged in spring and recaptured in fall had an average growth of 41 mm, a substantial increase over pre-

reservoir conditions. To compare 1996-1997 growth with previous data, we selected seven Arctic grayling which were tagged in fall 1996 and recaptured about one year later in fall 1997. Average annual growth for these fish was 38 mm (Figure 4).

Figure 4. The minimum, maximum, and average annual growth of Arctic grayling in upper Fish Creek and the Fort Knox water supply reservoir from 1994 to 1997.



### ***Fort Knox Water Supply Reservoir, Burbot***

Burbot use of the Lower Last Chance Creek Pond and Polar Ponds #1 and #2 was reported by Ott and Weber Scannell (1996). In May 1995, we conducted a mark/recapture experiment and estimated the burbot population at about 825 (Ott and Weber Scannell 1996). Flooding of the water supply reservoir began in November 1995, isolating burbot upstream of the dam. Burbot sampling continued in summer 1996, with data collected on growth of fish tagged in 1995, recruitment and growth of young-of-the-year burbot, and catch using minnow traps, hoop nets, and fyke nets (Ott and Townsend 1997).

In late May 1997, we again conducted a mark/recapture population estimate for burbot. Total catch by gear type and catch per unit of effort are shown in Table 3. Catch per unit of effort generally was highest in the small hoop traps and least in minnow traps. Effectiveness of gear type probably was related to the size composition of the population being sampled. Unmarked burbot were tagged, and recaptured fish with an oxytetracycline mark were retained. Some mortalities (gilled in hoop nets) were encountered in the large hoop traps.

We marked 189 burbot captured with hoop nets and minnow traps on May 21 and 22, 1997. Sixteen of the burbot ranged in size from 145 to 181 mm and the remaining 173 were between 287 and 605 mm. We recaptured 125 burbot on May 28 and 29, 1997. Of the 125 fish, eight were small (147 to 195 mm) and the rest ranged from 273 to 612 mm. Thirty-two of the fish seen during the recapture event had been marked on May 21 or 22. None of the recaptured fish was less than 250 mm. Our population estimate for burbot  $\geq 250$  mm was 622 (95% confidence interval 462 to 782) with an unknown number less than 250 mm. This length range likely represents the same cohorts that were estimated in 1995.

Sampling for burbot continued in late August and early September 1997 using fyke-nets. A total of 245 burbot was captured. Catch rates in late August and early September of 1997 were substantially higher than in August 1996 (Table 4); and a much larger proportion of small burbot ( $< 250$  mm) were captured during the 1997

Table 3. Catch of burbot in the water supply reservoir in 1996 and 1997 using minnow traps and hoop nets.

Sample Date	Gear Type	Number of Traps	Catch (Total)	Mean CPUE <sup>1</sup> (BB/trap/day)
May 22, 96	minnow	8	18	2.3
May 23, 96	minnow	8	5	0.6
May 20, 97	minnow	12	5	0.4
May 21, 97	minnow	11	4	0.4
May 28, 97	minnow	12	1	0.1
May 29, 97	minnow	12	3	0.3
May 22, 96	small hoop	11	36	3.3
May 23, 96	small hoop	11	19	1.7
May 20, 97	small hoop	11	58	5.3
May 21, 97	small hoop	11	61	5.5
May 28, 97	small hoop	11	45	4.1
May 29, 97	small hoop	11	32	2.9
May 22, 96	large hoop	4	6	1.5
May 23, 96	large hoop	4	2	0.5
May 20, 97	large hoop	13	24	1.8
May 21, 97	large hoop	17	56	3.3
May 28, 97	large hoop	19	42	2.2
May 29, 97	large hoop	20	39	2.0

<sup>1</sup>CPUE = catch per unit of effort

Table 4. Catch of burbot in unbaited fyke-nets fished in the Fort Knox water supply reservoir.

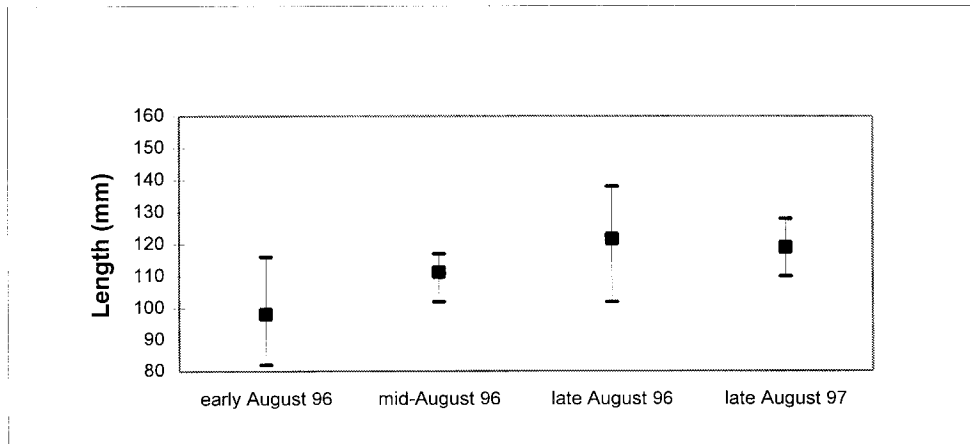
Sample Date	Number of Nets	Number of Burbot (<250 mm)	Number of Burbot (≥250 mm)	CPUE (BB/trap/day)
6/5/96	1	0	4	4.0
6/26/96	2	0	1	0.5
6/27/96	2	0	0	0.0
6/28/96	2	0	1	0.5
8/6/96	4	2	14	4.0
8/7/96	5	11	12	4.6
8/8/96	5	9	18	5.4
8/16/96	1	8	1	9.0
8/27/96	5	8	19	5.4
8/28/96	5	3	20	4.6
8/29/96	5	5	21	5.2
8/30/96	5	1	22	4.6
5/21/97	2	12	0	6.0
8/26/97	5	36	35	14.2
8/27/97	5	46	33	13.8
9/7/97	5	42	53	19.0



sampling than were during the 1996 sampling. On September 7, 1997, forty-four percent of the burbot caught were less than 250 mm. We believe the higher catches observed in fall 1997 reflect recruitment of these fish (probably age 1+) into the population.

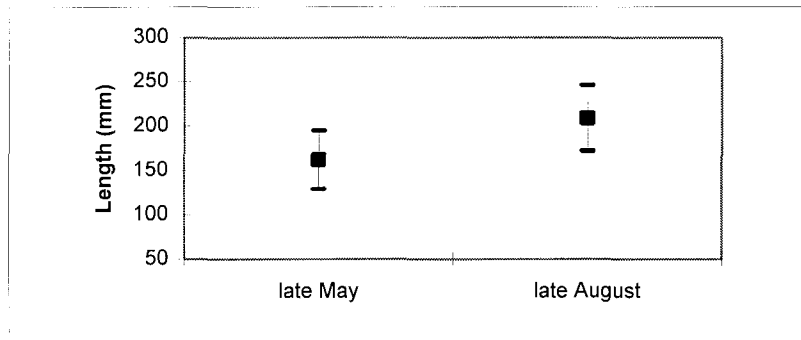
In August 1993, we collected 18 burbot in the seepage channel entering and leaving Horseshoe Pond (Weber Scannell and Ott 1994) which is now part of the water supply reservoir. These burbot ranged from 80 to 110 mm. Based on fish size in August, we assume the 80 to 110 mm fish are young-of-the-year burbot from the February/March 1993 spawning. In 1996 and 1997 spring sampling in the water supply reservoir with minnow traps, hoop nets, and fyke nets, young-of-the-year burbot were not captured. However, in August of 1996 and 1997 young-of-the-year burbot were present in fyke-net catches. In early August 1996 these fish averaged 98 mm, but by late August their average size was 122 mm (Figure 5). A similar size distribution was documented in late August/early September of 1997 when this size group ranged from 110 to 128 mm with an average length of 119 mm (Figure 5).

Figure 5. Length (minimum, average, and maximum) of young-of-the-year burbot captured with fyke-nets in August 1996 and 1997.



In late May 1997, we caught 28 small burbot that ranged from 129 to 195 mm (n=28, average length 162 mm). We assume these are age 1+ fish that averaged 122 mm in the fall of 1996. This size group of fish caught in late August/early September 1997 averaged 209 mm (n=114, range 172 to 246 mm). Average growth was 47 mm during summer 1997 (Figure 6). These fish caused the substantial increase in catch per unit of effort in fall 1997 (Table 4).

Figure 6. Length (minimum, average, and maximum) of age 1+ burbot captured with hoop and minnow traps in late May 1997 and with fyke-nets in late August 1997.

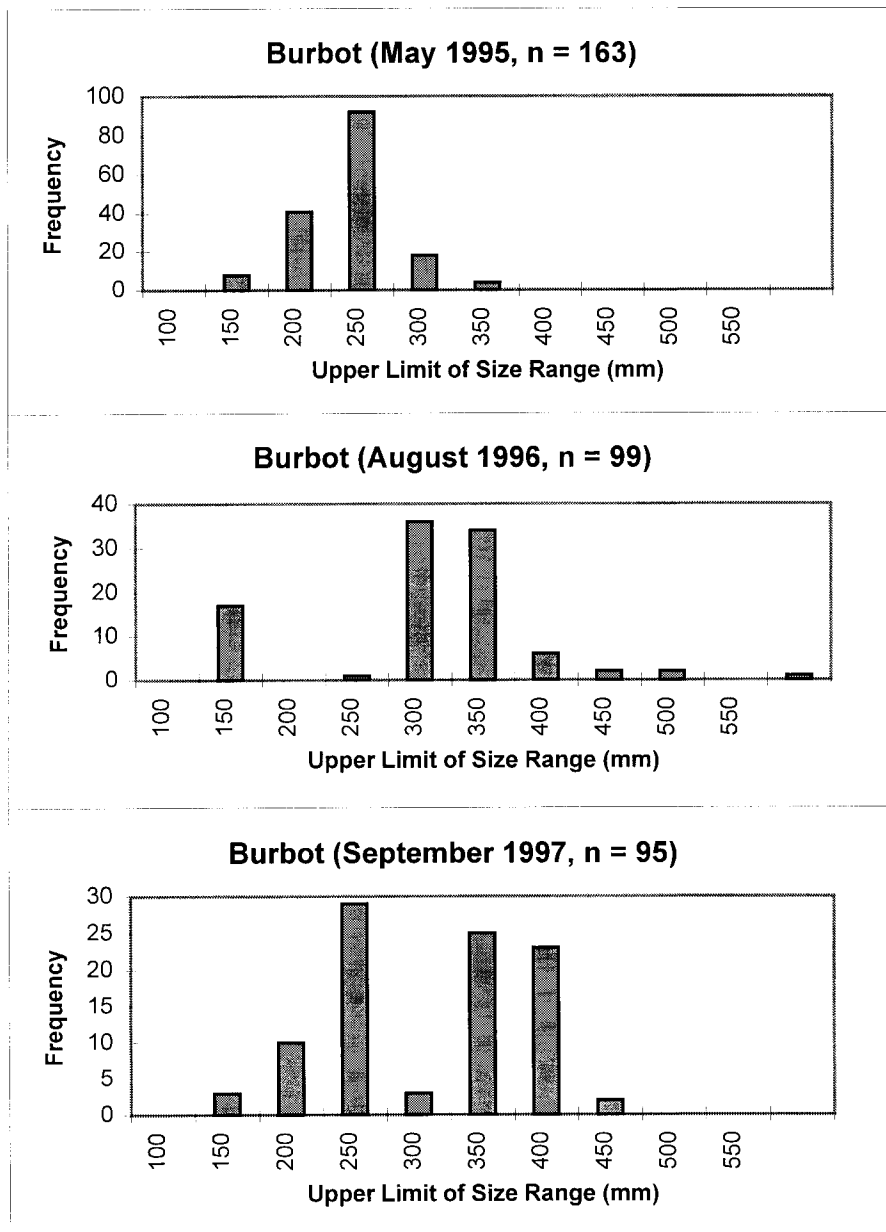


Length-frequency distribution for burbot caught in fyke-nets in May 1995 (pre-flooding of the water supply reservoir), August 1996, and September 1997 is shown in Figure 7. We believe that spawning success was high in February/March 1994 as reflected by high catches of fish <200 mm in spring 1995, extremely poor for February/March 1995 as seen by the near total absence of fish between 200 and 250 mm in August of 1996, and high for 1996 based on an abundance of fish <250 mm in August 1997.

During the construction phase of the Fort Knox project, flow in Fish Creek was diverted through the Polar Pond complex beginning in 1993. Flow through the Polar Pond complex where burbot were first found in 1994 remained unchanged until April 1995 when, at the request of the department, flow was diverted at the tailings dam away from the Polar Pond complex. Diversion of breakup flows from the Polar Pond complex was done to reduce the risk of dike failures and potential effects to construction activities at the water supply dam site. Immediately following breakup in 1995, Fish Creek was diverted back to flow through the Polar Ponds. Diversion of water from the ponds in April 1995 may have caused, in part, the lack of spawning success and fry survival.

Growth information was collected in 1997 from 21 burbot tagged in May and recaptured in late August/early September 1997 (Appendix 3). Burbot, when marked, ranged from 299 to 387 mm (average length 341 mm, SD = 23 mm). Burbot growth for summer 1997 ranged from 0 to 45 mm with an average of 18 mm (SD = 13). Average growth for burbot tagged in May 1995 and recaptured in November 1995 was 30 mm (Ott and Townsend 1997). Burbot caught in May 1996 had an average growth of 50 mm since May 1995 (Ott and Townsend 1997).

Figure 7. Length-frequency distribution of burbot caught in the water supply reservoir (1995-1997).



## Literature Cited

- Chapman, D.G. 1951. Some practices of the hypergeometric distribution with applications to zoological censuses. University of California Publications in Statistics 1:131-60.
- Clark, R.A. 1995. Stock status and rehabilitation of Chena River Arctic grayling during 1994. Alaska Department of Fish and Game, Division of Sport Fish. Fisheries Data Series No. 95-8. Federal Aid in Sport Fish Restoration Act, Project F-10-10, Job No. 3-2(a). 64 pp.
- Holmes, R. 1985. Population structure and dynamics of the Arctic grayling with emphasis on heavily fished stocks. Annual Performance Report. Alaska Department of Fish and Game. Federal Aid in Fish Restoration Act. Vol. 26. Proj. F-9-17, Study R-I, Job R-I-A. 59-102.
- Hughes, N. 1986. Fish and aquatic habitat of Badger Slough, Chena River, Alaska. Unit Contribution Number 22, Alaska Cooperative Fishery Research Unit, University of Alaska, Fairbanks, Alaska, USA. 26 pp.
- Ott, A.G. and A.H. Townsend. 1997. Fisheries use of the Fort Knox water supply reservoir 1996. Alaska Department of Fish and Game Tech. Rept. 97-2. Habitat and Restoration Division. Juneau. 69 pp.
- Ott, A.G., P. Weber Scannell, and A.H. Townsend. 1995. Aquatic habitat and fisheries studies upper Fish Creek, 1992-1995. Alaska Department of Fish and Game Tech. Rept. 95-4. Habitat and Restoration Division. Juneau. 61 pp.
- Ott, A.G. and P. Weber Scannell. 1996. Baseline fish and aquatic habitat data for Fort Knox mine 1992 to 1995. Alaska Department of Fish and Game Tech. Rept. 96-5. Habitat and Restoration Division. Juneau. 165 pp.
- Weber Scannell, P. and A.G. Ott. 1993. Aquatic habitat study, upper Fish Creek drainage, with an emphasis on Arctic grayling (*Thymallus arcticus*): baseline studies 1992. Alaska Department of Fish and Game Tech. Rept. 93-4. Habitat and Restoration Division. Juneau. 76 pp.
- Weber Scannell, P. and A.G. Ott. 1994. Aquatic habitat of Fish Creek before development of the Fort Knox gold mine 1992-1993. Alaska Department of Fish and Game Tech. Rept. 94-5. Habitat and Restoration Division. Juneau. 79 pp.
- Wuttig, K.G. 1997. Successional changes in hydrology, water quality, primary production, and growth of juvenile Arctic grayling of blocked Tanana River sloughs, Alaska. M.S. Thesis. University of Alaska Fairbanks. 105 pp.

## Appendix 1 - Water Quality Water Supply Reservoir

Date	Site	Depth (m)	Dissolved Oxygen (mg/L)	Temperature (Celcius)	pH	Specific Conductivity (u si/cm)	Turbidity (NTU)
9/17/97	8	surface	6.44	10.8	7.11	142	
		1	6.17	10.8	7.09	140	
		2	6.18	10.8	7.01	140	
		3	6.23	10.8	7.07	140	
		5	5.98	10.7	7.12	139	
		7	1.73	9.4	6.73	137	
		10	0.25	6.5	6.62	153	
9/17/97	9	surface	7.6	10.9	6.97	139	
		1	6.95	10.9	7.08	151	
		2	7.03	10.8	7.16	142	
		3	4.8	10.05	6.87	142	
9/25/97	1	surface	5.9	9.36	7.94	156	1.8
		1	5.62	9.25	7.68	156	1.4
		3	5.42	9.1	7.38	155	1.3
		bottom 4.5	4.3	8.96	7.13	155	1
9/25/97	2	surface	5.78	9.25	7.08	147	2
		1	5.67	9.18	7.05	148	1.8
		3	5.52	9.11	7.01	148	1.8
		bottom 7.5	5.4	9.05	7	148	1.7
9/25/97	3	surface	6.1	9.34	7.23	143	1.4
		1	5.76	9.23	7.1	145	1.6
		3	5.67	9.18	7.05	147	1.6
		5	4.58	9.01	6.95	147	1.8
		7	2.65	8.49	6.92	146	1.1
		bottom 7.5					
9/25/97	4	surface	5.83	9.27	7.04	144	1.7
		1	5.74	9.24	7.03	144	1.7
		3	5.65	9.16	7.01	145	1.7
		5	5.53	9.13	7	145	1.8
		7	2.69	9.49	6.79	145	1.2
		9	0.06	6.7	6.65	153	0
		bottom 10	0.02	6.25	6.61	160	0.5

Appendix 1 (concluded).

Date	Site	Depth (m)	Dissolved Oxygen (mg/L)	Temperature (Celcius)	pH	Specific Conductivity (usi/cm)	Turbidity (NTU)
9/25/97	5	surface	5.94	9.42	7.04	142	1.5
		1	5.69	9.23	7.03	142	1.6
		3	5.61	9.17	7	143	1.6
		5	4.1	8.93	6.88	143	1.6
		7	2.64	8.34	6.78	143	0.4
		bottom 7.6	2.39	7.87	6.74	147	0
9/25/97	6	surface	6.11	9.49	7.05	142	1.8
		1	5.8	9.22	7.04	142	1.8
		3	5.7	9.13	7.02	143	1.8
		5	5.5	9.11	7.01	142	1.6
		7	1.55	8.2	6.73	141	1
		9	0.02	6.7	6.67	153	0.6
		11	0	6.11	6.67	156	0.7
		13	0	5.93	6.68	156	0.8
		14	0	5.73	6.7	157	0
		bottom 14.2					
9/25/97	7	surface	6.34	9.22	7.01	141	1.8
		1	5.77	8.97	7.01	141	1.6
		3	4.9	8.86	6.94	142	1.3
		4	4.76	8.9	6.92	141	1.5
		bottom 4.5					

## Appendix 2 - Growth of Tagged Arctic Grayling (1997)

Tag Number	Color	Length (mm)	Date Captured	Site Captured	Recapture Date	Recapture Site	Length (mm)	Growth (mm)
19038	BL	175	6/26/96	Fyke Net 2	8/27/97	Fyke Net 7	255	80
19049	BL	160	6/26/96	Fyke Net 2	8/27/97	Fyke Net 1	244	84
19053	BL	185	6/27/96	Fyke Net 1	9/7/97	Fyke Net 1	234	49
19109	BL	190	6/27/96	Fyke Net 2	9/6/96	FW Pond	205	15
					8/27/97	Fyke Net 2	227	37
19350	BL	188	8/6/96	Fyke Net 1	9/7/97	Fyke Net 3	229	41
19357	BL	200	8/6/96	Fyke Net 1	9/7/97	Fyke Net 1	234	34
19363	BL	237	8/6/96	Fyke Net 1	9/7/97	Fyke Net 7	261	24
19373	BL	201	8/6/96	Fyke Net 2	8/27/97	Fyke Net 2	235	34
19252	BL	218	8/6/96	Fyke Net 3	9/7/97	Fyke Net 7	234	16
19537	BL	199	8/8/96	Fyke Net 1	8/27/97	Fyke Net 2	232	33
19598	BL	189	8/8/96	Fyke Net 2	9/7/97	Fyke Net 5	257	68
6425	OR	186	5/17/95	Upper LC	8/27/97	Fyke Net 2	240	54
6897	OR	164	5/23/95	Upper Pond	6/1/95	Upper Pond	165	1
					8/27/97	Fyke Net 5	221	57



### Appendix 3 - Growth of Tagged Burbot (1995 - 1997)

Tag Number	Color	Length (mm)	Date Captured	Site Captured	Recapture Date	Recapture Site	Length (mm)
11900	OR	224	5/10/95	Polar 1			
11901	OR	163	5/10/95	Polar 1			
11902	OR	278	5/10/95	Polar 1			
11903	OR	283	5/10/95	Polar 1	8/6/96	LC Bay #6	438
11904	OR	162	5/10/95	Polar 1			
11905	OR	247	5/10/95	Polar 1			
11906	OR	258	5/10/95	Polar 1			
11907	OR	158	5/10/95	Polar 1	5/21/97	Main Reservoir	332
11908	OR	250	5/10/95	Polar 1			
11909	OR	201	5/10/95	Polar 1	5/22/96	Main Reservoir	261
11910	OR	272	5/10/95	Polar 1			
11911	OR	222	5/10/95	Polar 1	8/30/96	Main Reservoir #8	297
11912	OR	203	5/10/95	Polar 1			
11913	OR	198	5/10/95	Polar 1			
11914	OR	256	5/10/95	Polar 1	5/22/96	Main Reservoir	342
11915	OR	197	5/10/95	Polar 1			
11916	OR	208	5/10/95	Polar 1	5/28/97	Main Reservoir	355
11917	OR	278	5/10/95	Polar 1			
11918	OR	231	5/10/95	Polar 1	5/28/97	Main Reservoir	343
11919	OR	211	5/10/95	Polar 1	5/28/97	Main Reservoir	360
11920	OR	200	5/10/95	Polar 1			
11921	OR	234	5/10/95	Polar 1			
11922	OR	242	5/10/95	Polar 1	5/22/96	Main Reservoir	280
11923	OR	177	5/10/95	Polar 1			
11924	OR	245	5/10/95	Polar 1			
11925	OR	164	5/10/95	Polar 1			
11926	OR	209	5/10/95	Polar 1	5/20/97	Main Reservoir	339
11927	OR	231	5/10/95	Polar 1			
11928	OR	167	5/10/95	Polar 1			
11929	OR	227	5/10/95	Polar 1			
11930	OR	222	5/10/95	Polar 1	5/22/96	Main Reservoir	234
11931	OR	175	5/10/95	Polar 1			
11932	OR	237	5/10/95	Polar 1			
11933	OR	186	5/10/95	Polar 1			
11934	OR	183	5/10/95	Polar 1	8/29/96	LC Bay #2	290
					5/21/97	Main Reservoir	320
11935	OR	209	5/10/95	Polar 1			
11936	OR	247	5/10/95	Polar 1			
11937	OR	212	5/10/95	Polar 1			
11938	OR	232	5/10/95	Polar 1			
11939	OR	154	5/10/95	Polar 1			
11940	OR	177	5/10/95	Polar 1	5/20/97	Main Reservoir	335
11941	OR	171	5/10/95	Polar 1			
11942	OR	156	5/10/95	Polar 1			

Appendix 3 (continued).

Tag Number	Color	Length (mm)	Date Captured	Site Captured	Recapture Date	Recapture Site	Length (mm)
11943	OR	191	5/10/95	Polar 1			
11944	OR	202	5/10/95	Polar 1			
11945	OR	246	5/10/95	Polar 1			
11946	OR	272	5/10/95	Polar 1			
11947	OR	238	5/10/95	Polar 1	11/30/95	Polar 2	252
11948	OR	217	5/10/95	Polar 1			
11949	OR	280	5/10/95	Polar 1			
11950	OR	202	5/10/95	Polar 1			
11951	OR	242	5/10/95	Polar 1			
11952	OR	249	5/10/95	Polar 1			
11953	OR	229	5/10/95	Polar 1	8/30/96	Upper LC Bay #5	300
11954	OR	234	5/10/95	Polar 1			
11955	OR	239	5/10/95	Polar 1			
11956	OR	226	5/10/95	Polar 1			
11957	OR	231	5/10/95	Polar 1	5/29/97	Main Reservoir	337
11958	OR	187	5/10/95	Polar 1			
11959	OR	210	5/10/95	Polar 1			
11960	OR	155	5/10/95	Polar 1			
11961	OR	155	5/10/95	Polar 1			
11962	OR	212	5/10/95	Polar 1			
11963	OR	211	5/10/95	Polar 1			
11964	OR	189	5/10/95	Polar 1			
11965	OR	216	5/10/95	Polar 1			
11966	OR	157	5/10/95	Polar 1			
11967	OR	161	5/10/95	Polar 1			
11968	OR	221	5/10/95	Polar 1			
11969	OR	167	5/10/95	Polar 1			
11970	OR	154	5/10/95	Polar 1			
11971	OR	194	5/10/95	Polar 1	5/23/96	Main Reservoir	248
11972	OR	182	5/10/95	Polar 1	5/21/97	Main Reservoir	302
11973	OR	206	5/10/95	Polar 1			
11974	OR	197	5/10/95	Polar 1			
11975	OR	274	5/10/95	Polar 1			
11976	OR	247	5/10/95	Polar 1	5/20/97	Main Reservoir	377
11977	OR	225	5/10/95	Polar 1			
11978	OR	212	5/10/95	Polar 1			
11979	OR	243	5/10/95	Polar 1			
11981	OR	192	5/10/95	Polar 1	5/22/96	Main Reservoir	250
11983	OR	188	5/10/95	Polar 1			
11984	OR	188	5/10/95	Polar 1			
11845	OR	156	5/10/95	Polar 2	8/7/96	Solo Bay #1	272
11846	OR	246	5/10/95	Polar 2			
11847	OR	331	5/10/95	Polar 2			
11848	OR	302	5/10/95	Polar 2			

Appendix 3 (continued).

Tag Number	Color	Length (mm)	Date Captured	Site Captured	Recapture Date	Recapture Site	Length (mm)
11849	OR	230	5/10/95	Polar 2			
11850	OR	152	5/10/95	Polar 2	8/29/96	Pump Bay #3	285
11851	OR	252	5/10/95	Polar 2			
11852	OR	250	5/10/95	Polar 2			
11853	OR	308	5/10/95	Polar 2	5/21/97	Main Reservoir	468
11854	OR	267	5/10/95	Polar 2			
11855	OR	169	5/10/95	Polar 2			
11856	OR	237	5/10/95	Polar 2			
11857	OR	232	5/10/95	Polar 2			
11858	OR	199	5/10/95	Polar 2			
11859	OR	185	5/10/95	Polar 2			
11860	OR	204	5/10/95	Polar 2	11/30/95	Polar 2	275
11861	OR	214	5/10/95	Polar 2	5/22/96	Main Reservoir	262
11862	OR	205	5/10/95	Polar 2			
11863	OR	186	5/10/95	Polar 2			
11864	OR	216	5/10/95	Polar 2	8/26/97	Pump Bay #3	362
11865	OR	217	5/10/95	Polar 2			
11866	OR	224	5/10/95	Polar 2			
11867	OR	182	5/10/95	Polar 2			
11868	OR	180	5/10/95	Polar 2			
11869	OR	226	5/10/95	Polar 2			
11870	OR	216	5/10/95	Polar 2			
11871	OR	228	5/10/95	Polar 2			
11872	OR	212	5/10/95	Polar 2	5/21/97	Main Reservoir	364
11873	OR	214	5/10/95	Polar 2			
11874	OR	217	5/10/95	Polar 2			
11875	OR	233	5/10/95	Polar 2			
11876	OR	211	5/10/95	Polar 2	5/28/97	Main Reservoir	357
11877	OR	224	5/10/95	Polar 2			
11878	OR	212	5/10/95	Polar 2	5/21/97	Main Reservoir	322
11879	OR	209	5/10/95	Polar 2			
11880	OR	208	5/10/95	Polar 2			
11881	OR	235	5/10/95	Polar 2			
11882	OR	207	5/10/95	Polar 2			
11883	OR	224	5/10/95	Polar 2	5/23/96	Main Reservoir	289
11884	OR	275	5/10/95	Polar 2			
11885	OR	222	5/10/95	Polar 2			
11886	OR	236	5/10/95	Polar 2			
11887	OR	208	5/10/95	Polar 2			
11888	OR	261	5/10/95	Polar 2			
11889	OR	236	5/10/95	Polar 2			
11890	OR	232	5/10/95	Polar 2			
11891	OR	203	5/10/95	Polar 2	8/29/96	Solo Bay #1	304
					8/27/97	Solo Bay #1	328

Appendix 3 (continued).

Tag Number	Color	Length (mm)	Date Captured	Site Captured	Recapture Date	Recapture Site	Length (mm)
11892	OR	223	5/10/95	Polar 2	8/27/96	Solo Bay #1	283
11893	OR	226	5/10/95	Polar 2	8/29/96	Main Reservoir #8	360
11894	OR	246	5/10/95	Polar 2			
11895	OR	215	5/10/95	Polar 2	8/27/96	Pump Bay #3	305
11896	OR	234	5/10/95	Polar 2			
11897	OR	222	5/10/95	Polar 2			
11898	OR	267	5/10/95	Polar 2			
11899	OR	205	5/10/95	Polar 2			
11980	OR	214	5/10/95	Polar 2	5/20/97	Main Reservoir	323
11982	OR	324	5/10/95	Polar 2	5/22/96	Main Reservoir	428
11985	OR	212	5/10/95	Polar 2			
11986	OR	292	5/10/95	Polar 2			
11987	OR	218	5/10/95	Polar 2	5/21/97	Main Reservoir	378
11988	OR	252	5/10/95	Polar 2			
11989	OR	230	5/10/95	Polar 2	5/23/96	Main Reservoir	289
11990	OR	247	5/10/95	Polar 2			
11991	OR	187	5/10/95	Polar 2	5/20/97	Main Reservoir	339
11992	OR	261	5/10/95	Polar 2			
11993	OR	257	5/10/95	Polar 2			
11994	OR	213	5/10/95	Polar 2	5/20/97	Main Reservoir	315
11995	OR	237	5/10/95	Polar 2			
11996	OR	192	5/10/95	Polar 2			
11997	OR	230	5/10/95	Polar 2			
11998	OR	235	5/10/95	Polar 2	5/21/97	Main Reservoir	431
11999	OR	210	5/10/95	Polar 2			
6675	OR	183	5/18/95	Polar 1			
6676	OR	247	5/18/95	Polar 1			
6677	OR	234	5/18/95	Polar 1	5/21/97	Main Reservoir	350
6678	OR	166	5/18/95	Polar 1	5/29/97	Main Reservoir	327
6679	OR	205	5/18/95	Polar 1			
6680	OR	152	5/18/95	Polar 1	8/8/96	LC Bay #6	267
					5/21/97	Main Reservoir	312
6681	OR	177	5/18/95	Polar 1			
6682	OR	177	5/18/95	Polar 1	8/28/96	Pump Bay #3	287
					8/30/96	Upper LC Bay #5	290
6683	OR	182	5/18/95	Polar 1	8/29/96	Upper LC Bay #5	307
6684	OR	219	5/18/95	Polar 1	5/21/97	Main Reservoir	365
6685	OR	217	5/18/95	Polar 1			
6686	OR	227	5/18/95	Polar 1			
6687	OR	172	5/18/95	Polar 1			
6688	OR	235	5/18/95	Polar 1	5/21/97	Main Reservoir	359
6689	OR	154	5/18/95	Polar 1			
6690	OR	217	5/18/95	Polar 1			

Appendix 3 (continued).

Tag Number	Color	Length (mm)	Date Captured	Site Captured	Recapture Date	Recapture Site	Length (mm)
6691	OR	205	5/18/95	Polar 1			
6692	OR	265	5/18/95	Polar 1			
6693	OR	243	5/18/95	Polar 1			
6694	OR	227	5/18/95	Polar 1			
6695	OR	170	5/18/95	Polar 1			
6696	OR	155	5/18/95	Polar 1	5/21/97	Main Reservoir	315
6697	OR	174	5/18/95	Polar 1			
6698	OR	180	5/18/95	Polar 1			
6699	OR	176	5/18/95	Polar 1	5/29/97	Main Reservoir	332
11825	OR	165	5/18/95	Polar 1	8/27/97	Pump Bay #3	355
11826	OR	172	5/18/95	Polar 1			
11827	OR	205	5/18/95	Polar 1			
11828	OR	218	5/18/95	Polar 1			
11829	OR	218	5/18/95	Polar 1			
11830	OR	222	5/18/95	Polar 1	5/21/97	Main Reservoir	338
11831	OR	216	5/18/95	Polar 1	5/22/96	Main Reservoir	262
11832	OR	232	5/18/95	Polar 1	5/20/97	Main Reservoir	311
11833	OR	205	5/18/95	Polar 1			
11834	OR	243	5/18/95	Polar 1			
11835	OR	204	5/18/95	Polar 1			
11836	OR	175	5/18/95	Polar 1			
11837	OR	200	5/18/95	Polar 1			
11838	OR	212	5/18/95	Polar 1			
11839	OR	218	5/18/95	Polar 1			
11840	OR	210	5/18/95	Polar 1	8/16/96	Fish Bay #7	291
					5/21/97	Main Reservoir	319
11841	OR	225	5/18/95	Polar 1			
11842	OR	206	5/18/95	Polar 1	5/22/96	Main Reservoir	273
11843	OR	177	5/18/95	Polar 1			
6600	OR	219	5/18/95	Polar 2			
6601	OR	221	5/18/95	Polar 2			
6602	OR	182	5/18/95	Polar 2			
6603	OR	222	5/18/95	Polar 2			
6604	OR	215	5/18/95	Polar 2			
6605	OR	208	5/18/95	Polar 2			
6606	OR	232	5/18/95	Polar 2			
6607	OR	217	5/18/95	Polar 2	11/30/95	Polar 2	234
6608	OR	171	5/18/95	Polar 2			
6609	OR	152	5/18/95	Polar 2	8/27/97	Upper LC Bay #5	318
6610	OR	230	5/18/95	Polar 2			
6611	OR	218	5/18/95	Polar 2			
6612	OR	192	5/18/95	Polar 2			
6613	OR	157	5/18/95	Polar 2	5/28/97	Main Reservoir	311
6614	OR	182	5/18/95	Polar 2			

Appendix 3 (continued).

Tag Number	Color	Length (mm)	Date Captured	Site Captured	Recapture Date	Recapture Site	Length (mm)
6615	OR	167	5/18/95	Polar 2	8/8/96	LC Bay #6	244
6616	OR	242	5/18/95	Polar 2	11/30/95	Polar 2	273
6617	OR	235	5/18/95	Polar 2			
6618	OR	194	5/18/95	Polar 2			
6619	OR	184	5/18/95	Polar 2	5/23/96	Main Reservoir	212
6620	OR	226	5/18/95	Polar 2			
6621	OR	192	5/18/95	Polar 2			
6622	OR	170	5/18/95	Polar 2	5/20/97	Main Reservoir	322
6623	OR	183	5/18/95	Polar 2			
6624	OR	181	5/18/95	Polar 2	8/26/97	Solo Bay #1	321
6625	OR	230	5/18/95	Polar 2			
6626	OR	259	5/18/95	Polar 2	11/30/95	Polar 2	260
6627	OR	232	5/18/95	Polar 2	5/21/97	Main Reservoir	352
6628	OR	226	5/18/95	Polar 2			
6629	OR	210	5/18/95	Polar 2			
6630	OR	200	5/18/95	Polar 2			
6631	OR	217	5/18/95	Polar 2			
6632	OR	251	5/18/95	Polar 2	5/22/96	Main Reservoir	285
6633	OR	267	5/18/95	Polar 2			
6634	OR	185	5/18/95	Polar 2	5/21/97	Main Reservoir	345
6635	OR	223	5/18/95	Polar 2			
6636	OR	179	5/18/95	Polar 2			
6637	OR	185	5/18/95	Polar 2			
6638	OR	192	5/18/95	Polar 2	5/20/97	Main Reservoir	311
6639	OR	213	5/18/95	Polar 2			
6640	OR	226	5/18/95	Polar 2			
6641	OR	206	5/18/95	Polar 2			
6642	OR	219	5/18/95	Polar 2			
6643	OR	232	5/18/95	Polar 2			
6644	OR	260	5/18/95	Polar 2			
6645	OR	215	5/18/95	Polar 2	8/27/97	Upper LC Bay #5	330
6646	OR	213	5/18/95	Polar 2	5/21/97	Main Reservoir	360
6647	OR	188	5/18/95	Polar 2			
6648	OR	179	5/18/95	Polar 2	8/26/97	Pump Bay #3	323
6649	OR	201	5/18/95	Polar 2	11/30/95	Polar 2	230
6650	OR	268	5/18/95	Polar 2			
6651	OR	196	5/18/95	Polar 2			
6652	OR	220	5/18/95	Polar 2			
6653	OR	228	5/18/95	Polar 2			
6654	OR	222	5/18/95	Polar 2			
6655	OR	183	5/18/95	Polar 2			
6656	OR	256	5/18/95	Polar 2			
6657	OR	215	5/18/95	Polar 2			
6658	OR	211	5/18/95	Polar 2	9/7/97	Upper LC Bay #5	350

Appendix 3 (continued).

Tag Number	Color	Length (mm)	Date Captured	Site Captured	Recapture Date	Recapture Site	Length (mm)
6659	OR	259	5/18/95	Polar 2			
6660	OR	242	5/18/95	Polar 2	5/23/96	Main Reservoir	271
6661	OR	239	5/18/95	Polar 2			
6662	OR	204	5/18/95	Polar 2	5/21/97	Main Reservoir	385
6663	OR	242	5/18/95	Polar 2			
6664	OR	236	5/18/95	Polar 2	11/30/95	Polar 2	288
6665	OR	210	5/18/95	Polar 2	5/22/96	Main Reservoir	245
6666	OR	224	5/18/95	Polar 2	11/30/95	Polar 2	247
6667	OR	227	5/18/95	Polar 2			
6668	OR	254	5/18/95	Polar 2			
6669	OR	256	5/18/95	Polar 2			
6670	OR	217	5/18/95	Polar 2			
6671	OR	244	5/18/95	Polar 2			
6672	OR	243	5/18/95	Polar 2			
6673	OR	241	5/18/95	Polar 2			
6674	OR	267	5/18/95	Polar 2	5/20/97	Main Reservoir	446
6700	OR	209	5/18/95	Polar 2			
6701	OR	168	5/18/95	Polar 2			
6702	OR	211	5/18/95	Polar 2	8/8/96	LC Bay #2	272
6703	OR	225	5/18/95	Polar 2			
6704	OR	169	5/18/95	Polar 2			
6705	OR	245	5/18/95	Polar 2			
6706	OR	253	5/18/95	Polar 2			
6707	OR	251	5/18/95	Polar 2			
6708	OR	281	5/18/95	Polar 2	11/30/95	Polar 2	309
6709	OR	224	5/18/95	Polar 2			
6710	OR	201	5/18/95	Polar 2			
6711	OR	287	5/18/95	Polar 2			
6712	OR	203	5/18/95	Polar 2			
6713	OR	234	5/18/95	Polar 2			
6714	OR	170	5/18/95	Polar 2			
6715	OR	195	5/18/95	Polar 2	8/26/97	Fish Bay #7	372
6716	OR	234	5/18/95	Polar 2	5/22/96	Main Reservoir	265
					8/27/97	Pump Bay #3	375
6717	OR	163	5/18/95	Polar 2			
6718	OR	223	5/18/95	Polar 2	5/28/97	Main Reservoir	352
6719	OR	244	5/18/95	Polar 2	11/30/95	Polar 2	280
7730	OR	175	5/20/97	Fish Bay #7			
31200	BL	345	5/20/97	Fish Bay #7			
7731	OR	160	5/20/97	Fish Bay #7			
7732	OR	166	5/20/97	Fish Bay #7			
31201	BL	317	5/20/97	Pump Bay #3			
31202	BL	327	5/20/97	Pump Bay #3			

Appendix 3 (continued).

Tag Number	Color	Length (mm)	Date Captured	Site Captured	Recapture Date	Recapture Site	Length (mm)
31203	BL	318	5/20/97	Pump Bay #3			
31204	BL	343	5/20/97	Pump Bay #3			
31205	BL	345	5/20/97	Pump Bay #3	8/26/97	Solo Bay #1	357
31206	BL	304	5/20/97	Pump Bay #3			
31207	BL	309	5/20/97	Upper LC Bay #5			
31208	BL	305	5/20/97	Upper LC Bay #5			
31209	BL	348	5/20/97	Upper LC Bay #5			
31210	BL	355	5/20/97	Upper LC Bay #5			
31211	BL	343	5/20/97	Upper LC Bay #5			
31212	BL	361	5/20/97	Upper LC Bay #5			
31213	BL	336	5/20/97	Polar #1, #2			
31214	BL	319	5/20/97	Polar #1, #2			
31215	BL	447	5/20/97	Solo Bay #1			
31216	BL	349	5/20/97	Solo Bay #1			
31217	BL	358	5/20/97	Solo Bay #1			
31218	BL	303	5/20/97	Solo Bay #1			
31219	BL	355	5/20/97	Solo Bay #1			
31220	BL	496	5/20/97	Solo Bay #1			
31221	BL	348	5/20/97	Solo Bay #1			
31222	BL	365	5/20/97	Solo Bay #1			
31223	BL	321	5/20/97	Solo Bay #1			
31224	BL	360	5/20/97	Solo Bay #1			
31225	BL	352	5/20/97	Solo Bay #1			
31226	BL	325	5/20/97	Main Reservoir			
31227	BL	337	5/20/97	Main Reservoir			
31228	BL	328	5/20/97	Main Reservoir			
31229	BL	333	5/20/97	Main Reservoir			
31230	BL	335	5/20/97	Main Reservoir			
31231	BL	352	5/20/97	Main Reservoir			
31232	BL	287	5/20/97	Main Reservoir			
31233	BL	340	5/20/97	Main Reservoir			
31234	BL	342	5/20/97	Main Reservoir			
31235	BL	357	5/20/97	Main Reservoir			
31236	BL	313	5/20/97	Main Reservoir	8/26/97	Solo Bay #1	322
31237	BL	308	5/20/97	Main Reservoir			
31238	BL	299	5/20/97	Main Reservoir	9/7/97	Upper LC Bay #5	318
31239	BL	365	5/20/97	Main Reservoir	9/7/97	Solo Bay #1	375
31240	BL	371	5/20/97	Main Reservoir			
31241	BL	341	5/20/97	Main Reservoir			
31242	BL	350	5/20/97	Main Reservoir			
31243	BL	323	5/20/97	Main Reservoir			
31244	BL	300	5/20/97	Main Reservoir			
31245	BL	315	5/20/97	Main Reservoir			
31246	BL	322	5/20/97	Main Reservoir			



Appendix 3 (continued).

Tag Number	Color	Length (mm)	Date Captured	Site Captured	Recapture Date	Recapture Site	Length (mm)
31247	BL	345	5/20/97	Main Reservoir			
31248	BL	306	5/20/97	Main Reservoir			
31249	BL	329	5/20/97	Main Reservoir	9/7/97	Solo Bay #1	336
31250	BL	304	5/20/97	Main Reservoir			
31251	BL	320	5/20/97	Main Reservoir			
31252	BL	373	5/20/97	Main Reservoir			
31253	BL	337	5/20/97	Main Reservoir			
31254	BL	313	5/20/97	Main Reservoir			
31255	BL	355	5/20/97	Main Reservoir			
31256	BL	339	5/20/97	Main Reservoir			
31257	BL	327	5/20/97	Main Reservoir			
31258	BL	348	5/20/97	Main Reservoir			
31259	BL	304	5/20/97	Main Reservoir			
31260	BL	351	5/20/97	Main Reservoir			
31261	BL	605	5/20/97	Main Reservoir			
31262	BL	332	5/20/97	Main Reservoir			
31263	BL	331	5/20/97	Main Reservoir			
31264	BL	334	5/20/97	Main Reservoir			
31265	BL	350	5/20/97	Main Reservoir			
31266	BL	336	5/20/97	Main Reservoir	8/26/97	Upper LC Bay #5	345
31267	BL	325	5/20/97	Main Reservoir			
31268	BL	325	5/20/97	Main Reservoir			
31269	BL	293	5/20/97	Main Reservoir			
7733	OR	145	5/21/97	Fish Bay #7			
7734	OR	145	5/21/97	Fish Bay #7			
7735	OR	181	5/21/97	Fish Bay #7			
7736	OR	172	5/21/97	Fish Bay #7			
31270	BL	328	5/21/97	Pump Bay #3			
31271	BL	362	5/21/97	Pump Bay #3			
31272	BL	312	5/21/97	Pump Bay #3			
31273	BL	340	5/21/97	Pump Bay #3	9/7/97	LC Bay #2	371
31274	BL	322	5/21/97	Pump Bay #3			
31275	BL	339	5/21/97	Pump Bay #3			
31276	BL	310	5/21/97	Pump Bay #3			
31277	BL	379	5/21/97	Upper LC Bay #5	8/26/97	Fish Bay #7	408
31278	BL	377	5/21/97	Upper LC Bay #5			
31279	BL	291	5/21/97	Upper LC Bay #5			
31280	BL	301	5/21/97	Polar #1, #2			
31281	BL	324	5/21/97	Solo Bay #1			
31282	BL	316	5/21/97	Solo Bay #1			
31283	BL	381	5/21/97	Solo Bay #1			
31284	BL	338	5/21/97	Solo Bay #1			
31285	BL	570	5/21/97	Main Reservoir			

Appendix 3 (continued).

Tag Number	Color	Length (mm)	Date Captured	Site Captured	Recapture Date	Recapture Site	Length (mm)
31286	BL	448	5/21/97	Main Reservoir			
31287	BL	328	5/21/97	Main Reservoir			
31288	BL	339	5/21/97	Main Reservoir			
31289	BL	464	5/21/97	Main Reservoir			
31290	BL	311	5/21/97	Main Reservoir			
31291	BL	307	5/21/97	Main Reservoir	9/7/97	LC Bay #2	311
31292	BL	328	5/21/97	Main Reservoir			
31293	BL	337	5/21/97	Main Reservoir	8/27/97	Pump Bay #3	309
31294	BL	358	5/21/97	Main Reservoir			
31295	BL	385	5/21/97	Main Reservoir			
31296	BL	357	5/21/97	Main Reservoir			
31297	BL	314	5/21/97	Main Reservoir			
31298	BL	316	5/21/97	Main Reservoir			
31299	BL	337	5/21/97	Main Reservoir			
31300	BL	318	5/21/97	Main Reservoir			
31301	BL	308	5/21/97	Main Reservoir			
31302	BL	322	5/21/97	Main Reservoir			
31303	BL	300	5/21/97	Main Reservoir			
31304	BL	329	5/21/97	Main Reservoir			
31305	BL	323	5/21/97	Main Reservoir			
31306	BL	371	5/21/97	Main Reservoir			
31307	BL	328	5/21/97	Main Reservoir	8/26/97	LC Bay #2	337
31308	BL	323	5/21/97	LC Bay #2			
31309	BL	372	5/21/97	LC Bay #2			
31310	BL	345	5/21/97	LC Bay #2			
31311	BL	334	5/21/97	LC Bay #2	8/26/97	Solo Bay #1	345
31312	BL	320	5/21/97	LC Bay #2			
31313	BL	402	5/21/97	LC Bay #2			
31314	BL	452	5/21/97	LC Bay #2			
31315	BL	424	5/21/97	LC Bay #2			
31316	BL	376	5/21/97	LC Bay #2			
31317	BL	299	5/21/97	LC Bay #2			
31318	BL	327	5/21/97	LC Bay #2			
31319	BL	311	5/21/97	LC Bay #2			
31320	BL	396	5/21/97	Main Reservoir			
31321	BL	337	5/21/97	Main Reservoir			
31322	BL	345	5/21/97	Main Reservoir			
31323	BL	324	5/21/97	Main Reservoir			
31324	BL	357	5/21/97	Main Reservoir			
31325	BL	335	5/21/97	Main Reservoir			
31326	BL	381	5/21/97	Main Reservoir			
31327	BL	343	5/21/97	Main Reservoir			
31328	BL	352	5/21/97	Main Reservoir			
31329	BL	341	5/21/97	Main Reservoir			

Appendix 3 (continued).

Tag Number	Color	Length (mm)	Date Captured	Site Captured	Recapture Date	Recapture Site	Length (mm)
31330	BL	343	5/21/97	Main Reservoir			
31331	BL	304	5/21/97	Main Reservoir			
31332	BL	308	5/21/97	Main Reservoir			
31333	BL	352	5/21/97	Main Reservoir			
31334	BL	309	5/21/97	Main Reservoir			
31335	BL	324	5/21/97	Main Reservoir			
31336	BL	330	5/21/97	Main Reservoir			
31337	BL	353	5/21/97	Main Reservoir			
31338	BL	337	5/21/97	Main Reservoir			
31339	BL	320	5/21/97	Main Reservoir			
31340	BL	317	5/21/97	Main Reservoir			
31341	BL	315	5/21/97	Main Reservoir			
31342	BL	435	5/21/97	Main Reservoir			
31343	BL	323	5/21/97	Main Reservoir			
31344	BL	347	5/21/97	Main Reservoir			
31345	BL	328	5/21/97	Main Reservoir			
31346	BL	337	5/21/97	Main Reservoir	8/26/97	LC Bay #2	382
31347	BL	302	5/21/97	Main Reservoir			
31348	BL	321	5/21/97	Main Reservoir	9/7/97	Fish Bay #7	335
31349	BL	316	5/21/97	Main Reservoir			
31350	BL	340	5/21/97	Main Reservoir			
31351	BL	327	5/21/97	Main Reservoir			
31352	BL	324	5/21/97	Main Reservoir			
31353	BL	304	5/21/97	Main Reservoir			
31354	BL	307	5/21/97	Main Reservoir			
31355	BL	343	5/21/97	Main Reservoir			
31356	BL	368	5/21/97	Main Reservoir	5/28/97	Polar #1, #2	368
31357	BL	366	5/21/97	Main Reservoir			
7737	OR	172	5/21/97	Solo Bay #1			
7738	OR	181	5/21/97	Solo Bay #1			
7739	OR	179	5/21/97	Solo Bay #1			
7740	OR	170	5/21/97	Solo Bay #1			
7741	OR	164	5/21/97	Solo Bay #1			
7742	OR	169	5/21/97	Solo Bay #1			
7743	OR	162	5/21/97	Solo Bay #1			
7744	OR	146	5/21/97	Solo Bay #1			
7745	OR	173	5/21/97	Solo Bay #1			
31358	BL	325	5/28/97	Pump Bay #3	9/7/97	Upper LC Bay #5	360
7746	OR	170	5/28/97	Pump Bay #3			
7747	OR	165	5/28/97	Upper LC Bay #7			
31359	BL	348	5/28/97	Upper LC Bay #7	9/7/97	Upper LC Bay #5	379
31360	BL	312	5/28/97	Polar #1, #2			
31361	BL	318	5/28/97	Polar #1, #2			

Appendix 3 (continued).

Tag Number	Color	Length (mm)	Date Captured	Site Captured	Recapture Date	Recapture Site	Length (mm)
31362	BL	346	5/28/97	Polar #1, #2			
31363	BL	304	5/28/97	Polar #1, #2			
31364	BL	334	5/28/97	Polar #1, #2			
31365	BL	305	5/28/97	Polar #1, #2			
31366	BL	311	5/28/97	Polar #1, #2			
31367	BL	333	5/28/97	Polar #1, #2			
31368	BL	304	5/28/97	Polar #1, #2			
31369	BL	334	5/28/97	Main Reservoir			
31370	BL	335	5/28/97	Main Reservoir			
31371	BL	337	5/28/97	Main Reservoir			
31372	BL	338	5/28/97	Main Reservoir			
31373	BL	397	5/28/97	Main Reservoir			
31374	BL	328	5/28/97	Main Reservoir			
31375	BL	351	5/28/97	Main Reservoir			
31376	BL	315	5/28/97	Main Reservoir			
31377	BL	307	5/28/97	Main Reservoir			
31378	BL	334	5/28/97	LC Bay #2			
31379	BL	331	5/28/97	LC Bay #2			
31380	BL	437	5/28/97	Main Reservoir			
31381	BL	321	5/28/97	Main Reservoir			
31382	BL	347	5/28/97	Main Reservoir			
31383	BL	343	5/28/97	Main Reservoir			
31384	BL	327	5/28/97	Main Reservoir			
31385	BL	327	5/28/97	Main Reservoir			
31386	BL	329	5/28/97	Main Reservoir			
31387	BL	310	5/28/97	Main Reservoir			
31388	BL	386	5/28/97	Main Reservoir			
31389	BL	329	5/28/97	Main Reservoir			
31390	BL	322	5/28/97	Main Reservoir			
31391	BL	336	5/28/97	Main Reservoir			
31392	BL	347	5/28/97	Main Reservoir			
31393	BL	492	5/28/97	Main Reservoir			
31394	BL	339	5/28/97	Main Reservoir	9/7/97	Upper LC Bay #5	372
31395	BL	340	5/28/97	Main Reservoir			
31396	BL	350	5/28/97	Main Reservoir			
31397	BL	301	5/28/97	Main Reservoir			
31398	BL	612	5/28/97	Main Reservoir			
31399	BL	383	5/28/97	Main Reservoir			
31400	BL	550	5/28/97	Main Reservoir			
31401	BL	317	5/28/97	Main Reservoir			
31402	BL	329	5/28/97	Main Reservoir			
31403	BL	361	5/28/97	Main Reservoir			
31404	BL	331	5/28/97	Main Reservoir			
31405	BL	297	5/28/97	Main Reservoir			

Appendix 3 (continued).

Tag Number	Color	Length (mm)	Date Captured	Site Captured	Recapture Date	Recapture Site	Length (mm)
31406	BL	340	5/28/97	Main Reservoir			
31407	BL	323	5/28/97	Main Reservoir			
31408	BL	352	5/28/97	Main Reservoir			
31409	BL	350	5/28/97	Solo Bay #1			
31410	BL	341	5/28/97	Solo Bay #1			
31411	BL	351	5/28/97	Solo Bay #1			
31412	BL	328	5/28/97	Solo Bay #1			
31413	BL	510	5/28/97	Solo Bay #1			
31414	BL	370	5/28/97	Solo Bay #1	8/26/97	LC Bay #2	376
31415	BL	377	5/28/97	Solo Bay #1			
31416	BL	314	5/28/97	Solo Bay #1			
31417	BL	353	5/28/97	Solo Bay #1			
31418	BL	273	5/29/97	Solo Bay #1			
31419	BL	364	5/29/97	Pump Bay #3	9/7/97	Fish Bay #7	400
7748	OR	162	5/29/97	Pump Bay #3			
31420	BL	322	5/29/97	Pump Bay #3			
31421	BL	427	5/29/97	Pump Bay #3			
31422	BL	307	5/29/97	Pump Bay #3			
31423	BL	346	5/29/97	Pump Bay #3			
7749	OR	166	5/29/97	Pump Bay #3			
7750	OR	195	5/29/97	Upper LC Bay #5			
31424	BL	323	5/29/97	Polar #1, #2			
31425	BL	308	5/29/97	Polar #1, #2			
31426	BL	335	5/29/97	Polar #1, #2			
31427	BL	327	5/29/97	Polar #1, #2			
7751	OR	193	5/29/97	Polar #1, #2			
31428	BL	312	5/29/97	Polar #1, #2			
31429	BL	313	5/29/97	Polar #1, #2			
31430	BL	305	5/29/97	Polar #1, #2			
31431	BL	327	5/29/97	Polar #1, #2			
31432	BL	332	5/29/97	Polar #1, #2			
31433	BL	321	5/29/97	Polar #1, #2			
31434	BL	325	5/29/97	Polar #1, #2			
31435	BL	343	5/29/97	Polar #1, #2			
31436	BL	365	5/29/97	Polar #1, #2			
31437	BL	327	5/29/97	Polar #1, #2			
31438	BL	293	5/29/97	Solo Bay #1			
31439	BL	312	5/29/97	Solo Bay #1			
31440	BL	357	5/29/97	Solo Bay #1			
31441	BL	295	5/29/97	Solo Bay #1			
31442	BL	364	5/29/97	Solo Bay #1	9/7/97	Pump Bay #3	388
31443	BL	321	5/29/97	Solo Bay #1			
31444	BL	378	5/29/97	Solo Bay #1			

Appendix 3 (continued).

Tag Number	Color	Length (mm)	Date Captured	Site Captured	Recapture Date	Recapture Site	Length (mm)
31445	BL	355	5/29/97	LC Bay #2			
31446	BL	387	5/29/97	LC Bay #2	8/26/97	Upper LC Bay #5	388
31447	BL	337	5/29/97	LC Bay #2			
31448	BL	324	5/29/97	LC Bay #2			
31449	BL	326	5/29/97	LC Bay #2			
31450	BL	336	5/29/97	LC Bay #2			
31451	BL	352	5/29/97	Main Reservoir			
31452	BL	332	5/29/97	Main Reservoir			
31453	BL	294	5/29/97	Main Reservoir			
31454	BL	290	5/29/97	Main Reservoir			
31455	BL	315	5/29/97	Main Reservoir			
31456	BL	487	5/29/97	Main Reservoir			
31457	BL	339	5/29/97	Main Reservoir			
31458	BL	314	5/29/97	Main Reservoir			
31459	BL	320	5/29/97	Main Reservoir			
31460	BL	352	5/29/97	Main Reservoir			
31461	BL	307	5/29/97	Main Reservoir			
31462	BL	318	5/29/97	Main Reservoir			
7777	OR	172	9/7/97	Upper LC Bay #5			
7779	OR	223	9/7/97	Upper LC Bay #5			
7780	OR	344	9/7/97	Upper LC Bay #5			
7781	OR	344	9/7/97	Upper LC Bay #5			
7783	OR	352	9/7/97	Upper LC Bay #5			
7784	OR	352	9/7/97	Upper LC Bay #5			
7785	OR	338	9/7/97	Upper LC Bay #5			
7786	OR	335	9/7/97	Upper LC Bay #5			
7787	OR	438	9/7/97	Upper LC Bay #5			
7788	OR	334	9/7/97	Upper LC Bay #5			
7789	OR	384	9/7/97	Upper LC Bay #5			
7790	OR	225	9/7/97	LC Bay #2			
7793	OR	205	9/7/97	LC Bay #2			
7794	OR	237	9/7/97	LC Bay #2			
7796	OR	350	9/7/97	LC Bay #2			
7797	OR	258	9/7/97	LC Bay #2			
7798	OR	217	9/7/97	Fish Bay #7			
7799	OR	233	9/7/97	Fish Bay #7			
7791	OR	355	9/7/97	Fish Bay #7			
7782	OR	371	9/7/97	Fish Bay #7			
7776	OR	187	9/7/97	Fish Bay #7			
7775	OR	224	9/7/97	Fish Bay #7			
7875	OR	184	9/7/97	Fish Bay #7			
7876	OR	349	9/7/97	Fish Bay #7			
7877	OR	241	9/7/97	Fish Bay #7			

Appendix 3 (continued).

Tag Number	Color	Length (mm)	Date Captured	Site Captured	Recapture Date	Recapture Site	Length (mm)
7878	OR	233	9/7/97	Fish Bay #7			
7879	OR	346	9/7/97	Fish Bay #7			
7880	OR	369	9/7/97	Fish Bay #7			
7882	OR	186	9/7/97	Fish Bay #7			
7883	OR	189	9/7/97	Fish Bay #7			
7884	OR	304	9/7/97	Fish Bay #7			
7885	OR	217	9/7/97	Fish Bay #7			
7886	OR	334	9/7/97	Fish Bay #7			
7887	OR	362	9/7/97	Fish Bay #7			
7888	OR	329	9/7/97	Fish Bay #7			
7889	OR	212	9/7/97	Fish Bay #7			
7890	OR	340	9/7/97	Fish Bay #7			
7891	OR	314	9/7/97	Fish Bay #7			
7892	OR	363	9/7/97	Fish Bay #7			
7893	OR	225	9/7/97	Fish Bay #7			
7894	OR	311	9/7/97	Fish Bay #7			
7895	OR	191	9/7/97	Fish Bay #7			
7897	OR	230	9/7/97	Pump Bay #3			
7898	OR	243	9/7/97	Pump Bay #3			
7899	OR	225	9/7/97	Pump Bay #3			
7778	OR	347	9/7/97	Pump Bay #3			
7792	OR	192	9/7/97	Pump Bay #3			
7795	OR	341	9/7/97	Pump Bay #3			
7800	OR	325	9/7/97	Pump Bay #3			
7801	OR	366	9/7/97	Pump Bay #3			
7802	OR	397	9/7/97	Pump Bay #3			
7803	OR	219	9/7/97	Pump Bay #3			
7804	OR	348	9/7/97	Pump Bay #3			
7805	OR	423	9/7/97	Pump Bay #3			
7806	OR	395	9/7/97	Pump Bay #3			
7807	OR	284	9/7/97	Pump Bay #3			
7809	OR	215	9/7/97	Pump Bay #3			
7810	OR	215	9/7/97	Pump Bay #3			
7811	OR	211	9/7/97	Pump Bay #3			
7814	OR	226	9/7/97	Pump Bay #3			
7816	OR	227	9/7/97	Pump Bay #3			
7817	OR	352	9/7/97	Pump Bay #3			
7818	OR	224	9/7/97	Pump Bay #3			
7819	OR	198	9/7/97	Pump Bay #3			
7820	OR	353	9/7/97	Pump Bay #3			
7821	OR	346	9/7/97	Pump Bay #3			
7822	OR	246	9/7/97	Pump Bay #3			
7823	OR	203	9/7/97	Pump Bay #3			
7824	OR	205	9/7/97	Pump Bay #3			

Appendix 3 (concluded).

Tag Number	Color	Length (mm)	Date Captured	Site Captured	Recapture Date	Recapture Site	Length (mm)
7808	OR	203	9/7/97	Pump Bay #3			
7812	OR	333	9/7/97	Pump Bay #3			
7813	OR	236	9/7/97	Pump Bay #3			
7830	OR	384	9/7/97	Solo Bay #1			
7815	OR	190	9/7/97	Solo Bay #1			
7825	OR	300	9/7/97	Solo Bay #1			
7826	OR	220	9/7/97	Solo Bay #1			
7827	OR	359	9/7/97	Solo Bay #1			
7828	OR	380	9/7/97	Solo Bay #1			
7829	OR	239	9/7/97	Solo Bay #1			
7831	OR	173	9/7/97	Solo Bay #1			