LOWER MOKELUMNE RIVER FISHERIES MONITORING PROGRAM 1999–2000

Administered by:

East Bay Municipal Utility District
Fisheries and Wildlife Division
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Lodi, California 95240

A Technical Report on

Downstream Migration Monitoring at Woodbridge Dam
During December 1999 through July 2000

November 2000

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EXECUTIVE SUMMARY

The objective of the East Bay Municipal Utility District's Lower Mokelumne River Fisheries Monitoring Program (monitoring program) is collection of information on the ecology and management of anadromous salmonids and other fishes inhabiting the lower Mokelumne River. This report provides summary data for fishes captured, assessments of the downstream migration of juvenile fall-run chinook salmon (*Oncorhynchus tshawytscha*) and steelhead (*O. mykiss*), and numbers of wild fall-run chinook salmon coded-wire tagged at Woodbridge Dam during 1999-2000.

Two rotary screw traps were fished between December 15, 1999 and July 31, 2000 at Woodbridge Dam. River flows at Woodbridge Dam were about 300 cfs from December 1999 through January 2000. Flood control releases increased flows to a peak of about 2,400 cfs during February followed by a gradual decline to about 300 to 500 cfs by April. Flows remained at these levels until the end of the season. Daily water temperatures at Woodbridge Dam through the rearing and emigration season varied from 9°C early in the year to 18°C in June and July.

Juvenile chinook salmon were the most abundant species captured followed, in order of abundance, by juvenile Pacific lampreys, prickly sculpin, and spotted bass. Young-of-the-year fall-run chinook salmon emigration pattern was bimodal with a distinct peak for fry in February and an extended emigration of smolts from April through June. Fry numbers diminished by mid-March. Most fry passing Woodbridge Dam were recently "buttoned-up" (with fully absorbed yolk-sac). The estimated abundance of naturally produced chinook salmon (fry and smolts) was estimated at 168,525 (95% C.I. : 133,823-235,713). Approximately 64% emigrated as fry and 36% as fingerling smolts. Of 939 steelhead smolts (age 1+) captured from December 1999 through July 2000, 95% were adipose fin clipped. Over 93% of smolt-sized steelhead were captured within one month of the MRFI steelhead smolt release made in December. One hundred twenty-five YOY steelhead were captured from March to July, mostly from April to July. An abundance estimate for YOY steelhead migrating from April to July was approximated at 1,091 (95% C.I.: 825-1,753).

No distinct associations were observed between the abundance of juvenile salmon emigrants and the range of river flows and water temperatures experienced in 2000. Peak catches of fry were associated with storms and increased turbidity. Fry were most abundant in late-January/early-February. These fry were mostly newly emerged based on typical incubation times at temperatures prevailing during the preceding months. Fingerling salmon smolts were observed after mid-March as in past years. Smolts were abundant from late April through June, with peaks each month during waxing and waning moon phases. During the peak migration period, salmon smolts migrated mostly during the night. Little flow variation occurred during the smolt emigration and no other specific conditions appeared to be associated with the patterns of migration.

From January 25 to July 23, 2000, 12,276 naturally produced chinook salmon were captured, coded-wire tagged, and released at Woodbridge Dam. Approximately 6,000 of these were tagged and released as fry or parr and 6,300 as smolts.

I. OBJECTIVES

This report addresses two objectives of East Bay Municipal Utility District's (EBMUD) 1999–2000 Lower Mokelumne River Fisheries Monitoring Program:

- Monitor abundance and emigration timing of juvenile fall-run chinook salmon (*Oncorhynchus tshawytscha*), steelhead (*O. mykiss*), and other fish species within the lower Mokelumne River.

- Coded-wire tag wild chinook salmon fry and smolts migrating past Woodbridge Dam.

These objectives are integral to the ongoing collection of information on the ecology and management of anadromous salmonids in the lower Mokelumne River (Figure 1). Specific tasks performed in support of these program objectives during 1999-2000 were:

- Monitor the daily abundance and downstream migration patterns of naturally produced juvenile anadromous salmonids passing the Woodbridge Irrigation District Dam (WIDD).

- Monitor size and condition of emigrating juvenile anadromous salmonids and determine the proportions of juvenile salmon emigrating as fry and as smolts.

- Evaluate juvenile anadromous salmonid emigration patterns related to environmental factors (i.e., stream flow, water temperature, lunar phase, precipitation, water turbidity, and time of day).

- Coded-wire tag (CWT) naturally produced chinook salmon smolts for ongoing assessments of population-level responses to management actions and fishery recruitment of the Mokelumne River fall-run chinook salmon stock.

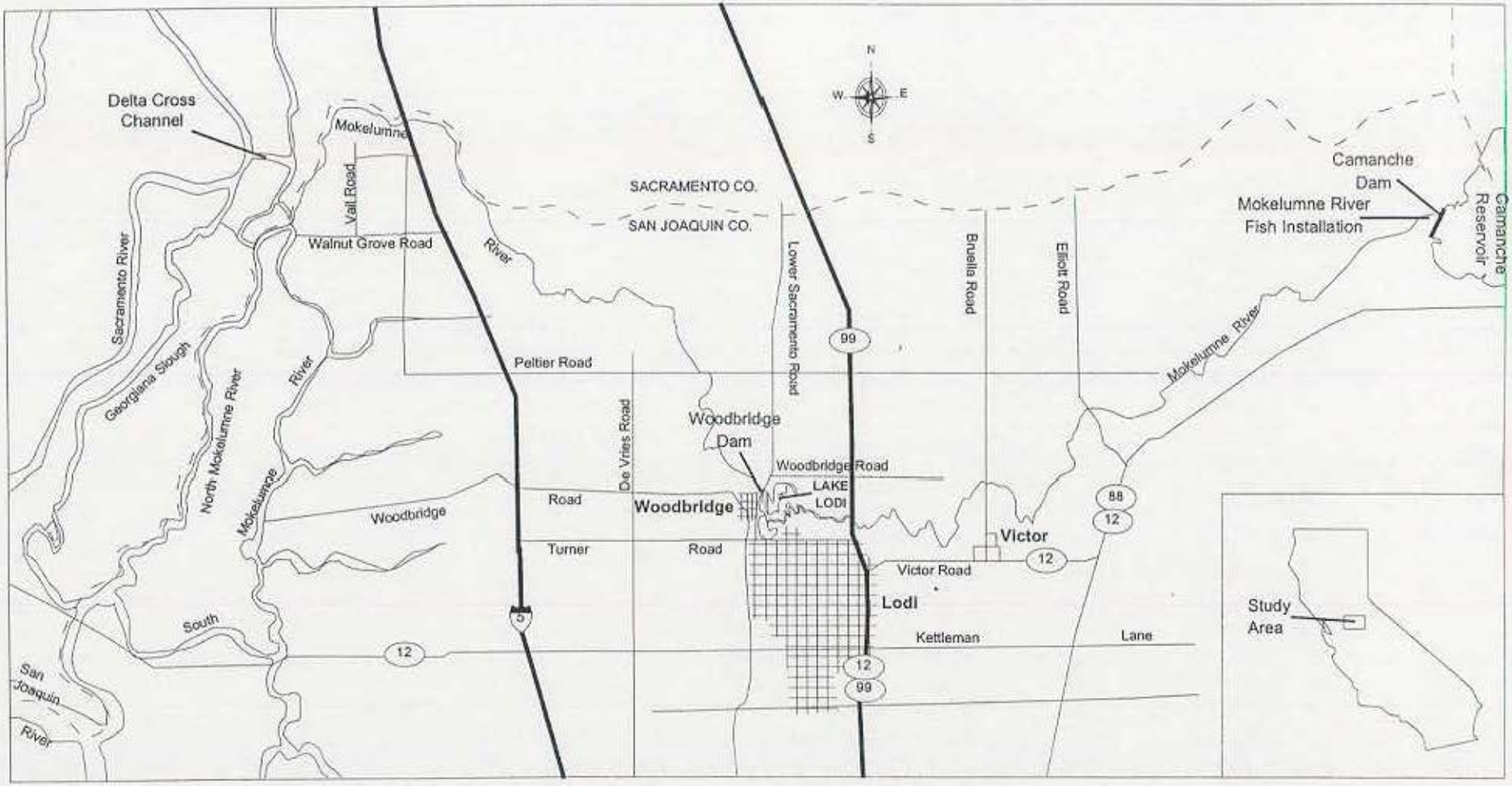

Figure 1. The Mokelumne River from Camanche Dam to its confluence with the San Joaquin River.

II. METHODS

2.1 Downstream Migrant Trapping at Woodbridge Dam

2.1.1 Rotary Screw Fish Traps

Woodbridge Dam has been used as a trapping site for downstream migrant salmonids since inception of EBMUD's Mokelumne River Fisheries Monitoring Program in 1990. This site, about midway between the Delta and Camanche Dam, is downstream of the principal spawning grounds (J. Setka, EBMUD, personal communication). During December 15, 1999 until July 31, 2000, two 2.4-m-diameter rotary screw fish traps were fished in tandem immediately downstream from Woodbridge Dam (Figure 2). The two traps were rigidly connected side by side. The trap suspension and operation system at Woodbridge Dam was similar to that described by Vogel and Marine (1994). When feasible, traps were positioned where the trapping cone rotation could be maintained at a minimum of 4 revolutions per minute. This rotation rate (0.4 m per second) is near the highest sustainable swimming speed of juvenile salmonids (Brett 1975).

2.1.2 Fish Handling and Measurements

The fish traps were tended at least twice daily. This was generally done early in the morning and late in the afternoon. During periods of high riverine debris loads and/or large catches of fish, the traps were attended more frequently throughout the day. Fish captured were transferred from the trap live boxes with dip nets to 20-liter (L) buckets filled with fresh river water. To facilitate longer holding times, buckets would be supplied aeration by an electric air pump through airstones, or fish were held in cylindrical 25 L-PVC (30 cm diameter, 40 cm long with soft nylon 2-mm Delta mesh covered ends) live cars placed in the river. Water temperatures were maintained during fish processing by partially immersing holding buckets or live cars in a 100-L fiberglass flow-through holding tank with a flow rate of about 30-L per minute. Fish were sedated in aerated river water with 30 to 50 mg/L of tricaine methane sulfonate[1] buffered *w/w* with sodium bicarbonate, Pro-PolyAqua[2], and 5‰ saline. This formulation was selected for protection against handling stresses and rapid and short-term induction of a moderate level of sedation for most of the species captured (Summerfelt and Smith 1990). All fish were identified to species (when possible) and enumerated.

Up to 60 of each salmonid species captured during each trapping period were randomly sampled for measurements of total length (TL) and fork length (FL) in millimeters (mm) and weighed in grams (g) on an Ohaus CT1200 portable balance. Weighing was done in tared beakers of fresh water set on the balance pan. Individual sedated fish were gently blotted on a moist sponge to remove excess water before weighing to ensure measurement of true wet weight. These

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[1]"Finquel" formulation, sold by Argent Chemical Laboratories, Redmond, Washington.

[2]"Pro-PolyAqua" is a proprietary stress reducing formulation manufactured by Novalek/AquaVet, Inc., Hayward, California

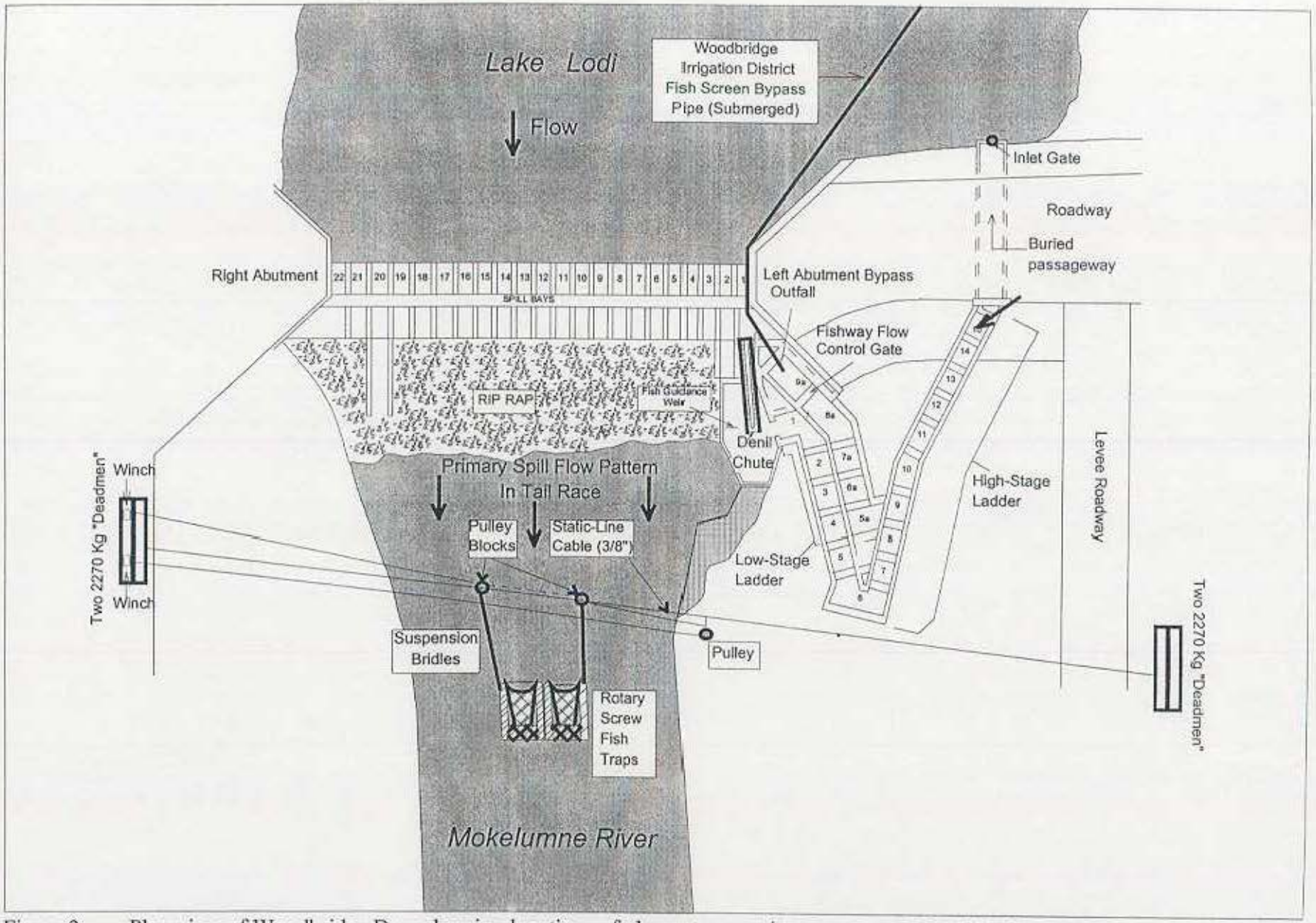

Figure 2. Plan view of Woodbridge Dam showing locations of downstream migrant traps employed during 1999.

measurements were recorded along with observations of external disease and injury. All adipose fin-clipped salmon (indicating CWT implants) and salmon otherwise marked that were observed among the fish counted or measured were recorded. After counting and measuring, fish were gently placed in a 20-L bucket of fresh, aerated river water or in a live car placed in the flow-through tank to recover from sedation before being released downstream of the traps. Total processing time for individual fish from sedation and measurement to recovery and release was generally 15 to 30 minutes. Additionally, prior to release, some coded-wire tagged fry and parr were held to receive an external photonic[3] color mark for recogition as part of another study.

Surface water temperature was measured with a mercury-filled thermometer, water clarity was measured with a secchi disk, and turbidity samples were collected at the trapping site each time traps were attended. Any other relevant biological or environmental conditions potentially affecting trap performance or fish behavior (*e.g.*, incidence of predators, incidence of poaching, debris loads in traps, changes in river flow, or spill configurations at Woodbridge Dam) were recorded on data sheets when observed.

2.1.3 Trap Maintenance and Debris Management

Trap inspection occured generally twice each day. Increased trap inspection frequencies were required during the stormy winter season and during increases in discharges from Camanche Dam or adjustment of flashboards in Woodbridge Dam. Tree limbs, floating lumber, and other debris larger than about 40 cm long and 10 cm in diameter entrained into a screw trap usually stopped rotation of the trap. Discarded monofilament fishing line was also a periodic problem especially during episodes of illegal fishing in the vicinity of the dam and traps during the spring and summer months. All debris and fishing line were cleared from the trap at least twice daily and up to four times daily during heavy accumulations.

Algal growth on the perforated rotating cone of the traps was removed by brushing all surfaces as often as twice daily. This algal growth occurred predominantly during the late spring and summer months.

Seals between the interior of the live boxes and the moving parts of the traps were inspected regularly to ensure proper fit and sealing. A vegetable oil-based lubricant was periodically applied to nylon bushings that bear the rotating axle shaft of the trap.

2.1.4 Trap Calibrations for Abundance Estimates

Fish capture efficiency of the rotary screw trap system was measured at twenty-eight intervals during the monitoring period to encompass the range of changes in fish sizes, river stage, turbidity, trap operating conditions and Woodbridge Dam spill conditions. Hatchery-reared

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[3]NEWWEST Technologies, Santa Rosa, California

(Mokelumne River and Feather River origin) were used for 21 of these mark-recapture tests. Hatchery-reared steelhead (from MRFI) were used in seven tests. All test fish were marked with a caudal fin clip or photonic color mark while sedated (*ca.* 70 to 100 mg/L tricaine solution). Caudal fin clips were made by excising a small portion (≤1mm) of the upper or lower lobe of the caudal fin. Photonic marks were applied to either the upper or lower caudal fin lobe using a pneumatic applicator gun[4]. Fish were allowed to recover in 25-L live cars (previously described) placed in a protected refuge in the low-stage fishway for 6 to 24 hours before their release for the tests. If handling or post-marking mortality exceeded more than 2 to 5 %, the test was repeated. A sample of 30 to 50 fish from each release group was measured for FL and examined for mark quality before release.

Paired test releases, one during daylight (1-hour after sunrise to 1-hour before sunset) and one during night time (½-hour after sunset to ½-hour before sunrise), were generally made for each trap efficiency measurement interval. Marked fish were released at the crest of the spill over flashboards on Woodbridge Dam (Figure 2). Fish were liberated on the spill crest's falling portion so that none escaped upstream into Lake Lodi. These release groups were divided into four or five groups of approximately equal sublots and released in relative proportion to the spill across the entire width of the dam. The hydraulic head differential between the upstream and downstream side of the dam ranged from about 0.3 m to 2.5 m. We assumed that the release distance from the trap and the spill configuration of the dam's discharge allowed fish to seek a preferred portion, or natural migration route, or to mix to a homogeneous distribution within the river flow before encountering the traps.

Standard mark-recapture ratios, m/M, where m = number of marked fish recaptured, and M = number of marked fish released, were used as measurements of trapping efficiency (TE).

2.2 Abundance and Timing of Emigration

The numbers of each salmonid species within each age class captured were stratified by day and night and compiled daily. Morning (night) and afternoon (day) trap capture numbers were combined to provide daily totals. Daily counts were compiled into weekly totals for several analyses. Outmigrant young-of-year (YOY) chinook salmon and steelhead abundance estimates were generated from trapping efficiency results. Diurnal (A_d)and nocturnal (A_n)abundances were estimated daily using the day and night trap efficiency rates, respectively, and summed to produce daily total abundances (A_T) as follows:

$$A_d = C_d / TE_d \quad \text{and;} \quad A_n = C_n / TE_n$$

where, C_d and C_n are day and night trap catches, respectively; and, TE_d and TE_n are day and night trap efficiency estimates, respectively.

So, $$A_T = A_d + A_n.$$

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[4]NEWWEST Technologies, Inc., Santa Rosa, California; Colors used: bright green, yellow, purple, blue.

For each day, nocturnal abundance estimates included fish passing during the full darkness and the crepuscular periods (dusk and dawn) of the preceding night; and, diurnal abundance estimates included fish passing during full daylight, generally 1 to 2 hours after sunrise until 1 to 3 hours before sunset.

Confidence intervals for each day and night abundance estimate were generated using the upper and lower 95% confidence limits approximated from a binomial distribution for each trap efficiency used. Ninety-five percent confidence limits for trapping efficiency estimates were computed as,

$$\text{lower 95\% confidence limit for } TE_{(p)},\ (LCL_{(p)}) = TE_{(p)} - 1.96\sqrt{[TE_{(p)}(1-TE_{(p)})/M_{(p)})]};\ \text{and}$$

$$\text{upper 95\% confidence limit for } TE_{(p)},\ (UCL_{(p)}) = TE_{(p)} + 1.96\sqrt{[TE_{(p)}(1-TE_{(p)})/M_{(p)})]},$$

where, $\textit{estimated variance of } TE_{(p)} = [TE_{(p)}(1-TE_{(p)})/M_{(p)})]$;

the subscript p notation refers to a specific diel period, day or night. Therefore, low and high values of the confidence interval for each abundance estimate were computed as,

$$A_{low(p)} = C_{(p)}/UCL_{(p)} \text{ and; } A_{high(p)} = C_{(p)}/LCL_{(p)}, \text{ respectively.}$$

Rotary trap abundance estimates were summed with the numbers of salmon captured in the fishway-installed downstream migrant traps to generate daily abundance estimates for years when these traps were operated.

2.3 Fish Size and Condition

Sizes (FL, TL) and weights of fish were obtained from subsamples of up to 60 per species for salmonids and 15 for non-salmonids each day. Fulton's Condition Factor, given as (100 x weight/TL^3) by Bagenal and Tesch (1978), where weight is in grams and TL is in millimeters, was computed for the salmonids. Daily and weekly averages for FL, TL, weight, and condition factors were computed and analyzed. Salmon fry were classified as those with FL≤50 mm based on a general size criterion for ocean-type chinook salmon throughout their range (Healy 1991). Classification of other juvenile life stages generally followed that provided by CVPIA's Comprehensive Assessment and Monitoring Program draft protocols (USFWS 1997). The parr stage was characterized as salmon between about 50 mm and 70 mm FL with distinctive parr markings and robust body form. Smolt stage salmon were characterized as salmon greater than 50 mm FL with a distinct silvery appearance, faint or indistinct parr markings, easily dislodged scales, and a more slender body form than the parr. Steelhead life stages were similarly characterized as to appearance, but within the following size ranges: FL ≤50 mm for fry,

50 mm<FL≤200 mm for parr, and FL≥150 mm for smolts. Discrimination between parr and smolts within their overlapping size ranges was made using the external morphological characteristics.

Injuries on trapped fish were described, recorded, and compiled daily, as well as the numbers of dead fish found in the traps. Incidents of injury and mortality were examined with regard to effects of predators, debris fouling of the traps, and other conditions that may have contributed to their occurrence.

2.4 Physical Environmental Data

Daily environmental data for the period December 1999 through July 2000 were obtained from the following sources:

- River Flow passing Woodbridge Dam: U.S. Geological Survey (USGS) gauging station (11325500) on the Mokelumne River located downstream of Woodbridge Dam near River Kilometer 60.

- WID's Canal Diversions: USGS gauging station (11325000) located in the canal near the point of diversion at Woodbridge, California.

- Local Watershed Precipitation: National Weather Service field data collection station at Camanche Dam, San Joaquin County, California; and a Campbell Scientific Instruments meteorological datalogger[5] at Woodbridge, California.

- River Temperature at Woodbridge Dam: Ryan Model RTM 2000 thermograph[6] installed in pool No. 6a of the low-stage fishway or pool No.15 of the high-stage fishway and surface temperatures generally measured twice daily, in the morning and in the afternoon, with a mercury-filled thermometer.

- Water Turbidity: Secchi depth visibility measured twice daily in the river channel off downstream end of screw traps, or in Lake Lodi immediately upstream from spillbay 1 at Woodbridge Dam. Turbidity, in nephelometric tubidity units (NTU), was measured using a Hach® turbidimeter on water samples collected twice daily at Woodbridge Dam.

- Lunar Age and Regional Sunrise/Sunset Timing: *1999/2000 Old Farmer's Almanac*, Yankee Publishing Inc., Dublin, New Hampshire.

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[5]Campbell Scientific Instruments, Inc., Logan, Utah

[6]Ryan Instruments Inc., Redmond, Washington

- Sacramento-San Joaquin Delta Water Conditions: U.S. Bureau of Reclamation, Central Valley Operations Coordinating Office, Sacramento, California and California Department of Water Resources, Sacramento, California.

2.5 Coded-Wire Tagging of Wild Juvenile Salmon at Woodbridge Dam Trap Site

Naturally produced juvenile salmon >36 mm FL captured in the traps were coded wire tagged from January 25 through July, 2000. A 3-meter long Wells Cargo® trailer outfitted with two marking stations, each with a NMT[7] Mark IV tagging machine, quality control device (QCD), and recirculating anesthetic bath, and a flow-through fiberglass holding tank supplied with pumped river water was stationed at the trapping site. Fish were tagged with 1 mm (full tag) or ½ mm (half tag) binary CWTs (microtags) injected by the tagging machine into the head cartilage and marked by excision of the adipose fin using Miltex® fine-tipped surgical scissors. Fish were handled, as previously described for fish handling and measurement, with the additional procedures of injecting CWTs, excision of the adipose fin, and passing fish through a QCD or field microtag detector to ensure tag implantation before their placement into a recovery tank of fresh, flowing river water. After recovery, fish were released approximately 100 m to 300 m downstream from the trap.

The quality of tagging and latent mortality associated with handling during tagging were assessed one to three times every month. Approximately, 30 tagged fish were placed in 25 L PVC live cars (previously described) at densities of about 10 fish per live car and held in a protected area of the fishway for 5 to 7 days. The live cars were checked daily for mortalities. At the end of the holding period, all fish were mildly sedated with tricaine (*ca.* 30 to 50 mg/l), examined for quality of the adipose fin clip, and passed through the microtag detector to confirm tag retention. After this procedure, all fish were released as previously described.

2.6 Coded-Wire Tag Summaries and Assessment

Data for wild tagged fish included initial numbers of fish tagged, tag retention, post-tagging mortality, size of fish at time of release, dates of release and release objectives. These data were submitted to the California Department of Fish and Game (CDFG) in their required reporting format during August 2000. These data are required by CDFG for compilation in statewide reports to the Pacific States Marine Fisheries Commission Regional Mark Information System. Tagging data for wild salmon marked as part of Task 2 are presented in this report.

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[7]Northwest Marine Technologies, Shaw Island, Washington.

III. RESULTS AND DISCUSSION

3.1 Fish Abundances Monitored at Woodbridge Dam

3.1.1 Numbers of Fish Trapped

Trapping was conducted from December 15, 1999 until July 31, 2000 at Woodbridge Dam. Appendices A and B provide daily records of traps used, trapping effort, and the numbers of juvenile fall-run chinook salmon and steelhead captured. Table 1 shows the monthly frequencies for thirty-one species captured at Woodbridge Dam. Juvenile chinook salmon were the most abundant species. Pacific lamprey (*Lampetra tridentata*), spotted bass (*Micropterus punctulatus*), and prickly sculpin *(Cottus asper*) were the most abundant non-salmonid species. In general, juveniles of the species captured dominated the catch. But, some adults of the smaller sized species, such as prickly sculpin, golden shiner (*Notemigonus crysoleucas*), and the smaller sunfishes were also frequently captured. Relatively large numbers of age 1+ steelhead were captured during December and January after MRFI made releases downstream of Woodbridge Dam. Few age 1+ steelhead were captured after January. Ninety-five percent of all yearling steelhead captured had clipped adipose fins indicating their hatchery origin. Two adult (FL>40 cm) and two sub-adult (30 cm>FL>40 cm) adipose fin clipped *O. mykiss* were captured in the rotary screw traps. One adult (FL=42 cm) was found dead in December having swallowed a fishing hook, one apparently spawned out adult female (FL=43 cm) was captured in May, and two sub-adult sized fish were captured in January.

Trapping mortality of salmon fry was high (50 to 100%) on several days early in the season. This was attributable to debris accumulations in the traps and fry crushed by large debris rolling in the trap cones (Appendix A). Overall, trapping mortality was typically less than 3% for fry and less than 1% for parr and smolts.

3.1.2 Abundance Estimates for Downstream Migrant Juvenile Salmonids

Abundance estimates for YOY fall-run chinook salmon and steelhead were based on 21 and 7, respectively, trap calibration intervals during the season (Table 2). Nineteen of twenty-three paired day and night trap efficiency tests resulted in significantly different (Chi-square, 1 *df*, $\alpha \leq 0.05$) day versus night trap efficiencies. Traps were more efficient during the day for salmon fry (FL≤50mm) and during the night for salmon smolts (FL>50mm). Trap efficiencies for steelhead also differed between day and night (Chi-square, 1 *df*, $\alpha \leq 0.05$), but not as dramatically, and not in as consistent a pattern as for salmon. Daily abundance estimates were stratified by day and night to perform computations.

Table 1. Numbers of each fish species captured at the Woodbridge Dam trap site from December 15, 1999 through July 31, 2000.

Species	Life Stage	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Total
Chinook Salmon (*Oncorhynchus tshawytscha*)	YOY	35	3,973	4,232	359	537	4,391	1,437	38	15,002
	Age 1+	18	4	5	12	6	4	0	0	49
Rainbow Trout/Steelhead (*Oncorhynchus mykiss*)	YOY	0	0	0	6	21	55	29	14	125
	Age 1+	1	10	5	5	11	5	4	3	44
	Ad-clipped Age 1+	134	714	11	2	0	0	29	5	895
	Adult	1[1]	2[2]	0	0	0	1[3]	0	0	4
Pacific Lamprey (*Lampetra tridentata*)	Juvenile	0	186	3,057	867	35	22	19	10	4,196
	Adult	0	0	60	2	6	1	0	0	69
Sacramento Sucker (*Catostomus occidentalis*)	Juvenile	0	1	2	1	0	0	1	1	6
	Adult	0	1	0	0	0	1	0	0	2
Bluegill (*Lepomis macrochirus*)	Juvenile	1	24	23	11	16	11	4	5	95
	Adult	0	3	0	2	1	1	0	0	7
Largemouth Bass (*Micropterus salmoides*)	Juvenile	0	6	4	2	0	1	0	0	13
	Adult	0	0	1	0	0	0	0	0	1
Striped Bass (*Morone saxatilis*)	Juvenile	0	0	0	0	0	1	7	1	9
	Adult	0	0	0	0	0	0	2	3	5
Spotted Bass (*Micropterus punctulatus*)	Juvenile	0	1	0	0	3	2,776	2,145	125	5,050
Smallmouth Bass (*Micropterus salmoides*)	Juvenile	1	0	0	0	0	0	0	0	1
Warmouth (*Lepomis gulosus*)	Juvenile	0	0	0	0	1	0	0	0	1
	Adult	0	0	0	0	0	0	1	1	2
Redear Sunfish (*Lepomis microlophus*)	Juvenile	0	0	0	1	0	3	1	4	9
	Adult	2	0	0	1	3	3	0	1	9
Green Sunfish (*Lepomis cyanellus*)	Juvenile	0	0	0	0	0	1	1	0	2
	Adult	0	0	0	0	1	1	2	0	4
Prickly Sculpin (*Cottus asper*)	Juvenile	35	58	163	55	23	436	88	15	873
	Adult	13	42	360	114	12	4	2	3	550
Black Crappie (*Pomoxis nigromaculatus*)	Juvenile	1	0	0	1	0	3	0	0	5
	Adult	0	0	1	1	1	4	1	0	8

Table 1. Numbers of each fish species captured at the Woodbridge Dam trap site from December 15, 1999 through July 31, 2000 (continued).

Species	Life Stage	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Total
Channel Catfish (*Ictalurus punctatus*)	Juvenile	0	0	2	1	0	0	0	0	3
White Catfish (*Ameiurus catus*)	Juvenile	0	1	1	0	0	0	0	0	2
	Adult	0	0	0	0	0	0	2	0	2
Brown Bullhead (*Ameiurus nebulosus*)	Juvenile	0	0	1	0	0	0	0	0	1
	Adult	0	0	0	0	0	0	0	0	0
Black Bullhead (*Ameiurus melas*)	Juvenile	0	0	0	1	0	1	0	0	2
	Adult	0	0	0	0	0	1	0	0	1
Goldfish (*Carassius auratus*)	Juvenile	0	0	0	0	0	1	7	2	10
	Adult	0	0	3	0	1	0	0	0	4
Carp (*Cyprinus carpio*)	Juvenile	2	0	0	0	0	0	0	0	2
Golden Shiner (*Notemigonus crysoleucas*)	Juvenile	4	11	4	0	0	1	1	1	22
	Adult	14	63	40	3	1	4	7	3	135
Hitch (*Lavinia exilicauda*)	Juvenile	7	26	7	10	9	7	10	2	78
	Adult	30	15	5	0	2	13	13	0	78
Sacramento Blackfish (*Orthodon microlepidotus*)	Adult	0	0	0	0	0	1	0	0	1
Sacramento Pikeminnow (*Ptychocheilus grandis*)	Juvenile	0	0	0	0	2	13	1	1	17
	Adult	1	0	1	0	2	2	1	0	7
Sacramento Splittail (*Pogonichthys macrolepidotus*)	Adult	0	0	0	0	1	3	0	0	4
American Shad (*Alosa sapidissima*)	Juvenile	0	0	0	0	0	0	0	2	2
	Adult	0	0	0	0	0	0	4	1	5
Threadfin Shad (*Dorosoma petenense*)	Juvenile	0	0	2	0	0	0	0	0	2
	Adult	0	0	0	1	0	0	0	1	2
Inland Silverside (*Menidia beryllina*)	Juvenile	0	0	0	0	0	0	0	121	121
	Adult	6	7	0	0	0	5	0	0	18
Mosquitofish (*Gambusia affinis*)	Adult	0	8	3	5	0	1	0	0	17

Table 1. Numbers of each fish species captured at the Woodbridge Dam trap site from December 15, 1999 through July 31, 2000 (continued).

Species	Life Stage	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Total
Tule Perch (*Hysterocarpus traski*)	Juvenile	1	0	0	0	0	0	0	0	1
	Adult	1	0	0	0	0	0	1	11	13
Unknown Smelt [4] (*Hypomesus sp.*)	Adult	0	0	3	0	0	0	0	0	3

Notes:

[1]Dead adult female (FL=42 cm), ad-clipped, with fishing hook and line embedded in esophagus.

[2]Sub-adults (30 cm<FL<40 cm), ad-clipped.

[3]Moribund, spawned out adult female (FL=43 cm), ad-clipped.

[4]Unknown smelt were either wakasagi (*Hypomesus nipponensis*) or delta smelt (*Hypomesus transpacificus*). Smelt were quickly released without measurement or specific identification to minimize handling stress due to their similar appearance and the threatened species listing status of delta smelt.

$BE $24 =ln(B3)* (B3)

Table 2. Trap efficiency test results for tandem rotary screw traps fished at Woodbridge Dam during December 1999 through July 2000.

Date of Test	Species	Purpose	Numbers of Marked Fish-Day		Numbers of Marked Fish-Night		Chi-Square	Avg. FL.	Trap Efficiency		River Flow	Water Temp.	Turbidity	No. Traps
			Released	Recaptured	Released	Recaptured	day vs. night	(mm)	Day	Night	(cfs)	(deg. C)	(NTU)	
01/27/00	FCS	D/N differential	410	69	405	30	33.5 (p<0.001)	44.0	0.168	0.074	299	11.1	8.11	2
01/31/00	FCS	D/N differential	404	63	403	43	30.3 (p<0.001)	37.0	0.156	0.107	532	10.8	6.51	2
02/03/00	FCS	D/N differential	404	14	404	59	53.9 (p<0.001)	37.7	0.035	0.146	942	11.2	12.00	2
02/11/00	FCS	D/N differential	401	18	398	10	3.8 (p<0.05)	38.3	0.045	0.025	982	10.6	13.45	2
02/23/00	FCS	D/N differential	420	12	404	25	10.0 (p<0.01)	40.1	0.029	0.062	2,100	11.3	16.00	2
03/08/00	FCS	D/N differential	814	38	810	24	7.0 (p<0.05)	40.0	0.047	0.030	2,330	10.9	7.87	2
03/17/00	FCS	D/N differential	870	80	815	37	25.2 (p<0.001)	47.7	0.092	0.045	1,630	11.3	5.35	2
03/25/00	FCS	D/N differential	700	14	237	6	0.8 (NS)	50.1	0.020	0.025	1,230	12.1	4.22	2
04/06/00	FCS	D/N differential	500	66	n/a	n/a	n/a	65.0	0.132	n/a	447	13.7	2.61	2
04/07/00	FCS	D/N differential	n/a	n/a	499	15	n/a	65.8	n/a	0.030	428	13.7	2.58	2
04/21/00	FCS	D/N differential	503	22	490	71	59.3 (p<0.001)	80.3	0.044	0.145	270	15.5	2.64	2
04/24/00	STH	D/N differential	449	59	n/a	n/a	n/a	39.9	0.131	n/a	258	14.8	2.77	2
04/25/00	STH	D/N differential	n/a	n/a	447	68	n/a	38.8	n/a	0.152	258	15.6	2.53	2
05/04/00	FCS	D/N differential	440	62	435	72	53.1 (p<0.001)	82.5	0.141	0.166	442	17.5	2.3	2
05/13/00	FCS	D/N differential	486	87	497	102	98.2 (p<0.001)	89.2	0.179	0.205	450	14.5	2.18	1
05/14/00	STH	D/N differential	411	80	414	80	77.0 (p<0.001)	55.0	0.195	0.193	456	14.5	2.46	1
06/05/00	FCS	D/N differential	264	22	302	12	7.8 (p<0.05)	107.1	0.083	0.040	500	15.3	2.33	1
06/08/00	STH	D/N differential	280	20	303	19	5.6 (p<0.05)	65.9	0.071	0.063	487	15.6	2.78	1
06/13/00	FCS	D/N differential	401	16	168	9	2.2 (NS)	108.2	0.040	0.054	459	16.5	2.23	1
06/19/00	FCS	(N) verification	***	***	395	84	n/a	112.9	n/a	0.213	446	16.4	2.24	1
06/23/00	FCS	D/N differential	304	23	302	16	5.7 (p<0.05)	115.0	0.076	0.053	440	16.8	2.33	1
06/26/00	STH	D/N differential	428	35	428	38	14.3 (p<0.005)	69.8	0.082	0.089	425	16.7	2.64	1
06/30/00	FCS	D/N differential	310	19	319	50	39.3 (p<0.001)	120.3	0.061	0.157	417	16.9	2.28	1
07/08/00	FCS	D/N differential	321	7	327	15	5.0 (p<0.05)	128.7	0.022	0.046	344	16.7	2.24	1
07/12/00	STH	D/N differential	310	15	313	10	2.8 (NS)	80.0	0.048	0.032	325	17.4	2.17	1
07/16/00	FCS	D/N differential	322	8	322	27	17.1 (p<0.001)	131.5	0.025	0.084	308	17.1	2.05	1
07/24/00	FCS	D/N differential	325	20	325	24	7.4 (NS)	130.0	0.062	0.074	266	18.1	2.48	1
07/25/00	STH	D/N differential	308	30	306	36	18.0 (p<0.001)	93.5	0.097	0.118	268	18.2	2.49	1

Notes:

Abbreviations: (D) - Day, (N) - Night, STH - steelhead, FCS - fall-run chinook salmon, p - statistical probability, (NS) - statistical nonsignificance
Recapture period includes two trapping intervals following release (approximately 24h).
Average turbidity, water temperatures, and stream flows at Woodbridge Dam are for the 24h period following the marked fish release.

Average trapping efficiencies for YOY salmon and steelhead were computed for relatively homogeneous time intervals when multiple tests were performed. A time interval was considered homogeneous when river flow, turbidity, spill configuration, fish size, number of traps in service, and observations of predators did not change appreciably. Trap efficiency tests were applied as shown in Table 3. Only one trap could be effectively fished after about May 1, and the ineffective trap cone was removed from the water on May 7. Only one trap fished from May 7 until the end of the season.

Each day's diurnal and nocturnal abundance estimates and associated upper and lower 95% confidence limits were summed to produce daily total estimated juvenile salmonid abundances and approximate 95% confidence limits. The daily diurnal and nocturnal estimates of abundance, associated mean trap efficiencies, and periods of estimation used to compute the overall abundance estimates are provided in Appendices C-1 and C-2. Daily abundance estimates should be considered indices of relative abundance for salmon and steelhead outmigrating past Woodbridge Dam (versus passing the rotary trap location), since all trap efficiencies are determined from marked fish released along the spill and fishway discharge of the dam.

From December 15, 1999 through July 31, 2000, an estimate of 168,525 naturally produced YOY chinook salmon passed the Woodbridge Dam trap site. The approximate 95% confidence limits for this overall abundance estimate ranged from 133,823 to 235,713.

Young-of-year steelhead were observed from March through July; however, numbers of fish were not sufficient and trapping efficiencies for steelhead were not performed until after April 1 to allow for estimates of their abundance. An overall abundance estimate of 1,091, with approximate 95% confidence limits ranging from 825 to 1,753, was determined for YOY steelhead fry/parr migrating past Woodbridge Dam during April through July (Appendix C-2). This estimate does not include an undetermined number of steelhead fry that migrated in March as indicated by six fry captured in that month.

3.2 Timing of the Downstream Migration of Juvenile Salmonids

Juvenile fall-run chinook salmon (BY99) exhibited a bimodal pattern of emigration in the lower Mokelumne River during 2000 (Figures 3 and 4). Large numbers of fry (FL≤50mm) migrated past Woodbridge Dam during late-January and February followed by relatively few fish from March through April. Larger juvenile salmon were observed to start emigrating around mid-March through April. These juvenile salmon were composed almost exclusively of smolts (FL>50mm, very silver in coloration with fading parr markings) suggesting the beginning of a purposeful smolt emigration (Figure 5). This rapid switch from fry to smolt migrants from mid-March to early April has been observed for Mokelumne River fall-run chinook salmon during recent years (Vogel and Marine 1994, 1996, 1998a,b, 1999a,b, 2000).

Abundance estimates indicate that about 64 percent of the BY99 natural production emigrated as fry during early 2000. Larger proportions of fry than smolt emigrants were also observed during 1997 to 1999. Prior to 1997, proportions of outmigrating fry were lower (Vogel and Marine 1999)[8]. The fry migration period, occurring principally during the latter part of January through - mid-March, was comparable to that observed in previous years (Vogel and Marine 1999a,b, 2000). As we have observed in the Mokelumne River, it is common for some proportion of a juvenile chinook salmon population to disperse downstream from the spawning grounds shortly after emergence (Healey 1991, Kjelson *et al.* 1982). Temporally bimodal fry-smolt emigration patterns are characteristic of ocean-type chinook salmon populations, especially in rivers with productive estuaries (Healey 1991). Hydrologic conditions have been observed to have a great influence on the magnitude of the fry emigration in the Sacramento River with a greater proportion of fry emigrating from upstream river reaches during wet winters with high river flows than during drier years (Vogel *et al.* 1988). However, the destiny of these early migrating fry varies among populations, according to Healey (1991); while some migrate directly to estuaries, others may simply relocate to other suitable freshwater habitat along the river's length.

Sampling by The Nature Conservancy along the Cosumnes River has found coded-wire tagged Mokelumne-origin chinook salmon (Keith Whitener, The Nature Conservancy, personal communication with M. Workman, EBMUD)

Yearling-sized chinook salmon were captured and observed at Woodbridge Dam during December 1999 through May 2000, though they were not significantly abundant (Table 1). These fish all appeared to be residualized hatchery reared fall-run chinook salmon that were released in October 1999. Yearling and smolt-sized *O. mykiss* (steelhead/rainbow trout) were not very common at any time except during a one month period following the release of hatchery-reared steelhead smolts at New Hope Landing in December 1999 (Table 1). A second small migration of these fish occurred in June and early July; perhaps, the return downstream migration of residualized smolts that reared after migrating back upriver. YOY *O. mykiss* fry were first captured in low numbers in March (Table 1). The abundance of fry and parr-sized *O. mykiss* increased modestly in May and June 2000 and these fish continued to migrate into July (Figure 5, Appendices B and C-2).

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[8]Downstream migrant trapping has begun on different dates among years. However, since traps were operating by mid-January in most years, and fry are not very abundant until after mid-January in years with early trapping data, we believe comparisons of relative fry abundance between most years can be made with appropriate qualification.

Table 3. Monitoring intervals and 95% confidence limits for trap efficiencies used to estimate abundance of YOY fall-run chinook salmon and steelhead emigrating from the Mokelumne River during December 1999 through July 2000.

Trapping Period	Test Nos. Used	Overall Trapping Efficiencies (95% C.I.)		River Flows (cfs)
		Day	Night	
Chinook Salmon				
12/15/99 - 02/01/00	1, 2	0.162 (0.137-0.187)	0.090 (0.070-0.110)	260 - 795
02/02/00 - 02/15/00	3, 4	0.040 (0.026-0.054)	0.086 (0.067-0.105)	886 - 1,130
02/16/00 - 03/12/00	5, 6	0.041 (0.030-0.052)	0.040 (0.029-0.051)	1,670 -2,320
03/13/00 - 03/22/00	7	0.092 (0.073-0.111)	0.045 (0.031-0.059)	1,450 - 1,860
03/23/00 - 04/03/00	8	0.020 (0.010-0.030)	0.025 (0.005-0.045)	761 - 1,290
04/04/00- 04/30/00	9, 11(n), 14	0.136 (0.115-0.157)	0.102 (0.082-0.122)	249 - 619
05/01/00 - 05/31/00	14, 15	0.161 (0.137-0.185)	0.187 (0.162-0.212)	323 - 496
06/01/00 - 06/14/00	17, 19	0.057 (0.039-0.075)	0.045 (0.026-0.071)	459 - 500
06/15/00 - 07/02/00	20(n), 21, 23	0.068 (0.048-0.088)	0.148 (0.126-0.170)	410 - 432
07/03/00 - 07/17/00	24	0.022 (0.006-0.038)	0.046 (0.023-0.069)	308 - 328
07/18/00 - 07/31/00	26, 27	0.043 (0.027-0.059)	0.079 (0.058-0.100)	150 - 282
Steelhead				
04/01/00 - 04/30/00	12, 13	0.131 (0.100-0.162)	0.152 (0.199-0.185)	247 - 770
05/01/00 - 05/31/00	16	0.195 (0.157-0.223)	0.193 (0.155-0.231)	323 - 483
06/01/00 - 06/14/00	18	0.071 (0.041-0.101)	0.063 (0.036-0.090)	449 - 500
06/15/00 - 07/02/00	22	0.082 (0.056-0.108)	0.089 (0.062-0.116)	419 - 432
07/03/00 - 07/17/00	25	0.048 (0.036-0.060)	0.032 (0.013-0.051)	313 - 360
07/18/00 - 07/31/00	28	0.097 (0.064-0.130)	0.118 (0.082-0.154)	157 - 282
(n) - night only values used; (d) - day only values used.				

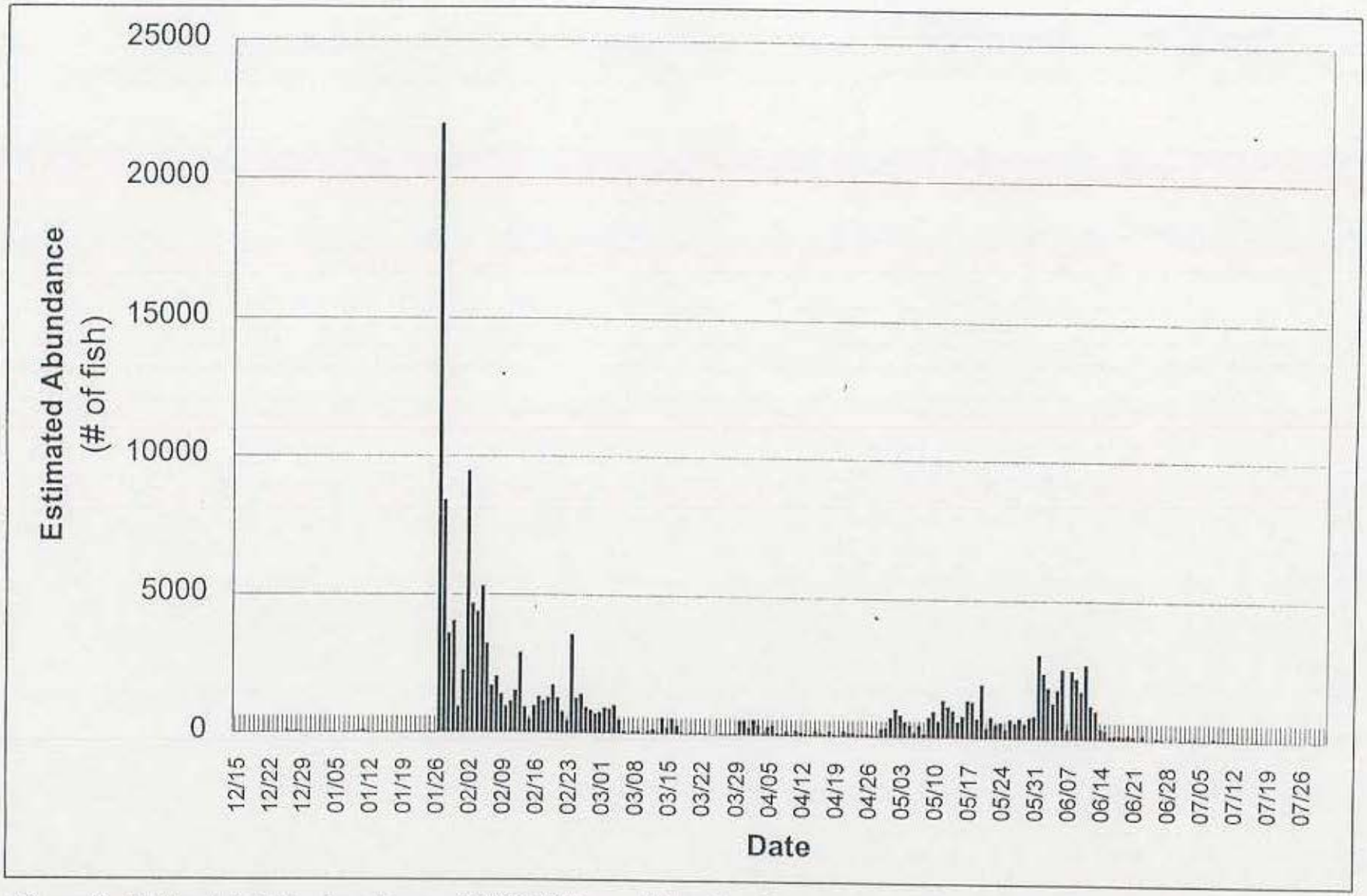

Figure 3. Estimated daily abundance of YOY fall-run chinook salmon passing Woodbridge Dam from December 15, 1999 through July 31, 2000.

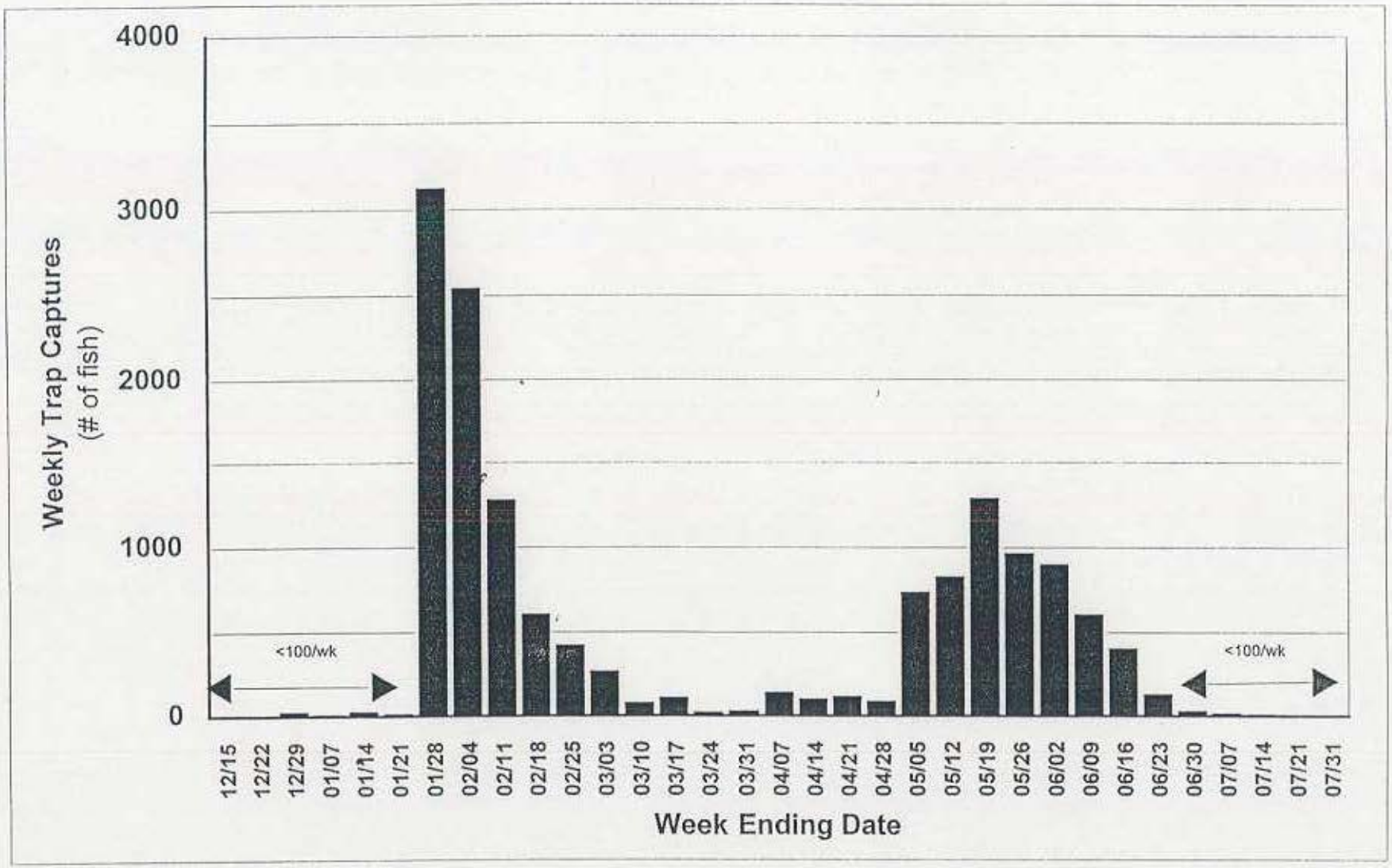

Figure 4. Weekly counts of YOY fall-run chinook salmon trapped in rotary screw fish traps at Woodbridge Dam on the Mokelumne River from December 15, 1999 through July 31, 2000.

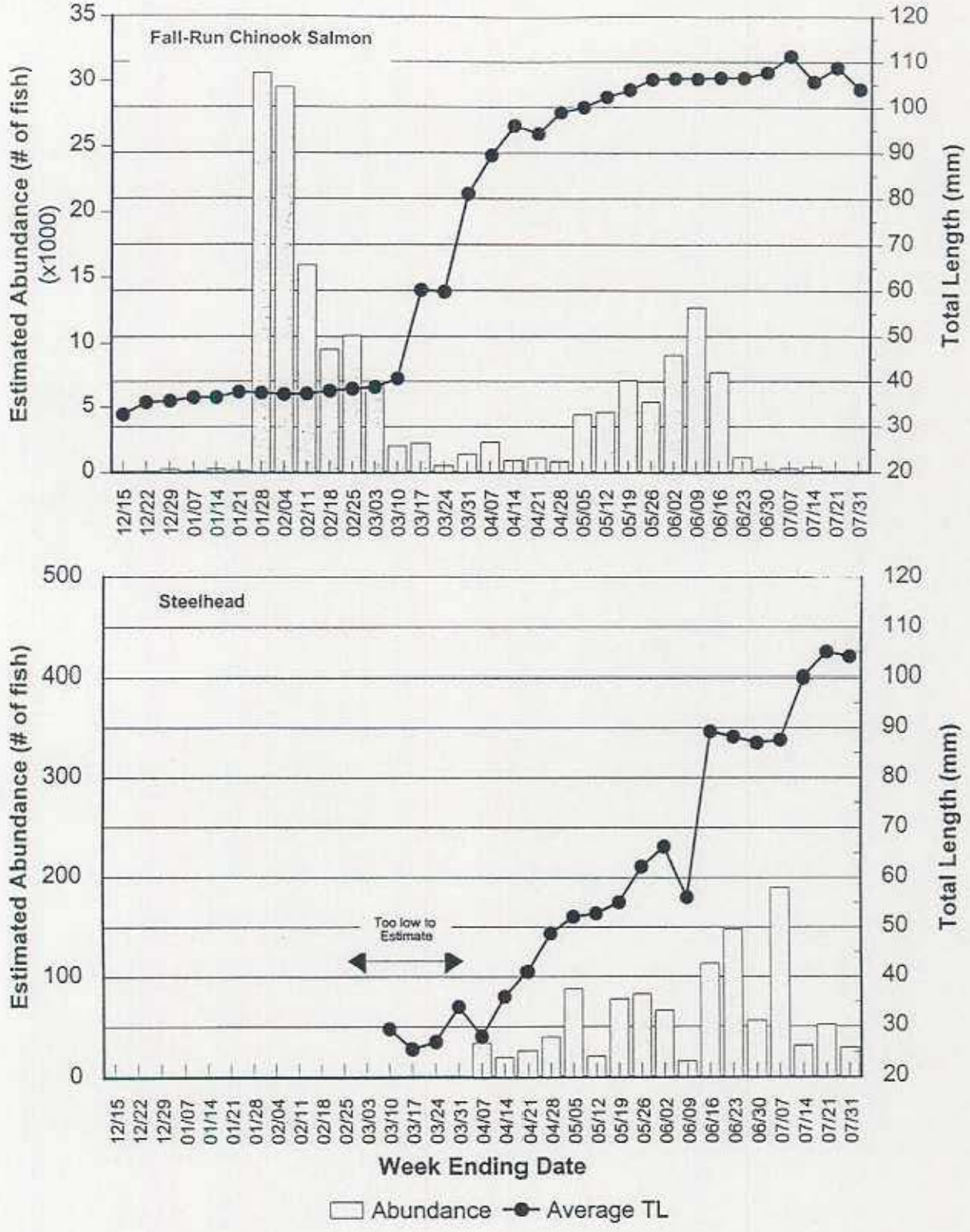

Figure 5. Estimated weekly abundance and average size of YOY fall-run chinook salmon and steelhead passing Woodbridge Dam from December 15, 1999 through July 31, 2000.

3.3 Size and Condition of Downstream Migrant Salmonids

Daily records of average TL, FL, weight, and condition factor, as well as the range of lengths and weights of YOY salmonids captured at Woodbridge Dam are provided in Appendix D-1 and D-2. Figure 6 shows the mean and range of total lengths for YOY fall-run chinook salmon based on sampling from December 15,1999 to July 31, 2000. Approximately 64 percent of BY99 production emigrated past Woodbridge Dam as fry and 36 percent as smolt-sized salmon (Figure 5 and Figure 6). As in past years, the number of smolt-sized subyearling salmon increased abruptly after mid-March, signaling the onset of the smolt emigration (Vogel and Marine 1994, 1996, 1998a,b, 1999a, 2000). Smolt-size salmon dominated catches from the third week in March through the end of the season, although small numbers of fry were observed until the first week of April. The size of smolts increased gradually for the duration of the season after the onset of this phase of emigration. Smolt size generally ranged from 70 to 120 mm TL.

The condition factor of emigrating salmon fry ranged from about 3.0×10^{-4} to 1.7×10^{-3}, with the vast majority ranging from about 5.5×10^{-4} to 6.5×10^{-4} (Figure 7). Yolk-sac fry less than 40mm FL occurred among the earliest emigrants in January and February. Most fry captured during March were post-absorptive (i.e., little to no yolk-sac remaining) fry/parr dominated by fish between 40mm and 50mm FL characterized by increasing condition factors. The abrupt occurrence of large parr and smolt sized salmon in the traps affected increases in the means and the ranges of size and condition measurements during March (Figure 6, Appendix D-1). The size of smolts migrating by Woodbridge Dam increased throughout the smolt migration. Average condition factor varied, but generally increased over the duration of fry and smolt emigrations (Figure 7). An exception to this trend was a small but distinct decline in condition factor, both in the average value and variation among fish, during April that coincided with increased captures of smolt-sized salmon. This event was followed by a slow but continuous increase in condition factor during the remainder of the season. This pattern of change in condition factor between the fry/parr and smolt life stages of anadromous salmonids is observed annually in the Mokelumne River and widely throughout their range. The reduction in "plumpness" characterized by declining condition factor is thought to reflect a change in overall bioenergetic balance associated with the metabolic rigors of salmonid smoltification, as well as, adaptive morphologic changes for life in the ocean (Hoar 1988).

Of 125 YOY *O. mykiss* captured, approximately 25% were fry (FL<50mm) captured from March through June. And, the majority of YOY *O. mykiss*, which were captured from April through July were classified as parr ranging from 50 to 114 mm FL (Appendix D-2).

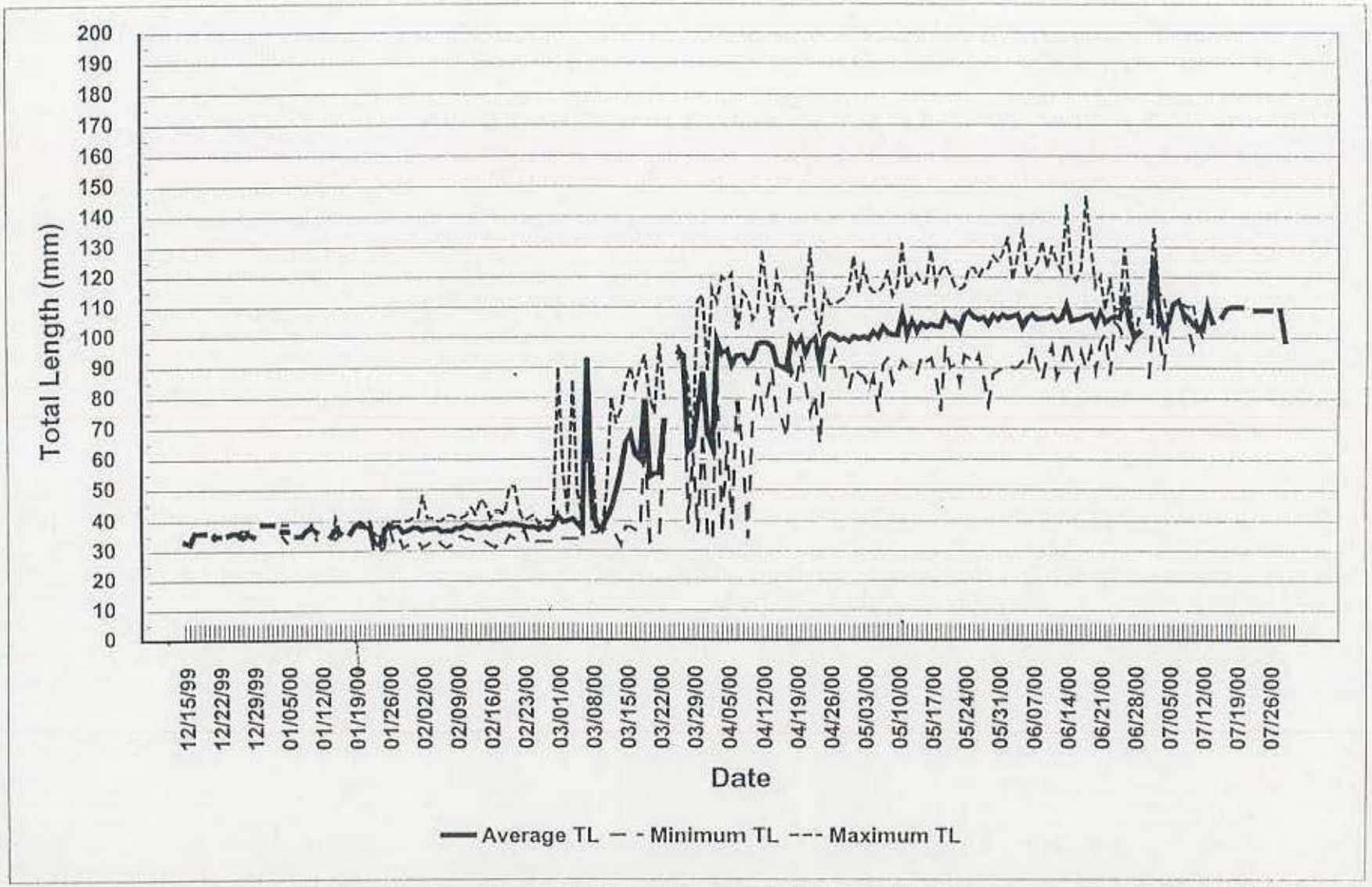

Figure 6. Daily average, minimum, and maximum total lengths of YOY fall-run chinook salmon captured at Woodbridge Dam on the Mokelumne River from December 15, 1999 through July 31, 2000.

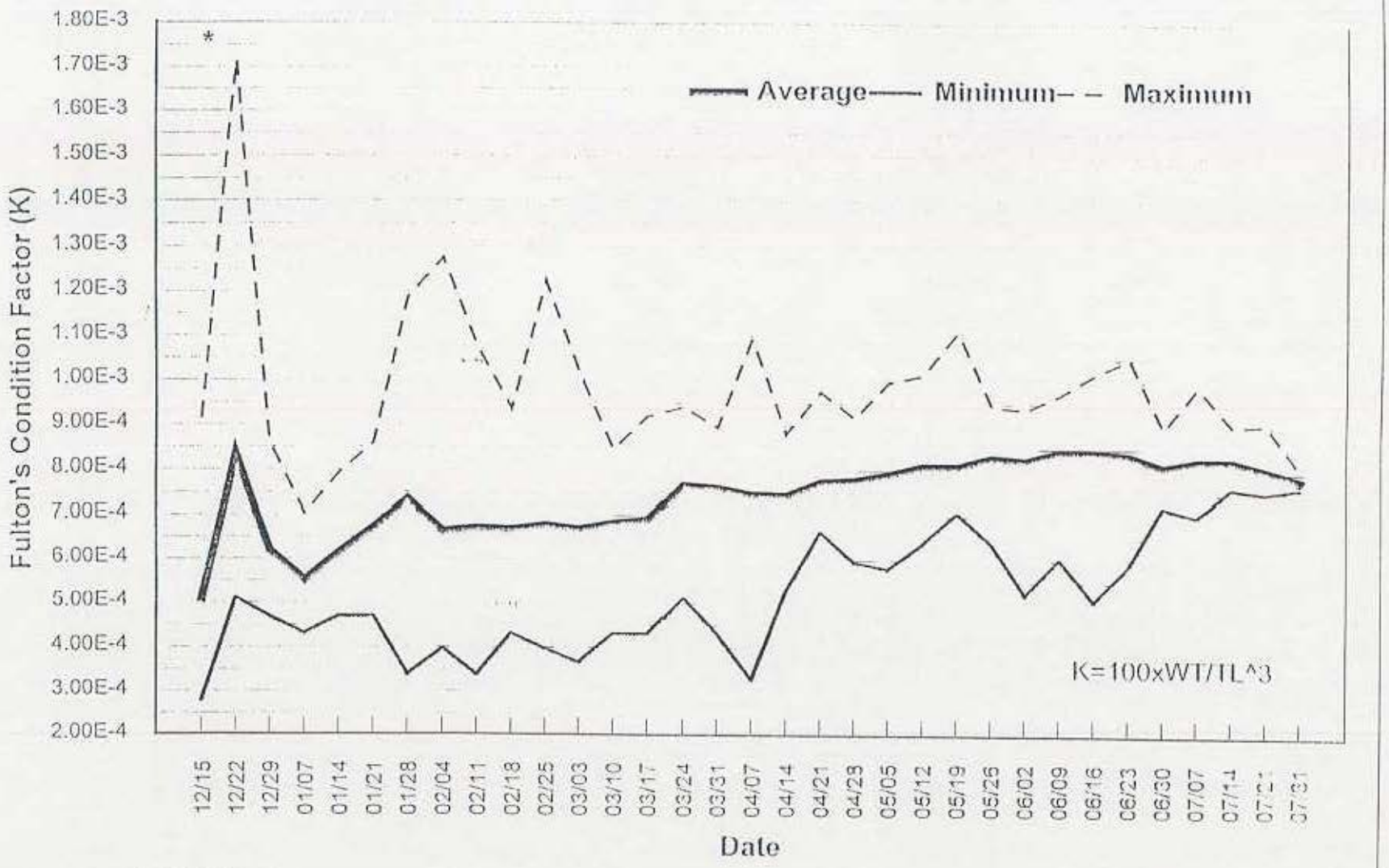

Figure 7. Weekly average and range of condition factor (K) for YOY fall-run chinook salmon captured at Woodbridge Dam on the Mokelumne River from December 15, 1999 through July 31, 2000. Asterisk indicates high K of a single robust sac fry with large egg sac.

3.4 Effects of Physical Environmental Conditions on Downstream Migrants

3.4.1 Diel Periodicity of Fish Migration Past Woodbridge Dam

The diel migration patterns of juvenile chinook salmon and steelhead passing Woodbridge Dam are shown in Figure 8. The majority of fish emigrated at night during the entire migration for both species. Day time migration abundance was somewhat higher during June and July for both species. However, this pattern may be an artifact of low total daily fish numbers and low trap efficiencies during these later months. Crepuscular peaks in passage have been documented during diel synoptic surveys conducted in past years (Bianchi et al. 1992, Vogel and Marine 1998b, 1999a,b), and fish passing during these hours are included in the night time passage in Figure 8.

3.4.2 Water Temperature, River Flow, Rainfall, Turbidity, and Lunar Phase

Daily average river flow, water clarity and turbidity, and water temperatures for the Woodbridge Dam trap site are provided in Appendix E. Daily rainfall at Camanche Dam, rainfall and barometric pressure at Woodbridge, California, lunar phase and times of sunrise and sunset are included in Appendix E.

Figure 9 shows the daily river flow, Woodbridge Canal diversions, periods of rainfall and turbidity, and barometric pressure at Woodbridge Dam. River flow levels were primarily related to changes in releases from Camanche Dam. Turbidities varied with transient increases during periods of rainfall and river stage changes. January and February storms were associated with the highest turbidities.

Figure 10 shows the hourly water temperatures recorded at the trapping site. Diel fluctuations in water temperatures varied through the season from less than 0.5 °C in January increasing to about 1.5 to 2°C in June. The thermograph was flooded during June and malfunctioned until the end of the season. However, measurements made early and late in the day provided surrogates for daily minimum and maximum temperatures and are provided in Appendix E. We computed mean daily water temperatures for evaluations of downstream migration patterns (Appendix E).

Some researchers have reported that juvenile salmon emigrations tend to occur in multiphasic peaks or pulses; these pulses may correspond to changes in flow, increased turbidity, and other hydrologic and ecologic conditions (Kjelson *et al.* 1982, McKeown 1984, Vogel 1989, Healey 1991). We examined potential migratory responses to river flow, turbidity, water temperature, lunar phase, and precipitation in Figures 11 and 12. As in past years, migration abundance was not consistently associated with any specific measured factor. Nor were any environmental thresholds for migratory responses identified. Rain storms and turbidity were frequently, but not always, associated with peak fry captures. However, the magnitudes of rainfall and increased turbidity were not directly proportional to the magnitude of fish abundance. Most changes in migrant abundance appeared to be associated with season or size (compare Figures 11 and 12 to Figure 5).

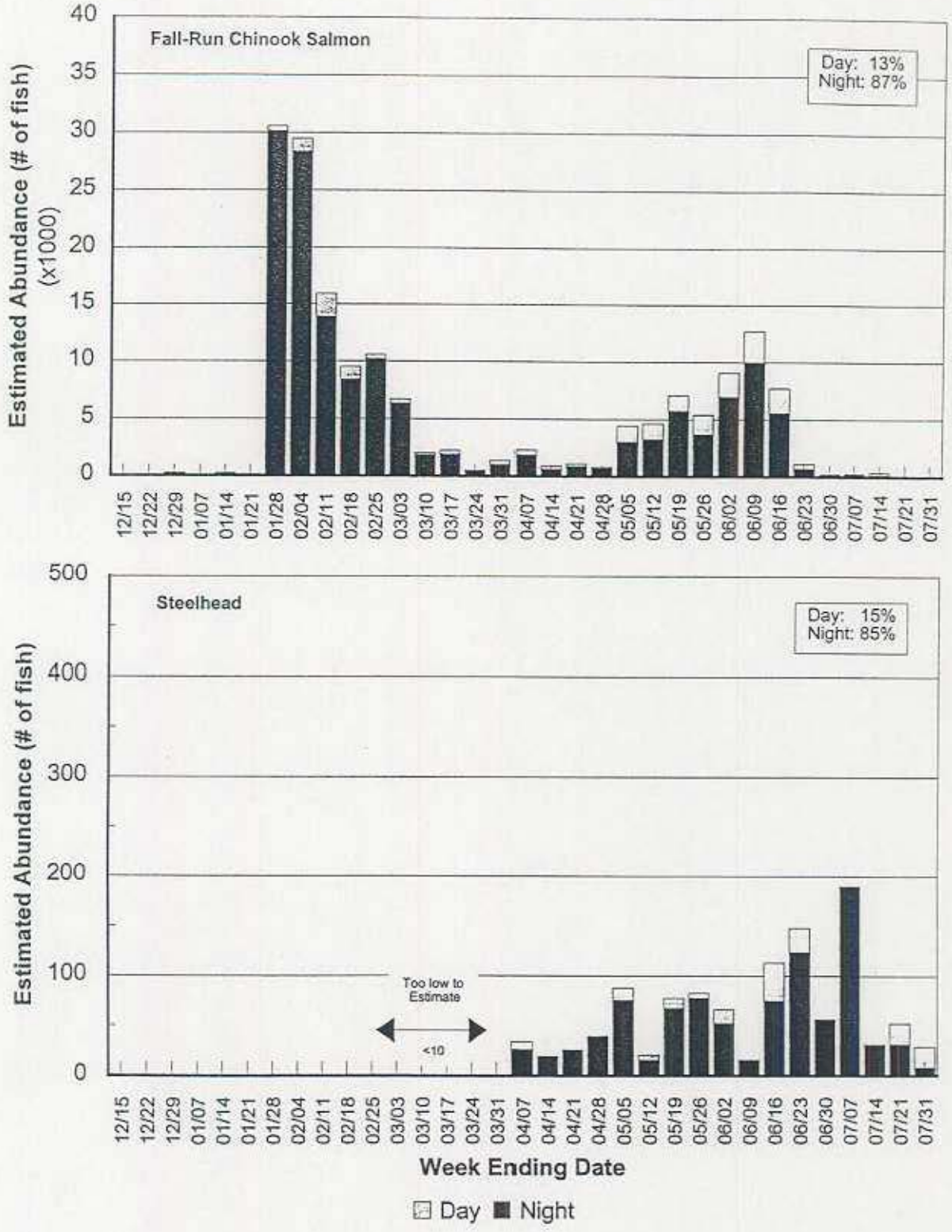

Figure 8. Weekly diel abundance distributions for YOY fall-run chinook salmon and steelhead emigrating by Woodbridge Dam from December 15, 1999 through July 31, 2000.

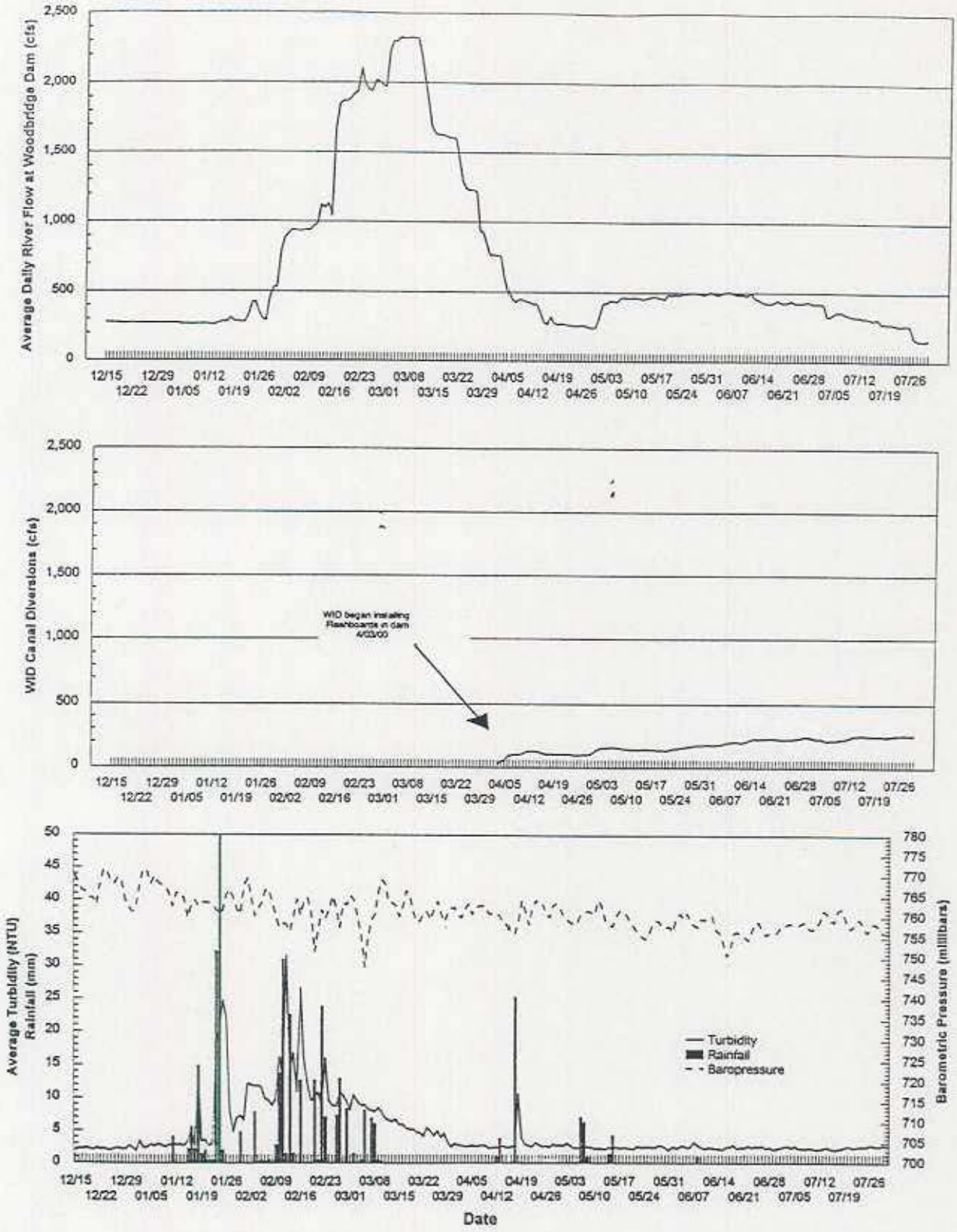

Figure 9. River flow passing Woodbridge Dam, WID canal diversions, daily average turbidity, barometric pressure and rainfall at Woodbridge Dam trap site from December 15, 1999 to July 31, 2000.

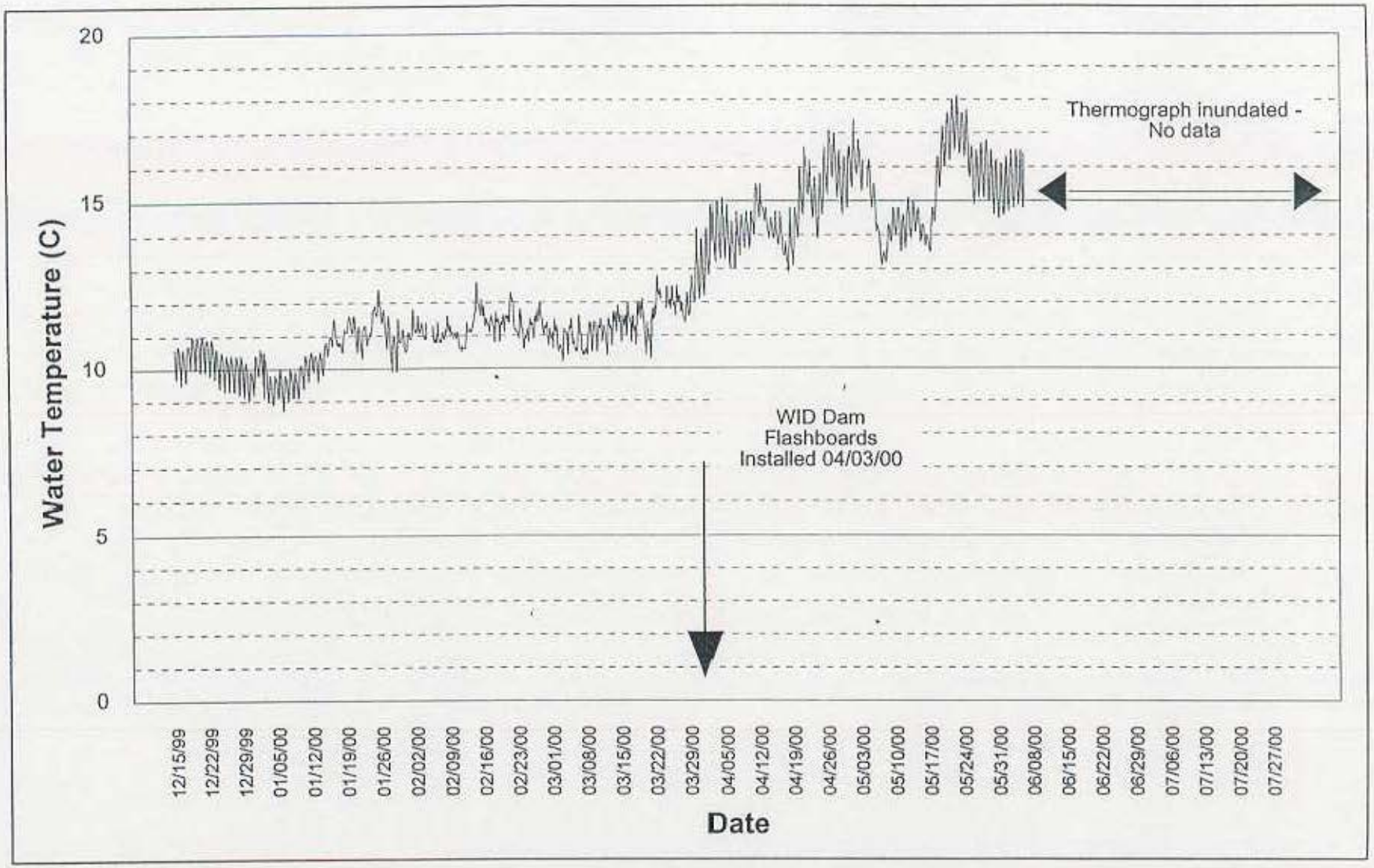

Figure 10. Hourly water temperatures recorded at Woodbridge Dam from December 15, 1999 through June 6, 2000.

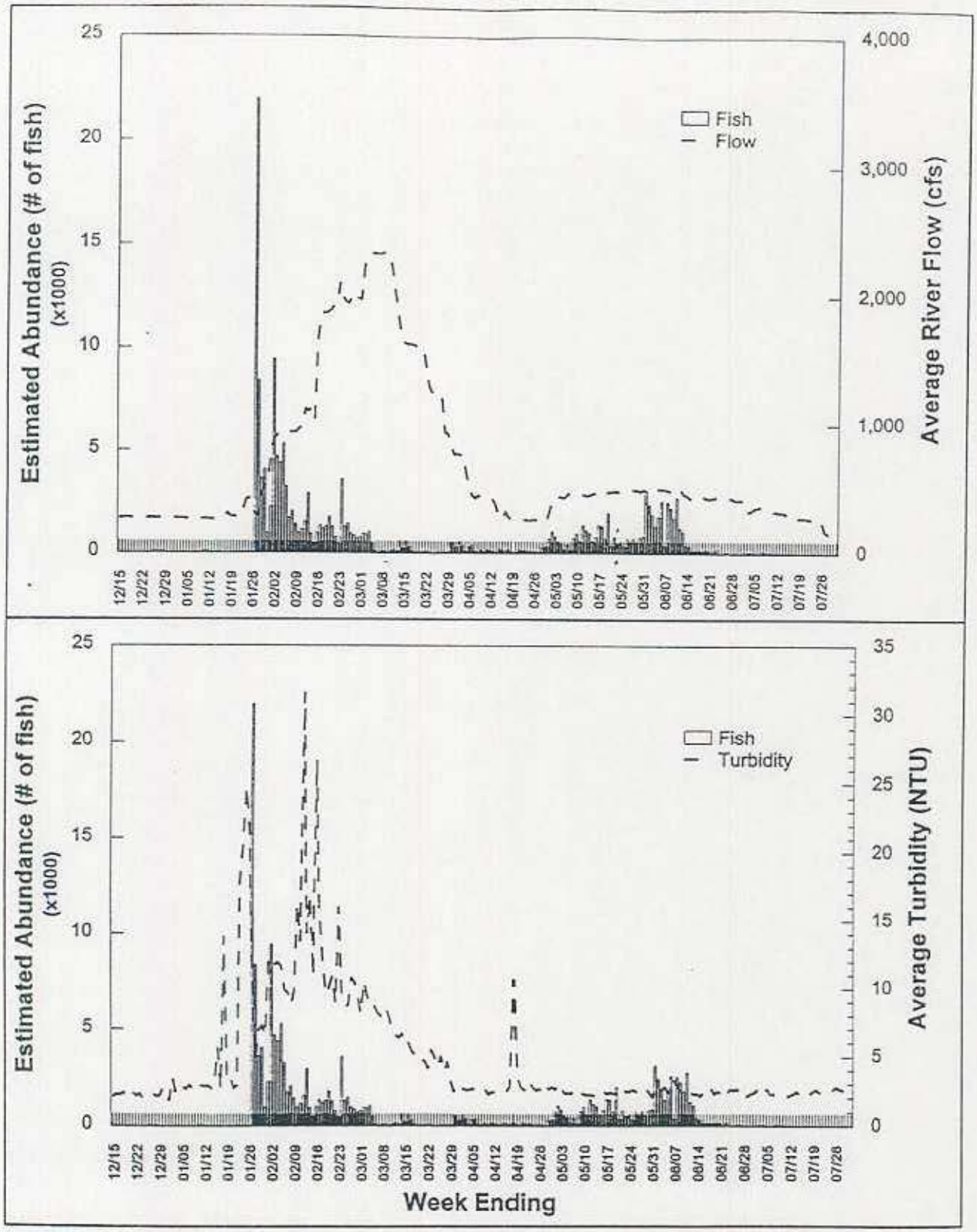

Figure 11. Estimated daily abundance of YOY fall-run chinook salmon passing Woodbridge Dam compared with average daily river flows passing Woodbridge Dam and water turbidity from December 15, 1999 through July 31, 2000.

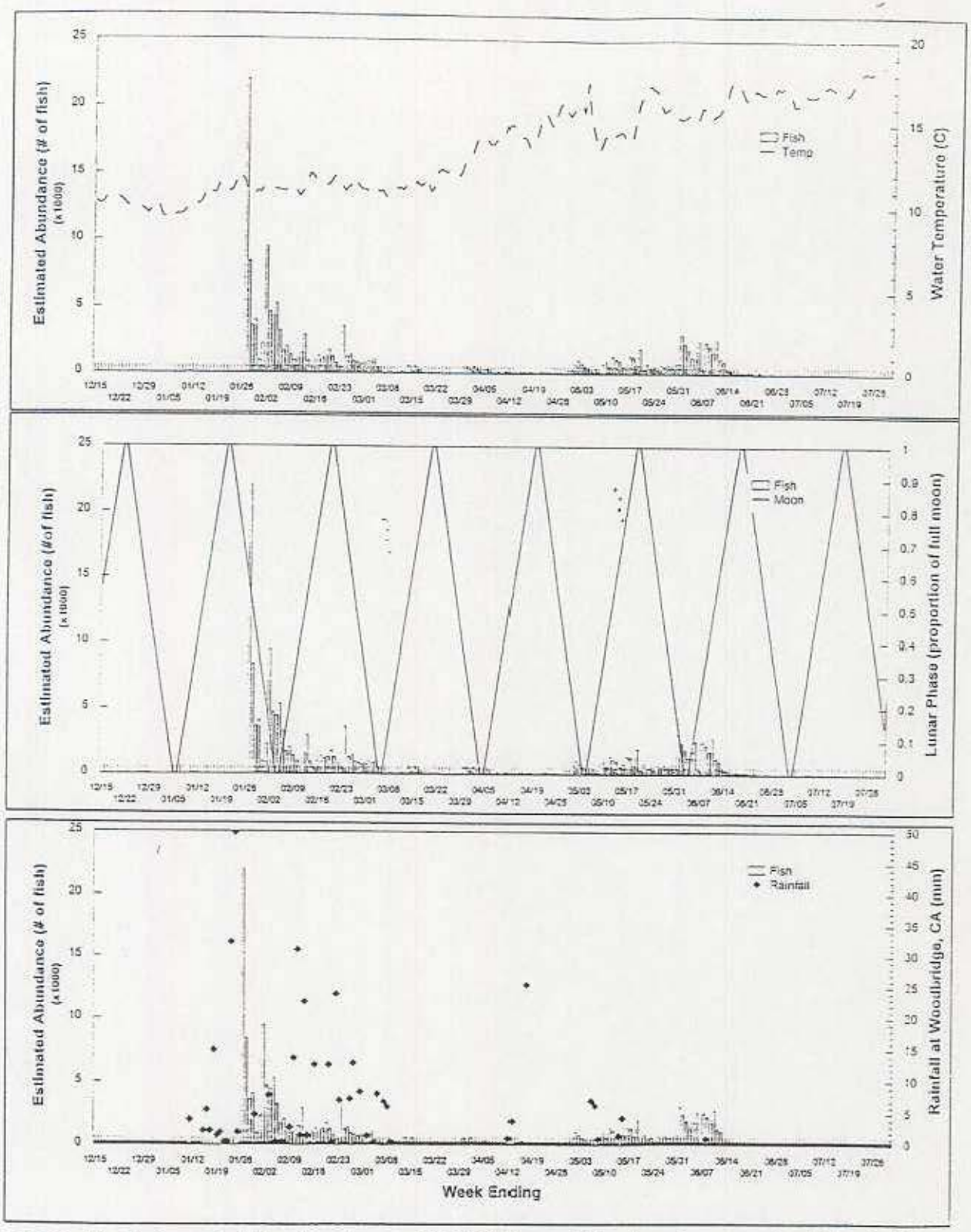

Figure 12. Estimated daily abundance of YOY fall-run chinook salmon passing Woodbridge Dam compared with daily water temperatures, lunar cycle, and daily rainfall measured from December 15, 1999 through July 31, 2000.

The relative importance of fish size, or life stage, on emigration is illustrated by the apparent size threshold response denoting the abrupt onset of migrating smolts in April (Figure 5). This "threshold response" is supported by observations of increasing numbers of smolt-sized salmon during April with relatively few intermediate sized salmon (40 - 50 mm FL) occurring in the traps after the subsidence of fry emigration in March. The relative influence of size (FL) on migration patterns of subyearling chinook salmon has also been noted for the mid-Columbia River, where size was found to be the most important determinant of migration rate among several likely factors including river discharge, water temperature, and season (Giorgi et al. 1997).

3.5 Comparison of Annual Juvenile Fall-Run Chinook Salmon Downstream Migrations During 1990-1999

Data from eleven consecutive monitoring seasons for juvenile chinook salmon emigrating from the Mokelumne River have been compiled for 1990 -2000. Outmigration monitoring methods have changed and have been refined over the years. Outmigration is monitored solely through the fishways under low flow conditions, with use of rotary fish traps when flows are higher, and with combinations of the two methods at intermediate flows. During 1990 -1992, only the fishway traps were used for smolt monitoring. During 1993 - 2000, rotary traps were used for all or portions of the season. And in 1994 and 1997, the fishway traps were fished during portions of the season, at times in combination with the rotary traps. Because of these differences in methodologies between years, direct comparisons among years must be made with some qualifications. However, certain generalized comparisons between years are possible.

The timing of juvenile chinook salmon emigrating past Woodbridge Dam for each year since 1990 is presented in Figures 13 through 15. Downstream migrant monitoring has been started in mid-December since the 1997-98 season. This is approximately 3 to 6 weeks earlier than in most previous seasons, except for 1993-94 when monitoring started in October 1993. Comparisons of seasonal changes in average weekly TL for 1995-2000 were made since data collection methods and time periods were similar for these years. Salmon fry were intermittently observed in small numbers as early as mid-December during 1997 to 2000 with fry numbers increasing after mid- to late-January. This pattern contrasts with 1993-94 when outmigration monitoring was continuous from October through July. Few fry at all were captured migrating by Woodbridge Dam during that year (Figure 14). If the patterns for 1994 (a dry year), 1999 (a normal to above normal year), and 1998 (a wet year) reflect a normal range of fry emigration in the Mokelumne River, then past years with monitoring start dates by the third week in January may be compared for juvenile fall-run chinook salmon emigration timing and relative abundance.

Although fry emigrant abundance varies, it has dominated that of smolts for each year since 1995. This pattern differs from the emigration timing exhibited in 1993 and 1994 (Figure 14). The onset of smolt emigration begins during mid-March to early April. The peak of smolt emigration varies within about ±2-3 weeks during May and June, but the duration of this migration period varies between years. River flows during 1990, 1991, 1992, and 1994 were substantially lower during the principal migratory period than river flows in 1993 and 1995 to 2000 (Bianchi *et. al.* 1992, Vogel and Marine 1994,1996, 1998, 1999a,b). Water temperatures

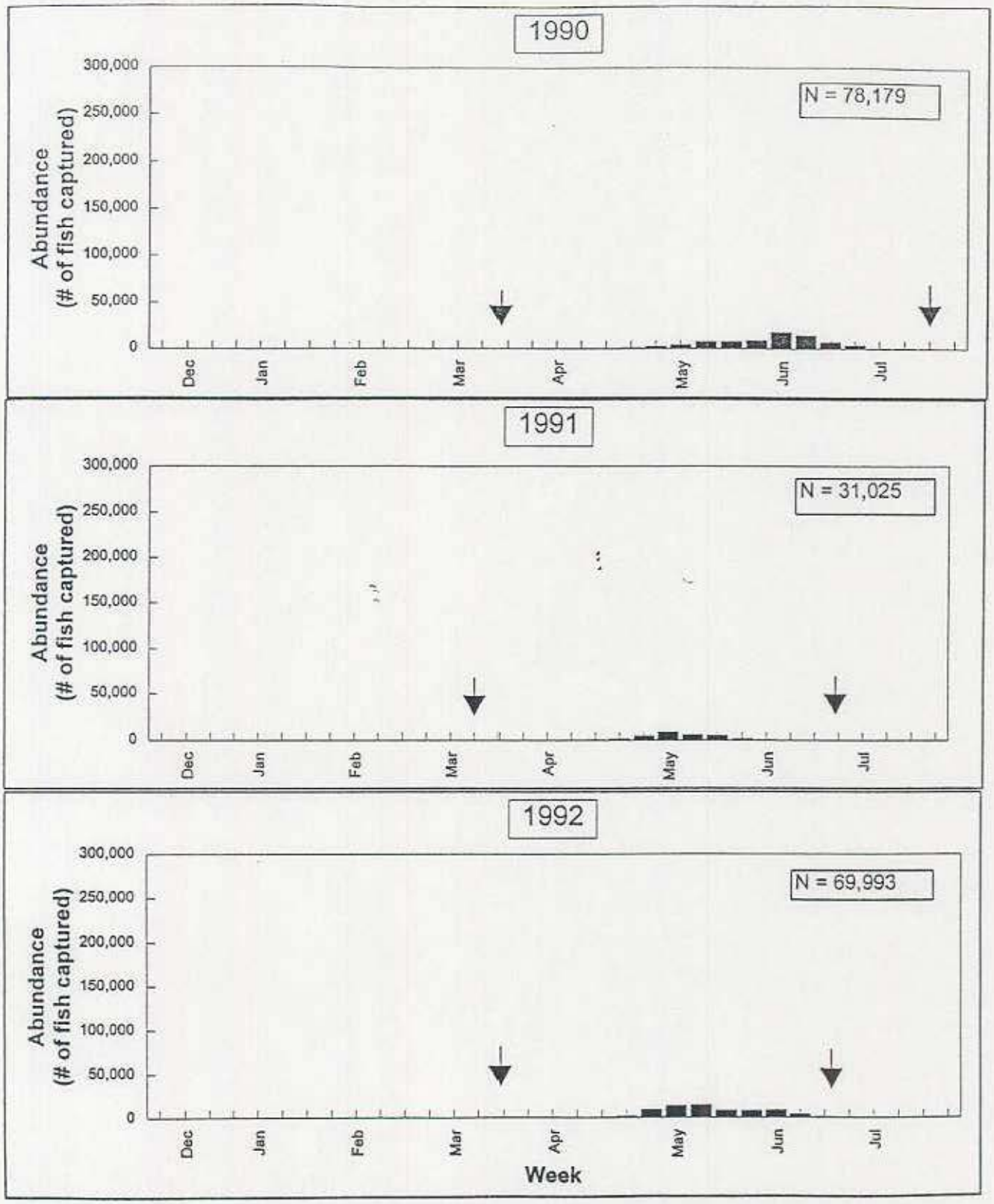

Figure 13. Weekly abundance of downstream migrant fall-run chinook salmon at Woodbridge Dam for 1990-1992. (Abundance for 1990-1992 was determined by capturing fish in fishway traps with nearly 100% of river flow passing through fishways) Month labels are on middle week of each month. Arrows indicate the beginning and end of annual monitoring periods.

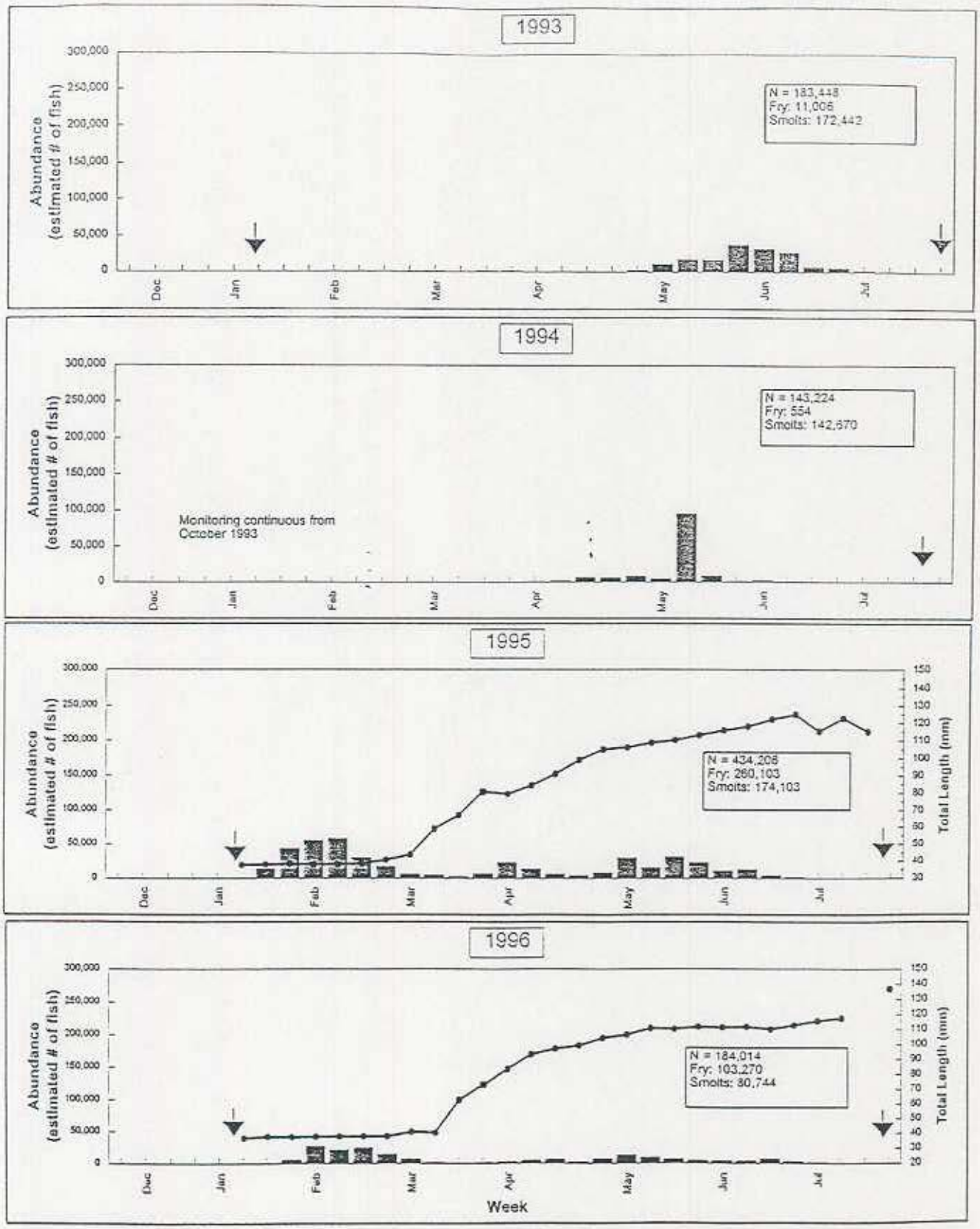

Figure 14. Weekly abundance (1993-1996) and size (1995-1996) of downstream migrant fall-run chinook salmon at Woodbridge Dam. (Abundance was determined using experimentally -derived capture probabilities for rotary traps [and adding fishway trap captures in '94]). Month labels are on the middle week of each month. Arrows indicate the beginning and end of annual monitoring periods.

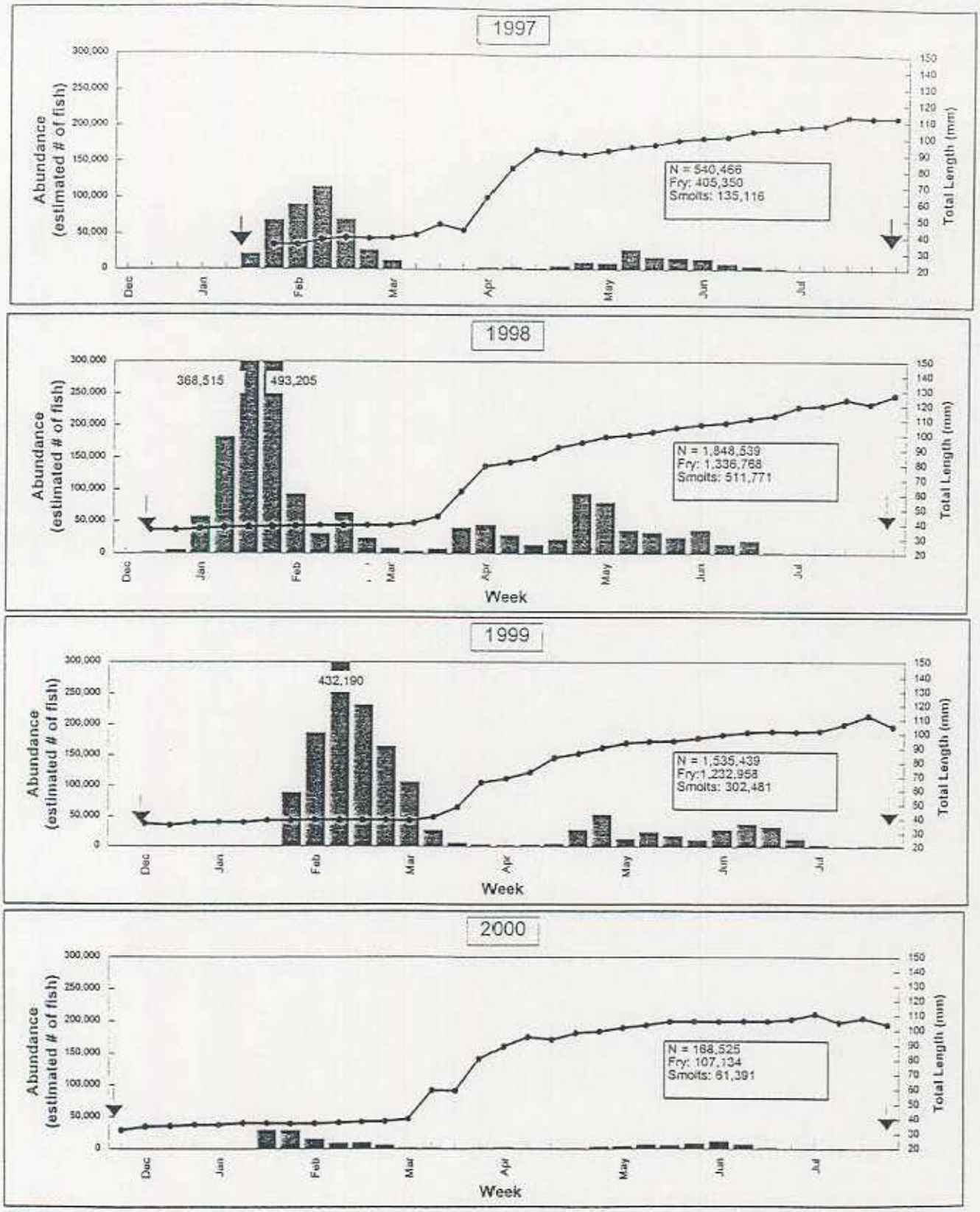

Figure 15. Weekly abundance and size of downstream migrant fall-run chinook salmon at Woodbridge Dam for 1997-2000. (Abundance was determined using experimentally-derived capture probabilities [and adding fishway trap captures in '97]). Month labels are on the middle week of each month. Arrows indicate the beginning and end of annual monitoring periods. Abundance values that exceed scale are presented as text.

recorded in 1991 and 1992 at Woodbridge Dam were approximately 0.5 to 3 °C higher than during comparable periods in later years (Bianchi *et. al.* 1992) . Water temperature data for 1990 were not available. Higher daily water temperatures during the early part of the smolt migration period may partially account for the earlier smolt-sized salmon outmigrations observed in 1991 and 1994 (data in Bianchi *et. al.* 1992, Vogel and Marine 1994, 1996, 1998a,b, 1999a,b).

Natural production of BY99 juvenile fall-run chinook salmon emigrating from the Mokelumne River, estimated at 168,525 (~107,134 fry and ~61,391 smolts), was lower than in the past three years, but comparable to 1993 and 1996. It is clear from eleven years of monitoring that the timing of fry and smolt emigrations is fairly consistent, but the magnitude of the fry migration varies to a greater extent than that of smolts. This phenomenon is observed elsewhere in the range of chinook salmon, such as the Big Qualicum River on Vancouver Island where numbers of emigrating fry may vary by as much as 100-fold annually but emigrating smolts by only as much as 10-fold (Lister and Walker 1966).

3.6 Comparison of Young-of-Year Steelhead Downstream Migrations During 1999 and 2000

Aside from the large numbers of yearling hatchery-reared steelhead smolts that are observed shortly after their release and some residualized hatchery steelhead observed for several months afterward, few juvenile steelhead have been observed in the downstream migrant traps since 1991 (Bianchi *et al.* 1992, Vogel and Marine 1994, 1996, 1998a,b, 1999a,b, 2000). However, in the past two to three years, YOY steelhead fry and parr have been more commonly observed in the downstream migrant rotary traps during the late winter, spring, and early summer at Woodbridge Dam. The timing and size of these YOY steelhead emigrants is provided in Figure 16. They have been first observed as fry in March or early April. They grow quickly exceeding 50mm FL beginning in May. YOY steelhead are most abundant as parr emigrants in June and July. The spawning population and factors affecting steelhead abundance, production, and juvenile emigration in the Mokelumne River remain uncertain.

3.7 Wild Chinook Salmon Smolts Coded-Wire Tagged at Woodbridge Dam

Appendix A provides a daily record of the numbers of wild fall-run chinook salmon fry/parr and smolts captured, coded-wire tagged, and released at Woodbridge Dam. Additional relevant data are provided in Table 4. Fish were tagged from January 25 until July 23, 2000. Two microtag codes were used during the season to tag 12,276 fish (Table 4). We marked and released approximately 6,000 fry/parr from January until April and 6,300 smolts from March through July.

Latent post-tagging mortality ranged from 0% to 5% with 8 fish out of 401 held that died in 9 separate tests (5 to7 days long). On most days, post-tagging survival was 99% or better throughout the season. Tag retention efficiency ranged from 84% to 100% during these tests.

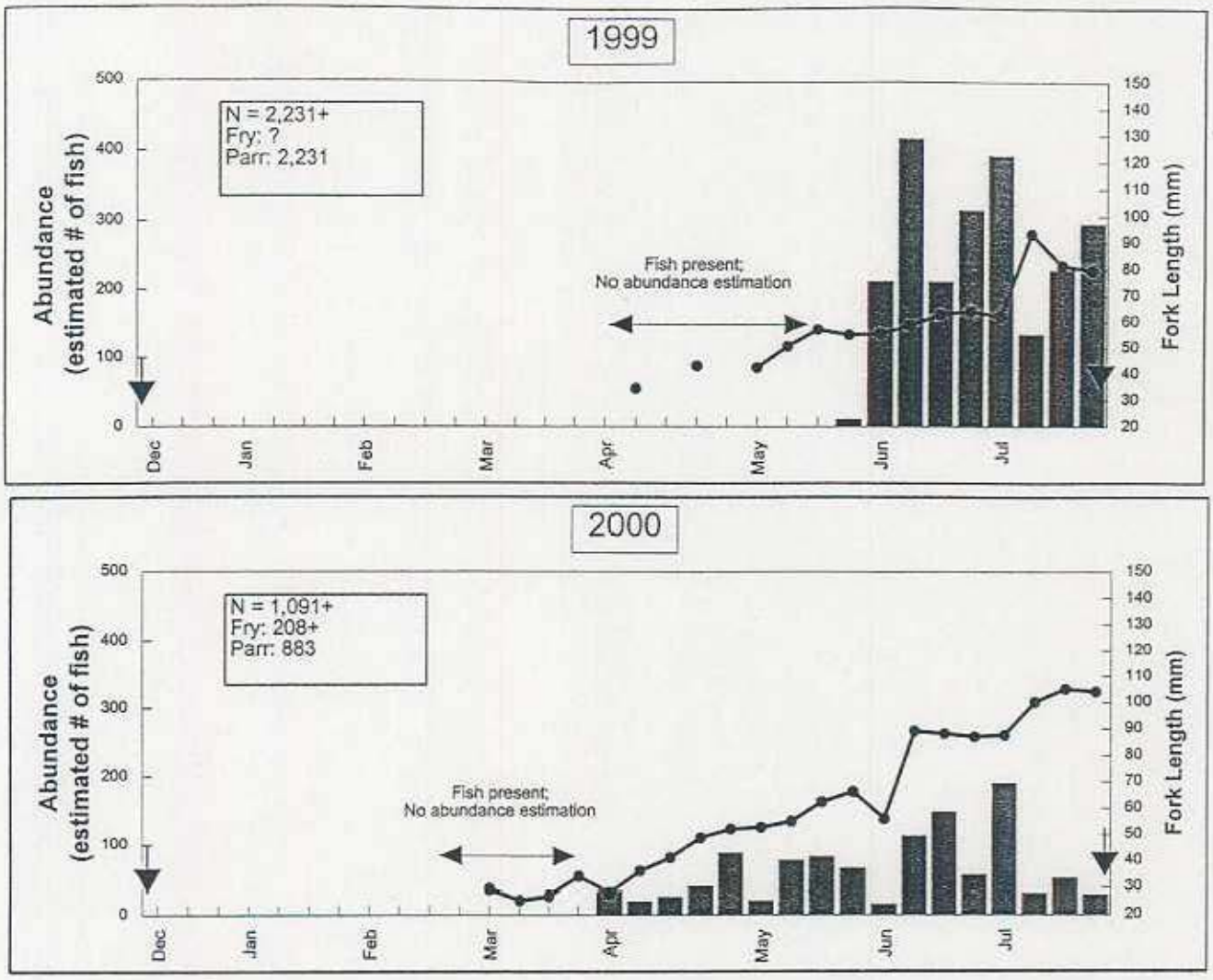

Figure 16. Weekly abundance and size of downstream migrant young-of-year steelhead at Woodbridge Dam. (Abundance was determined using experimentally -derived capture probabilities for rotary traps). Month labels are on the middle week of each month. Arrows indicate the beginning and end of annual monitoring periods.

Table 4. Coded-wire tag data for wild Mokelumne River fall-run chinook salmon marked and released at Woodbridge Dam - January through July 2000.

Code ID	Egg Lot No.	Brood Year	Release Location	Date Released		Rearing Type	Purpose	Total No. Tagged	Estimated Tag Loss and Mortality Before Release %[1]	No. Tagged Fish Released[2]	Quality Control Days	No./lb at Release [3]	Avg. FL (mm) [3]	Rearing Location	Stock of Release Group
				First	Last										
06-01-13-02-07	Wild	1999	Woodbridge Dam	01/25/00	04/01/00	wild	survival & fishery	6,010	9.0	5,464	7	1,100	36.5	Mokelumne River	MOK99
06-02-44	Wild	1999	Woodbridge Dam	03/13/00	07/23/00	wild	survival & fishery	6,266	3.1	6,067	7	40-400	64-100	Mokelumne River	MOK99

[1] Tag retention checked after 6 to 7day post-tagging holding periods. These checks were replicated for each tag group.

[2] Adjusted for estimated shed tags and prerelease mortality.

[3] Range in average size for entire time interval over which tag code was used.

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The field crew of Natural Resource Scientists, Inc. consisted of Josh Bradley, Russ Liebig, Bill Poytress, Eric Theiss, and Jeff Vitalé, who collectively executed the daily fish trapping and riverine monitoring tasks throughout the season, are gratefully acknowledged for their able contributions to this project. EBMUD biologists Steve Boyd, Joe Merz, Jim Smith, and Michelle Workman provided valuable oversight on various aspects of this project. Denisa Vogel is thanked for her work on day-to-day office administration associated with this project and her assistance in preparation of this report. We appreciate Stephanie Fleming and Dana Wood for assistance with data entry. The CWT crew of Big Eagle and Associates deserve special recognition for their tagging operations at the Mokelumne River Fish Installation. The cooperation of Woodbridge Irrigation District, Anders Christensen (WID Manager), and the WID staff is especially appreciated for allowing these important fishery resource investigations to be largely based from their property. The CDFG Region-2 staff provided periodic guidance, assistance, and cooperation throughout this investigation. The CDFG staff at the Mokelumne River Fish Installation provided especially valuable assistance with obtaining fish for trap calibrations; the work could not have been performed without their outstanding cooperation. The discussions and feedback among members of the Mokelumne River Technical Advisory Committee contributed valuable advice for implementation of various aspects of this project.

ACRONYMS

Acronym/Abreviation	Definition
CDFG	California Department of Fish and Game
cfs	cubic feet per second (1cfs = 0.03 cms)
cm	centimeter
CVPIA	Central Valley Project Improvement Act
CWT	coded-wire tagged
DO	dissolved oxygen
EBMUD	East Bay Municipal Utility District
FL	fork length
K	average condition factor
km	kilometer
L	Liter
m	meters
ml	milliliter
mm	millimeter
MRFI	Mokelumne River Fish Installation
NRS	Natural Resource Scientists, Inc.
NTU	Nephelometric turbidity units
‰	Parts per thousand
PVC	polyvinyl chloride
QCD	quality control device
SD	standard deviation
TL	total length
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VAMP	Vernalis Adaptive Management Plan
WID	Woodbridge Irrigation District
WIDD	Woodbridge Irrigation District Dam
w/w	formulation made by combination on a dry weight to dry weight ratio
YOY	young-of-year

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APPENDICES

Appendix A. Daily trapping abundance of YOY fall-run chinook salmon: December 15, 1999 -- July 31, 2000.

	Nocturnal				Diurnal				Daily Totals**				Trap Operations Data			
Date	Captured	Mortality***	Injury	CWT	Captured	Mortality***	Injury	CWT	Captured	Mortality***	Injury	CWT	Number Fished	Nocturnal (Hours)	Diurnal (Hours)	Non-Diel Specific* (Hours)
12/15/99	1	0	0	0	0	0	0	0	1	0	0	0	2	15:22	07:00	n/a
12/16/99	2	0	0	0	0	0	0	0	2	0	0	0	2	16:48	06:46	n/a
12/17/99	0	0	0	0	1	0	0	0	1	0	0	0	2	17:39	06:25	n/a
12/18/99	0	0	0	0	0	0	0	0	0	0	0	0	2	17:30	n/a	n/a
12/19/99	0	0	0	0	0	0	0	0	0	0	0	0	2	n/a	n/a	23:42
12/20/99	0	0	0	0	0	0	0	0	0	0	0	0	2	n/a	n/a	23:39
12/21/99	*	*	*	*	*	*	*	*	2	0	0	0	2	n/a	n/a	24:20
12/22/99	*	*	*	*	*	*	*	*	0	0	0	0	2	n/a	n/a	24:40
12/23/99	*	*	*	*	*	*	*	*	0	0	0	0	2	n/a	n/a	23:10
12/24/99	*	*	*	*	*	*	*	*	2	0	0	0	2	n/a	n/a	24:09
12/25/99	*	*	*	*	*	*	*	*	n/a	0	0	0	2	n/a	n/a	n/a
12/26/99	*	*	*	*	*	*	*	*	10	0	0	0	2	n/a	n/a	40:58
12/27/99	*	*	*	*	*	*	*	*	3	1	0	0	2	n/a	n/a	23:55
12/28/99	*	*	*	*	*	*	*	*	8	2	0	0	2	n/a	n/a	24:55
12/29/99	*	*	*	*	*	*	*	*	5	4	0	0	2	n/a	n/a	23:30
12/30/99	*	*	*	*	*	*	*	*	0	0	0	0	2	n/a	n/a	24:00
12/31/99	*	*	*	*	*	*	*	*	1	0	0	0	2	n/a	n/a	n/a
01/01/00	*	*	*	*	*	*	*	*	n/a	0	0	0	2	n/a	n/a	n/a
01/02/00	*	*	*	*	*	*	*	*	0	0	0	0	2	n/a	n/a	41:45
01/03/00	*	*	*	*	*	*	*	*	2	2	0	0	2	n/a	n/a	24:00
01/04/00	*	*	*	*	*	*	*	*	4	0	0	0	2	n/a	n/a	23:45
01/05/00	*	*	*	*	*	*	*	*	3	0	0	0	2	n/a	n/a	24:00
01/06/00	*	*	*	*	*	*	*	*	0	0	0	0	2	n/a	n/a	24:40
01/07/00	*	*	*	*	*	*	*	*	4	3	0	0	2	n/a	n/a	24:00
01/08/00	*	*	*	*	*	*	*	*	1	0	0	0	2	n/a	n/a	23:50
01/09/00	*	*	*	*	*	*	*	*	4	2	0	0	2	n/a	n/a	23:50
01/10/00	*	*	*	*	*	*	*	*	7	3	1	0	2	n/a	n/a	23:45
01/11/00	*	*	*	*	*	*	*	*	12	1	0	0	2	n/a	n/a	24:15
01/12/00	*	*	*	*	*	*	*	*	5	5	0	0	2	n/a	n/a	24:50
01/13/00	*	*	*	*	*	*	*	*	0	0	0	0	2	n/a	n/a	23:50
01/14/00	*	*	*	*	*	*	*	*	2	0	0	0	2	n/a	n/a	23:55
01/15/00	*	*	*	*	*	*	*	*	7	0	0	0	2	n/a	n/a	24:00
01/16/00	*	*	*	*	*	*	*	*	2	1	0	0	2	n/a	n/a	23:55
01/17/00	*	*	*	*	*	*	*	*	1	1	0	0	2	n/a	n/a	23:50
01/18/00	*	*	*	*	*	*	*	*	1	0	0	0	2	n/a	n/a	24:10
01/19/00	*	*	*	*	*	*	*	*	2	0	0	0	2	n/a	n/a	24:00
01/20/00	*	*	*	*	*	*	*	*	3	0	0	0	2	n/a	n/a	23:40
01/21/00	*	*	*	*	*	*	*	*	2	0	0	0	2	n/a	n/a	24:05
01/22/00	*	*	*	*	*	*	*	*	6	1	0	0	2	n/a	n/a	24:05
01/23/00	*	*	*	*	*	*	*	*	4	0	0	0	2	n/a	n/a	25:05

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	Nocturnal				Diurnal				Daily Totals**				Trap Operations Data			
Date	Captured	Mortality***	Injury	CWT	Captured	Mortality***	Injury	CWT	Captured	Mortality***	Injury	CWT	Number Fished	Nocturnal (Hours)	Diurnal (Hours)	Non-Diel Specific* (Hours)
01/24/00	*	*	*	*	*	*	*	*	3	0	0	0	2	n/a	n/a	23:15
01/25/00	*	*	*	*	*	*	*	*	8	0	0	0	2	n/a	n/a	24:30
01/26/00	*	*	*	*	*	*	*	*	3	0	0	1	2	n/a	n/a	23:30
01/27/00	*	*	*	*	26	1	0	24	2,329	68	0	415	2	n/a	n/a	24:55
01/28/00	733	10	1	665	40	0	0	39	773	10	1	704	2	06:30	16:50	n/a
01/29/00	325	0	0	310	3	0	0	3	328	0	0	313	2	06:35	17:20	n/a
01/30/00	364	0	0	319	4	0	0	4	368	0	0	323	2	06:45	17:25	n/a
01/31/00	87	0	2	78	2	0	0	1	89	0	2	79	2	17:20	07:20	n/a
02/01/00	198	0	0	197	14	1	0	13	212	1	0	210	2	17:25	07:10	n/a
02/02/00	785	4	0	755	13	0	1	12	798	4	1	767	2	17:15	06:35	n/a
02/03/00	352	3	0	347	24	1	0	22	376	4	0	369	2	17:55	06:30	n/a
02/04/00	372	5	0	360	3	1	0	2	375	6	0	362	2	17:35	06:25	n/a
02/05/00	422	7	4	393	16	0	0	16	438	7	4	409	2	18:10	06:25	n/a
02/06/00	252	5	1	240	13	0	0	12	265	5	1	252	2	17:20	06:30	n/a
02/07/00	135	0	0	133	7	0	0	7	142	0	0	140	2	17:25	06:35	n/a
02/08/00	132	6	1	126	21	2	0	19	153	8	1	145	2	17:35	07:20	n/a
02/09/00	101	1	0	100	10	0	0	10	111	1	0	110	2	16:35	07:20	n/a
02/10/00	60	3	0	57	12	0	0	9	72	3	0	66	2	17:10	06:50	n/a
02/11/00	94	1	1	71	3	0	0	3	97	1	1	74	2	17:15	06:40	n/a
02/12/00	117	1	2	97	8	0	0	8	125	1	2	105	2	18:00	06:25	n/a
02/13/00	218	6	1	211	16	0	0	16	234	6	1	227	2	18:00	05:40	n/a
02/14/00	63	3	0	60	9	0	0	9	72	3	0	69	2	18:25	06:35	n/a
02/15/00	25	1	0	24	9	0	0	9	34	1	0	33	2	17:30	06:20	n/a
02/16/00	40	17	1	22	0	0	0	0	40	17	1	22	2	18:35	06:15	n/a
02/17/00	54	19	0	34	0	0	0	0	54	19	0	34	2	18:15	06:00	n/a
02/18/00	45	4	0	34	3	0	0	3	48	4	0	37	2	17:50	06:05	n/a
02/19/00	50	2	2	44	3	0	0	3	53	2	2	47	2	17:40	06:20	n/a
02/20/00	71	1	1	67	0	0	0	0	71	1	1	67	2	17:50	06:35	n/a
02/21/00	50	5	0	45	2	0	0	2	52	5	0	47	2	17:40	06:15	n/a
02/22/00	30	0	0	29	2	1	0	0	32	1	0	29	2	17:35	06:10	n/a
02/23/00	16	2	0	14	4	0	0	4	20	2	0	18	2	18:05	06:35	n/a
02/24/00	141	5	0	132	3	0	0	3	144	5	0	135	2	18:20	06:05	n/a
02/25/00	50	2	1	47	2	0	0	2	52	2	1	49	2	17:30	06:30	n/a
02/26/00	56	0	1	51	2	0	0	2	58	0	1	53	2	17:45	06:15	n/a
02/27/00	38	1	1	35	1	0	0	1	39	1	1	36	2	17:55	06:40	n/a
02/28/00	32	2	0	30	3	0	0	3	35	2	0	33	2	18:00	06:10	n/a
02/29/00	28	4	0	23	2	0	0	2	30	4	0	25	2	17:45	06:25	n/a
03/01/00	27	2	0	22	5	0	0	4	32	2	0	26	2	17:40	06:55	n/a
03/02/00	35	1	0	33	3	0	1	2	38	1	1	35	2	17:30	06:20	n/a
03/03/00	37	0	1	34	0	0	0	0	37	0	1	34	2	17:55	06:00	n/a

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	Nocturnal				Diurnal				Daily Totals**				Trap Operations Data			
Date	Captured	Mortality***	Injury	CWT	Captured	Mortality***	Injury	CWT	Captured	Mortality***	Injury	CWT	Number Fished	Nocturnal (Hours)	Diurnal (Hours)	Non-Diel Specific* (Hours)
03/04/00	36	1	0	33	4	0	0	4	42	1	0	37	2	17:55	06:15	n/a
03/05/00	20	0	0	20	1	0	0	1	21	0	0	21	2	17:35	06:35	n/a
03/06/00	5	0	0	3	0	0	0	0	5	0	0	3	2	17:40	06:35	n/a
03/07/00	1	0	0	1	0	0	0	0	1	0	0	1	2	17:20	06:35	n/a
03/08/00	3	0	0	3	2	0	0	2	5	0	0	5	2	17:25	07:00	n/a
03/09/00	5	0	0	5	0	0	0	0	5	0	0	5	2	17:05	06:20	n/a
03/10/00	2	0	0	2	0	0	0	0	2	0	0	2	2	17:40	06:30	n/a
03/11/00	4	0	1	3	1	0	0	1	5	0	1	4	2	17:25	06:40	n/a
03/12/00	7	1	0	6	1	0	0	1	8	1	0	7	2	17:25	06:05	n/a
03/13/00	4	0	0	4	1	0	0	1	5	0	0	5	2	18:00	06:30	n/a
03/14/00	26	0	1	26	0	0	0	0	26	0	1	26	2	17:55	06:50	n/a
03/15/00	6	0	0	6	12	0	0	12	18	0	0	18	2	16:50	07:10	n/a
03/16/00	23	0	0	23	8	0	0	8	31	0	0	31	2	17:45	06:15	n/a
03/17/00	13	0	1	12	5	0	0	5	18	0	1	17	2	17:25	06:45	n/a
03/18/00	5	0	0	5	1	0	0	1	6	0	0	6	2	17:10	07:15	n/a
03/19/00	1	0	0	1	1	0	0	1	2	0	0	2	2	16:35	07:20	n/a
03/20/00	4	0	1	2	1	0	1	0	5	0	2	2	2	17:10	07:10	n/a
03/21/00	3	0	0	1	2	0	0	2	5	0	0	3	2	17:10	06:45	n/a
03/22/00	5	0	0	5	0	0	0	0	5	0	0	5	2	17:05	06:40	n/a
03/23/00	2	0	0	2	0	0	0	0	2	0	0	2	2	17:50	07:00	n/a
03/24/00	0	0	0	0	0	0	0	0	0	0	0	0	2	17:10	07:10	n/a
03/25/00	0	0	0	0	0	0	0	0	0	0	0	0	2	17:05	06:30	n/a
03/26/00	2	0	0	2	0	0	0	0	2	0	0	2	2	17:05	07:15	n/a
03/27/00	0	0	0	0	1	0	0	1	1	0	0	1	2	16:50	06:50	n/a
03/28/00	2	0	0	0	0	0	0	0	2	0	0	0	2	17:10	07:00	n/a
03/29/00	1	0	0	1	1	0	0	1	2	0	0	2	2	18:30	05:35	n/a
03/30/00	11	0	0	10	2	0	0	1	13	0	0	11	2	17:20	06:40	n/a
03/31/00	9	0	0	9	4	0	0	4	13	0	0	13	2	17:40	06:40	n/a
04/01/00	8	0	0	7	0	0	0	0	8	0	0	7	2	17:15	06:30	n/a
04/02/00	11	0	1	7	3	0	0	0	14	0	1	7	2	17:30	06:45	n/a
04/03/00	10	0	0	10	0	0	0	0	10	0	0	10	2	17:10	06:55	n/a
04/04/00	11	0	0	11	2	0	0	2	13	0	0	13	2	17:00	07:05	n/a
04/05/00	28	0	0	28	10	0	0	10	38	0	0	38	2	17:05	06:55	n/a
04/06/00	22	0	0	21	26	2	1	24	48	2	1	45	2	17:20	07:15	n/a
04/07/00	12	0	0	12	1	0	0	1	13	0	0	13	2	17:00	07:05	n/a
04/08/00	4	0	0	4	6	0	0	6	10	0	0	10	2	17:00	06:50	n/a
04/09/00	17	1	0	15	3	0	0	3	20	1	0	18	2	16:55	07:00	n/a
04/10/00	1	0	0	1	9	0	0	9	10	0	0	10	2	17:10	06:50	n/a
04/11/00	18	0	0	18	6	0	0	6	24	0	0	24	2	17:20	07:15	n/a
04/12/00	10	0	0	10	8	0	0	8	18	0	0	18	2	17:05	06:40	n/a

Appendix A. Daily trapping abundance of YOY fall-run chinook salmon: December 15, 1999 -- July 31, 2000.

	Nocturnal				Diurnal				Daily Totals**				Trap Operations Data			
Date	Captured	Mortality***	Injury	CWT	Captured	Mortality***	Injury	CWT	Captured	Mortality***	Injury	CWT	Number Fished	Nocturnal (Hours)	Diurnal (Hours)	Non-Diel Specific* (Hours)
04/13/00	8	0	0	8	6	0	0	6	14	0	0	14	2	17:15	07:10	n/a
04/14/00	8	1	1	6	1	0	0	1	9	1	1	7	2	16:50	07:40	n/a
04/15/00	11	0	2	11	15	0	0	15	26	0	2	26	2	16:35	07:15	n/a
04/16/00	15	0	0	14	3	0	0	3	18	0	0	17	2	16:55	07:00	n/a
04/17/00	11	0	0	12	1	0	0	1	12	0	0	13	2	17:10	06:50	n/a
04/18/00	19	0	0	19	4	0	0	4	23	0	0	23	2	17:05	06:35	n/a
04/19/00	10	1	0	9	1	1	0	0	11	2	0	9	2	17:25	06:50	n/a
04/20/00	5	0	0	6	3	0	0	3	8	0	0	9	2	17:00	07:40	n/a
04/21/00	20	0	0	20	3	0	0	3	23	0	0	23	2	16:30	07:25	n/a
04/22/00	15	0	0	15	0	0	0	0	15	0	0	15	2	17:20	06:50	n/a
04/23/00	15	0	0	15	4	0	0	4	19	0	0	19	2	16:50	07:35	n/a
04/24/00	9	0	0	9	2	0	0	2	11	0	0	11	2	16:45	07:30	n/a
04/25/00	5	0	0	5	9	0	0	9	14	0	0	14	2	16:30	07:10	n/a
04/26/00	10	0	0	10	4	0	0	4	14	0	0	14	2	16:50	07:20	n/a
04/27/00	9	0	0	9	1	0	0	1	10	0	0	10	2	16:55	07:05	n/a
04/28/00	9	0	0	9	0	0	0	0	9	0	0	9	2	16:55	07:00	n/a
04/29/00	30	1	0	30	5	1	0	3	35	2	0	33	2	16:50	07:15	n/a
04/30/00	31	2	0	29	9	0	0	9	40	2	0	38	2	16:55	07:00	n/a
05/01/00	105	4	1	100	30	2	0	28	135	6	1	128	2	17:10	07:10	n/a
05/02/00	112	7	0	105	74	1	0	73	186	8	0	178	2	17:25	06:40	n/a
05/03/00	117	3	0	114	35	0	0	35	152	3	0	149	2	17:00	06:55	n/a
05/04/00	56	2	0	54	48	1	0	47	104	3	0	101	2	17:10	07:00	n/a
05/05/00	62	4	1	56	24	1	0	23	86	5	1	81	2	17:05	07:05	n/a
05/06/00	42	1	0	41	0	0	0	0	42	1	0	41	2	17:00	07:00	n/a
05/07/00	85	1	0	84	1	0	0	1	86	1	0	85	1	17:05	06:55	n/a
05/08/00	18	1	0	17	13	0	0	13	31	1	0	30	1	16:50	07:05	n/a
05/09/00	94	2	1	91	42	1	0	41	136	3	1	132	1	17:00	07:00	n/a
05/10/00	101	1	0	100	70	1	0	69	171	2	0	169	1	16:50	07:15	n/a
05/11/00	60	1	0	59	51	2	0	49	111	3	0	108	1	16:50	07:15	n/a
05/12/00	209	5	3	201	43	2	0	41	252	7	3	242	1	17:05	06:55	n/a
05/13/00	166	6	0	160	43	2	0	41	209	8	0	201	1	17:00	06:55	n/a
05/14/00	164	9	3	152	22	0	0	22	186	9	3	174	1	16:55	06:55	n/a
05/15/00	102	1	0	101	12	0	0	12	114	1	0	113	1	17:05	07:05	n/a
05/16/00	130	4	3	123	20	2	0	18	150	6	3	141	1	16:55	07:00	n/a
05/17/00	196	6	0	190	54	0	0	54	250	6	0	244	1	17:05	07:10	n/a
05/18/00	188	3	6	179	54	1	0	53	242	4	6	232	1	16:50	06:55	n/a
05/19/00	124	5	4	115	14	0	0	14	138	5	4	129	1	17:05	06:55	n/a
05/20/00	259	17	3	239	95	1	0	94	354	18	3	333	1	17:45	06:25	n/a
05/21/00	35	5	0	30	35	1	0	34	70	6	0	64	1	17:15	06:35	n/a
05/22/00	116	0	0	80	29	0	0	29	145	0	0	109	1	17:30	06:40	n/a

Appendix A. Daily trapping abundance of YOY fall-run chinook salmon: December 15, 1999 -- July 31, 2000.

	Nocturnal				Diurnal				Daily Totals**				Trap Operations Data			
Date	Captured	Mortality***	Injury	CWT	Captured	Mortality***	Injury	CWT	Captured	Mortality***	Injury	CWT	Number Fished	Nocturnal (Hours)	Diurnal (Hours)	Non-Diel Specific* (Hours)
05/23/00	81	0	0	73	15	0	0	15	96	0	0	88	1	16:55	07:05	n/a
05/24/00	60	0	0	58	45	0	0	45	105	0	0	103	1	17:00	07:05	n/a
05/25/00	40	0	0	39	25	0	0	25	65	0	0	64	1	17:00	06:45	n/a
05/26/00	99	0	0	97	33	0	0	33	132	0	0	130	1	16:55	07:00	n/a
05/27/00	93	0	0	92	17	0	0	17	110	0	0	109	1	16:35	07:15	n/a
05/28/00	95	0	0	92	38	0	0	38	133	0	0	130	1	16:50	07:15	n/a
05/29/00	69	1	0	68	34	0	0	34	103	1	0	102	1	16:55	07:05	n/a
05/30/00	90	0	0	87	52	0	0	52	142	0	0	139	1	16:50	07:10	n/a
05/31/00	119	0	2	117	36	0	0	36	155	0	2	153	1	17:00	07:00	n/a
06/01/00	115	2	0	113	30	1	0	29	145	3	0	142	1	17:05	07:20	n/a
06/02/00	85	1	1	83	29	0	0	29	114	1	1	112	1	17:20	06:15	n/a
06/03/00	75	1	0	74	13	0	0	13	88	1	0	87	1	17:00	07:15	n/a
06/04/00	60	1	0	59	0	0	0	0	60	1	0	59	1	16:45	07:00	n/a
06/05/00	67	0	0	67	19	0	0	19	86	0	0	86	1	09:05	16:05	n/a
06/06/00	73	1	0	72	53	0	0	53	126	1	0	125	1	09:10	16:25	n/a
06/07/00	4	0	0	4	18	0	0	18	22	0	0	22	1	09:00	16:05	n/a
06/08/00	88	2	3	78	31	0	0	30	119	2	3	108	1	09:05	16:15	n/a
06/09/00	82	0	1	82	23	0	0	23	105	0	1	105	1	09:10	16:00	n/a
06/10/00	61	1	1	59	23	0	0	23	84	1	1	82	1	08:05	16:10	n/a
06/11/00	94	0	1	93	36	0	0	36	130	0	1	129	1	08:50	16:00	n/a
06/12/00	47	0	1	46	11	0	0	11	58	0	1	57	1	16:50	07:30	n/a
06/13/00	23	0	0	22	31	0	0	31	54	0	0	53	1	17:05	07:10	n/a
06/14/00	12	12	0	0	9	0	0	9	21	12	0	9	1	17:25	06:50	n/a
06/15/00	30	0	0	30	10	0	0	10	40	0	0	40	1	16:45	07:00	n/a
06/16/00	13	1	1	11	5	0	1	4	18	1	2	15	1	17:10	07:35	n/a
06/17/00	10	0	0	10	8	0	1	7	18	0	1	17	1	16:25	07:30	n/a
06/18/00	16	0	0	16	6	0	0	6	22	0	0	22	1	16:45	07:15	n/a
06/19/00	17	0	0	16	3	0	0	3	20	0	0	19	1	17:00	06:50	n/a
06/20/00	29	0	2	28	1	0	0	1	30	0	2	29	1	16:45	07:05	n/a
06/21/00	13	0	0	13	5	0	0	5	18	0	0	18	1	17:00	07:05	n/a
06/22/00	1	0	0	0	2	0	0	2	3	0	0	2	1	17:00	07:15	n/a
06/23/00	19	0	0	19	5	1	0	4	24	1	0	23	1	16:40	07:00	n/a
06/24/00	2	1	0	1	1	0	0	1	3	1	0	2	1	17:20	08:45	n/a
06/25/00	2	0	0	2	0	0	0	0	2	0	0	2	1	16:55	07:05	n/a
06/26/00	11	0	2	10	2	0	0	2	13	0	2	12	1	17:00	06:55	n/a
06/27/00	4	0	0	4	3	0	0	3	7	0	0	7	1	17:00	07:05	n/a
06/28/00	1	0	0	1	0	0	0	0	1	0	0	1	1	16:45	07:30	n/a
06/29/00	5	0	0	5	1	0	0	1	6	0	0	6	1	16:40	07:10	n/a
06/30/00	0	0	0	0	0	0	0	0	0	0	0	0	1	16:55	07:00	n/a
07/01/00	6	0	0	6	0	0	0	0	6	0	0	6	1	17:05	07:00	n/a

Appendix A. Daily trapping abundance of YOY fall-run chinook salmon: December 15, 1999 -- July 31, 2000.

	Nocturnal				Diurnal				Daily Totals**				Trap Operations Data			
Date	Captured	Mortality***	Injury	CWT	Captured	Mortality***	Injury	CWT	Captured	Mortality***	Injury	CWT	Number Fished	Nocturnal (Hours)	Diurnal (Hours)	Non-Diel Specific* (Hours)
07/02/00	4	0	0	4	0	0	0	0	4	0	0	4	1	16:55	07:00	n/a
07/03/00	3	0	0	3	0	0	0	0	3	0	0	3	1	16:50	07:10	n/a
07/04/00	2	0	1	1	1	0	0	1	3	0	1	2	1	16:50	07:05	n/a
07/05/00	1	0	0	1	0	0	0	0	1	0	0	1	1	17:00	07:00	n/a
07/06/00	0	0	0	0	1	0	0	1	1	0	0	1	1	16:55	07:00	n/a
07/07/00	1	0	0	1	0	0	0	0	1	0	0	1	1	17:00	07:00	n/a
07/08/00	1	0	0	1	2	0	0	2	3	0	0	3	1	17:00	07:10	n/a
07/09/00	1	0	0	1	1	0	0	1	2	0	0	2	1	16:45	07:15	n/a
07/10/00	3	0	0	3	0	0	0	0	3	0	0	3	1	16:50	07:00	n/a
07/11/00	0	0	0	0	1	0	0	1	1	0	0	1	1	16:35	07:30	n/a
07/12/00	1	0	0	1	1	0	0	1	2	0	0	2	1	16:45	07:10	n/a
07/13/00	1	0	0	1	0	0	0	0	1	0	0	1	1	16:40	07:15	n/a
07/14/00	1	0	0	1	0	0	0	0	1	0	0	1	1	16:50	07:00	n/a
07/15/00	0	0	0	0	0	0	0	0	0	0	0	0	1	17:00	06:55	n/a
07/16/00	1	0	0	1	0	0	0	0	1	0	0	1	1	16:55	07:05	n/a
07/17/00	2	0	0	2	0	0	0	0	2	0	0	2	1	16:45	07:00	n/a
07/18/00	0	0	0	0	0	0	0	0	0	0	0	0	1	16:45	07:15	n/a
07/19/00	0	0	0	0	0	0	0	0	0	0	0	0	1	16:50	07:00	n/a
07/20/00	0	0	0	0	0	0	0	0	0	0	0	0	1	16:55	07:20	n/a
07/21/00	0	0	0	0	0	0	0	0	0	0	0	0	1	16:40	07:10	n/a
07/22/00	0	0	0	0	0	0	0	0	0	0	0	0	1	16:50	07:05	n/a
07/23/00	1	0	0	1	0	0	0	0	1	0	0	1	1	16:45	07:15	n/a
07/24/00	0	0	0	0	0	0	0	0	0	0	0	0	1	17:00	07:05	n/a
07/25/00	0	0	0	0	0	0	0	0	0	0	0	0	1	16:50	06:45	n/a
07/26/00	0	0	0	0	0	0	0	0	0	0	0	0	1	17:00	07:10	n/a
07/27/00	0	0	0	0	0	0	0	0	0	0	0	0	1	16:55	07:00	n/a
07/28/00	0	0	0	0	0	0	0	0	0	0	0	0	1	16:50	07:00	n/a
07/29/00	0	0	0	0	1	0	0	0	1	0	0	0	1	16:55	07:00	n/a
07/30/00	1	1	0	0	0	0	0	0	1	1	0	0	1	16:45	07:00	n/a
07/31/00	0	0	0	0	n/a	n/a	n/a	n/a	0	0	0	0	1	16:05	n/a	n/a
TOTALS	10,610	244	70	9,966	1,972	31	6	1,918	15,002	368	77	12,276				

"n/a" - Indicates no data collected or no applicable data available.

*** Trap checked once daily or every other day without regard to diel (day/night) intervals.

**** Daily totals include fish captured during nocturnal, diurnal, and non-diel specific periods. Therefore, sum of nocturnal and diurnal counts will not always equal daily total if non-diel specific captures occur.

***** Includes mortality observed in traps only.

Appendix B. Daily trapping abundance of juvenile steelhead: December 15, 1999 -- July 31, 2000.

Date	Nocturnal			Diurnal			Daily Totals**			Trap Operations Data			
	YOY	Age 1+	Age 1+ Ad-clip	YOY	Age 1+	Age 1+ Ad-clip	YOY	Age 1+	Age 1+ Ad-clip	Number Fished	Nocturnal (Hours)	Diurnal (Hours)	Non-Diel Specific* (Hours)
12/15/99	0	0	0	0	0	0	0	0	0	2	15:22	07:00	n/a
12/16/99	0	0	0	0	0	0	0	0	0	2	16:48	06:46	n/a
12/17/99	0	1	0	0	0	0	0	1	0	2	17:39	06:25	n/a
12/18/99	0	0	0	0	0	0	0	0	0	2	17:30	n/a	n/a
12/19/99	0	0	0	0	0	0	0	0	0	2	n/a	n/a	23:42
12/20/99	0	0	0	0	0	0	0	0	0	2	n/a	n/a	23:39
12/21/99	*	*	*	*	*	*	0	0	0	2	n/a	n/a	24:20
12/22/99	*	*	*	*	*	*	0	0	0	2	n/a	n/a	24:40
12/23/99	*	*	*	*	*	*	0	0	0	2	n/a	n/a	23:10
12/24/99	*	*	*	*	*	*	0	0	0	2	n/a	n/a	24:09
12/25/99	*	*	*	*	*	*	0	0	0	2	n/a	n/a	n/a
12/26/99	*	*	*	*	*	*	0	0	2	2	n/a	n/a	40:58
12/27/99	*	*	*	*	*	*	0	0	7	2	n/a	n/a	23:55
12/28/99	*	*	*	*	*	*	0	0	37	2	n/a	n/a	24:55
12/29/99	*	*	*	*	*	*	0	0	50	2	n/a	n/a	23:30
12/30/99	*	*	*	*	*	*	0	0	19	2	n/a	n/a	24:00
12/31/99	*	*	*	*	*	*	0	0	19	2	n/a	n/a	n/a
01/01/00	*	*	*	*	*	*	0	0	0	2	n/a	n/a	n/a
01/02/00	*	*	*	*	*	*	0	1	216	2	n/a	n/a	41:45
01/03/00	*	*	*	*	*	*	0	0	75	2	n/a	n/a	24:00
01/04/00	*	*	*	*	*	*	0	0	45	2	n/a	n/a	23:45
01/05/00	*	*	*	*	*	*	0	0	41	2	n/a	n/a	24:00
01/06/00	*	*	*	*	*	*	0	1	65	2	n/a	n/a	24:40
01/07/00	*	*	*	*	*	*	0	0	109	2	n/a	n/a	24:00
01/08/00	*	*	*	*	*	*	0	0	40	2	n/a	n/a	23:50
01/09/00	*	*	*	*	*	*	0	0	37	2	n/a	n/a	23:50
01/10/00	*	*	*	*	*	*	0	0	22	2	n/a	n/a	23:45
01/11/00	*	*	*	*	*	*	0	0	11	2	n/a	n/a	24:15
01/12/00	*	*	*	*	*	*	0	0	21	2	n/a	n/a	24:50
01/13/00	*	*	*	*	*	*	0	0	5	2	n/a	n/a	23:50
01/14/00	*	*	*	*	*	*	0	0	9	2	n/a	n/a	23:55
01/15/00	*	*	*	*	*	*	0	3	0	2	n/a	n/a	24:00
01/16/00	*	*	*	*	*	*	0	1	5	2	n/a	n/a	23:55
01/17/00	*	*	*	*	*	*	0	0	8	2	n/a	n/a	23:50
01/18/00	*	*	*	*	*	*	0	0	3	2	n/a	n/a	24:10
01/19/00	*	*	*	*	*	*	0	1	1	2	n/a	n/a	24:00
01/20/00	*	*	*	*	*	*	0	0	0	2	n/a	n/a	23:40
01/21/00	*	*	*	*	*	*	0	2	0	2	n/a	n/a	24:05
01/22/00	*	*	*	*	*	*	0	1	1	2	n/a	n/a	24:05
01/23/00	*	*	*	*	*	*	0	0	0	2	n/a	n/a	25:05
01/24/00	*	*	*	*	*	*	0	0	0	2	n/a	n/a	23:15
01/25/00	*	*	*	*	*	*	0	0	0	2	n/a	n/a	24:30
01/26/00	*	*	*	*	*	*	0	0	0	2	n/a	n/a	23:30
01/27/00	*	*	*	0	0	0	0	0	0	2	n/a	n/a	24:55

Appendix B. Daily trapping abundance of juvenile steelhead: December 15, 1999 -- July 31, 2000.

Date	Nocturnal			Diurnal			Daily Totals**			Trap Operations Data			
	YOY	Age 1+	Age 1+ Ad-clip	YOY	Age 1+	Age 1+ Ad-clip	YOY	Age 1+	Age 1+ Ad-clip	Number Fished	Nocturnal (Hours)	Diurnal (Hours)	Non-Diel Specific* (Hours)
01/28/00	0	0	0	0	0	0	0	0	0	2	06:30	16:50	n/a
01/29/00	0	0	0	0	0	0	0	0	0	2	06:35	17:20	n/a
01/30/00	0	0	0	0	0	0	0	0	0	2	06:45	17:25	n/a
01/31/00	0	0	0	0	0	0	0	0	0	2	17:20	07:20	n/a
02/01/00	0	0	0	0	0	0	0	0	0	2	17:25	07:10	n/a
02/02/00	0	0	0	0	0	0	0	0	0	2	17:15	06:35	n/a
02/03/00	0	0	0	0	0	0	0	0	0	2	17:55	06:30	n/a
02/04/00	0	0	0	0	0	0	0	0	0	2	17:35	06:25	n/a
02/05/00	0	0	0	0	0	0	0	0	0	2	18:10	06:25	n/a
02/06/00	0	0	0	0	0	0	0	0	0	2	17:20	06:30	n/a
02/07/00	0	0	0	0	0	0	0	0	0	2	17:25	06:35	n/a
02/08/00	0	0	0	0	0	0	0	0	0	2	17:35	07:20	n/a
02/09/00	0	0	0	0	0	0	0	0	0	2	16:35	07:20	n/a
02/10/00	0	0	0	0	0	0	0	0	0	2	17:10	06:50	n/a
02/11/00	0	0	1	0	0	0	0	0	1	2	17:15	06:40	n/a
02/12/00	0	0	0	0	1	0	0	1	0	2	18:00	06:25	n/a
02/13/00	0	1	0	0	0	0	0	1	0	2	18:00	05:40	n/a
02/14/00	0	0	0	0	0	0	0	0	0	2	18:25	06:35	n/a
02/15/00	0	0	0	0	0	0	0	0	0	2	17:30	06:20	n/a
02/16/00	0	0	0	0	0	0	0	0	0	2	18:35	06:15	n/a
02/17/00	0	0	0	0	0	0	0	0	0	2	18:15	06:00	n/a
02/18/00	0	1	1	0	0	0	0	1	1	2	17:50	06:05	n/a
02/19/00	0	0	1	0	0	0	0	0	1	2	17:40	06:20	n/a
02/20/00	0	0	0	0	0	0	0	0	0	2	17:50	06:35	n/a
02/21/00	0	0	0	0	0	1	0	0	1	2	17:40	06:15	n/a
02/22/00	0	0	0	0	0	0	0	0	0	2	17:35	06:10	n/a
02/23/00	0	0	2	0	0	0	0	0	2	2	18:05	06:35	n/a
02/24/00	0	0	2	0	0	0	0	0	2	2	18:20	06:05	n/a
02/25/00	0	0	1	0	0	0	0	0	1	2	17:30	06:30	n/a
02/26/00	0	0	0	0	0	0	0	0	0	2	17:45	06:15	n/a
02/27/00	0	0	0	0	0	0	0	0	0	2	17:55	06:40	n/a
02/28/00	0	0	1	0	0	1	0	0	2	2	18:00	06:10	n/a
02/29/00	0	2	0	0	0	0	0	2	0	2	17:45	06:25	n/a
03/01/00	0	0	0	0	0	0	0	0	0	2	17:40	06:55	n/a
03/02/00	0	3	0	0	0	0	0	3	0	2	17:30	06:20	n/a
03/03/00	0	0	0	0	0	0	0	0	0	2	17:55	06:00	n/a
03/04/00	2	0	0	0	0	0	2	0	0	2	17:55	06:15	n/a
03/05/00	0	0	0	0	0	0	0	0	0	2	17:35	06:35	n/a
03/06/00	0	0	0	0	0	0	0	0	0	2	17:40	06:35	n/a
03/07/00	0	0	0	0	0	0	0	0	0	2	17:20	06:35	n/a
03/08/00	0	0	0	0	0	0	0	0	0	2	17:25	07:00	n/a
03/09/00	0	0	0	0	0	0	0	0	0	2	17:05	06:20	n/a
03/10/00	0	0	0	0	0	0	0	0	0	2	17:40	06:30	n/a
03/11/00	0	0	1	0	0	0	0	0	1	2	17:25	06:40	n/a

Appendix B. Daily trapping abundance of juvenile steelhead: December 15, 1999 -- July 31, 2000.

	Nocturnal			Diurnal			Daily Totals**			Trap Operations Data			
Date	YOY	Age 1+	Age 1+ Ad-clip	YOY	Age 1+	Age 1+ Ad-clip	YOY	Age 1+	Age 1+ Ad-clip	Number Fished	Nocturnal (Hours)	Diurnal (Hours)	Non-Diel Specific* (Hours)
03/12/00	0	1	1	0	0	0	0	1	1	2	17:25	06:05	n/a
03/13/00	1	0	0	0	0	0	1	0	0	2	18:00	06:30	n/a
03/14/00	1	0	0	0	0	0	1	0	0	2	17:55	06:50	n/a
03/15/00	0	0	0	0	0	0	0	0	0	2	16:50	07:10	n/a
03/16/00	0	0	0	0	0	0	0	0	0	2	17:45	06:15	n/a
03/17/00	0	0	0	0	0	0	0	0	0	2	17:25	06:45	n/a
03/18/00	1	0	0	0	0	0	1	0	0	2	17:10	07:15	n/a
03/19/00	0	0	0	0	0	0	0	0	0	2	16:35	07:20	n/a
03/20/00	0	0	0	0	0	0	0	0	0	2	17:10	07:10	n/a
03/21/00	0	0	0	0	0	0	0	0	0	2	17:10	06:45	n/a
03/22/00	0	0	0	0	0	0	0	0	0	2	17:05	06:40	n/a
03/23/00	0	0	0	0	0	0	0	0	0	2	17:50	07:00	n/a
03/24/00	0	0	0	0	0	0	0	0	0	2	17:10	07:10	n/a
03/25/00	0	0	0	0	0	0	0	0	0	2	17:05	06:30	n/a
03/26/00	0	0	0	0	0	0	0	0	0	2	17:05	07:15	n/a
03/27/00	0	0	0	0	0	0	0	0	0	2	16:50	06:50	n/a
03/28/00	0	0	0	0	0	0	0	0	0	2	17:10	07:00	n/a
03/29/00	0	0	0	0	0	0	0	0	0	2	18:30	05:35	n/a
03/30/00	1	1	0	0	0	0	1	1	0	2	17:20	06:40	n/a
03/31/00	0	0	0	0	0	0	0	0	0	2	17:40	06:40	n/a
04/01/00	0	0	0	0	0	0	0	0	0	2	17:15	06:30	n/a
04/02/00	0	0	0	1	1	0	1	1	0	2	17:30	06:45	n/a
04/03/00	0	0	0	0	0	0	0	0	0	2	17:10	06:55	n/a
04/04/00	2	0	0	0	0	0	2	0	0	2	17:00	07:05	n/a
04/05/00	2	0	0	0	0	0	2	0	0	2	17:05	06:55	n/a
04/06/00	0	1	0	0	0	0	0	1	0	2	17:20	07:15	n/a
04/07/00	0	0	0	0	0	0	0	0	0	2	17:00	07:05	n/a
04/08/00	0	0	0	0	0	0	0	0	0	2	17:00	06:50	n/a
04/09/00	0	0	0	0	0	0	0	0	0	2	16:55	07:00	n/a
04/10/00	1	0	0	0	0	0	1	0	0	2	17:10	06:50	n/a
04/11/00	0	0	0	0	0	0	0	0	0	2	17:20	07:15	n/a
04/12/00	1	0	0	0	0	0	1	0	0	2	17:05	06:40	n/a
04/13/00	0	1	0	0	0	0	0	1	0	2	17:15	07:10	n/a
04/14/00	1	0	0	0	0	0	1	0	0	2	16:50	07:40	n/a
04/15/00	0	1	0	0	0	0	0	1	0	2	16:35	07:15	n/a
04/16/00	0	1	0	0	1	0	0	2	0	2	16:55	07:00	n/a
04/17/00	1	0	0	0	0	0	1	0	0	2	17:10	06:50	n/a
04/18/00	1	0	0	0	0	0	1	0	0	2	17:05	06:35	n/a
04/19/00	0	0	0	0	0	0	0	0	0	2	17:25	06:50	n/a
04/20/00	1	0	0	0	0	0	1	0	0	2	17:00	07:40	n/a
04/21/00	1	1	0	0	0	0	1	1	0	2	16:30	07:25	n/a
04/22/00	2	0	0	0	1	0	2	1	0	2	17:20	06:50	n/a
04/23/00	0	0	0	0	0	0	0	0	0	2	16:50	07:35	n/a
04/24/00	0	0	0	0	0	0	0	0	0	2	16:45	07:30	n/a

Appendix B. Daily trapping abundance of juvenile steelhead: December 15, 1999 -- July 31, 2000.

	Nocturnal			Diurnal			Daily Totals**			Trap Operations Data			
Date	YOY	Age 1+	Age 1+ Ad-clip	YOY	Age 1+	Age 1+ Ad-clip	YOY	Age 1+	Age 1+ Ad-clip	Number Fished	Nocturnal (Hours)	Diurnal (Hours)	Non-Diel Specific* (Hours)
04/25/00	0	1	0	0	1	0	0	2	0	2	16:30	07:10	n/a
04/26/00	1	0	0	0	0	0	1	0	0	2	16:50	07:20	n/a
04/27/00	1	0	0	0	0	0	1	0	0	2	16:55	07:05	n/a
04/28/00	2	0	0	0	0	0	2	0	0	2	16:55	07:00	n/a
04/29/00	1	0	0	0	0	0	1	0	0	2	16:50	07:15	n/a
04/30/00	1	1	0	1	0	0	2	1	0	2	16:55	07:00	n/a
05/01/00	2	0	0	0	0	0	2	0	0	2	17:10	07:10	n/a
05/02/00	3	0	0	0	0	0	3	0	0	2	17:25	06:40	n/a
05/03/00	2	1	0	0	0	0	2	1	0	2	17:00	06:55	n/a
05/04/00	3	0	0	1	1	0	4	1	0	2	17:10	07:00	n/a
05/05/00	2	0	0	0	0	0	2	0	0	2	17:05	07:05	n/a
05/06/00	1	0	0	0	0	0	1	0	0	2	17:00	07:00	n/a
05/07/00	0	0	0	0	0	0	0	0	0	1	17:05	06:55	n/a
05/08/00	0	0	0	0	1	0	0	1	0	1	16:50	07:05	n/a
05/09/00	0	0	0	0	0	0	0	0	0	1	17:00	07:00	n/a
05/10/00	1	0	0	0	0	0	1	0	0	1	16:50	07:15	n/a
05/11/00	1	0	0	0	0	0	1	0	0	1	16:50	07:15	n/a
05/12/00	0	0	0	1	0	0	1	0	0	1	17:05	06:55	n/a
05/13/00	0	0	0	0	0	0	0	0	0	1	17:00	06:55	n/a
05/14/00	1	0	0	1	0	0	2	0	0	1	16:55	06:55	n/a
05/15/00	4	0	0	1	1	0	5	1	0	1	17:05	07:05	n/a
05/16/00	0	1	0	0	0	0	0	1	0	1	16:55	07:00	n/a
05/17/00	2	0	0	0	0	0	2	0	0	1	17:05	07:10	n/a
05/18/00	1	0	0	0	0	0	1	0	0	1	16:50	06:55	n/a
05/19/00	5	0	0	0	0	0	5	0	0	1	17:05	06:55	n/a
05/20/00	4	0	0	0	0	0	4	0	0	1	17:45	06:25	n/a
05/21/00	0	0	0	0	0	0	0	0	0	1	17:15	06:35	n/a
05/22/00	1	0	0	0	0	0	1	0	0	1	17:30	06:40	n/a
05/23/00	3	0	0	1	0	0	4	0	0	1	16:55	07:05	n/a
05/24/00	4	0	0	0	0	0	4	0	0	1	17:00	07:05	n/a
05/25/00	0	0	0	0	0	0	0	0	0	1	17:00	06:45	n/a
05/26/00	3	0	0	0	0	0	3	0	0	1	16:55	07:00	n/a
05/27/00	1	0	0	0	0	0	1	0	0	1	16:35	07:15	n/a
05/28/00	2	0	0	0	0	0	2	0	0	1	16:50	07:15	n/a
05/29/00	0	0	0	0	0	0	0	0	0	1	16:55	07:05	n/a
05/30/00	2	0	0	0	0	0	2	0	0	1	16:50	07:10	n/a
05/31/00	2	0	0	0	0	0	2	0	0	1	17:00	07:00	n/a
06/01/00	1	0	0	1	0	0	2	0	0	1	17:05	07:20	n/a
06/02/00	0	0	0	0	0	0	0	0	0	1	17:20	06:15	n/a
06/03/00	1	0	0	0	1	0	1	1	0	1	17:00	07:15	n/a
06/04/00	0	1	0	0	0	0	0	1	0	1	16:45	07:00	n/a
06/05/00	0	0	0	0	0	0	0	0	0	1	09:05	16:05	n/a
06/06/00	0	0	0	0	0	0	0	0	0	1	09:10	16:25	n/a
06/07/00	0	0	0	0	0	0	0	0	0	1	09:00	16:05	n/a

Appendix B. Daily trapping abundance of juvenile steelhead: December 15, 1999 -- July 31, 2000.

Date	Nocturnal			Diurnal			Daily Totals**			Trap Operations Data			
	YOY	Age 1+	Age 1+ Ad-clip	YOY	Age 1+	Age 1+ Ad-clip	YOY	Age 1+	Age 1+ Ad-clip	Number Fished	Nocturnal (Hours)	Diurnal (Hours)	Non-Diel Specific* (Hours)
06/08/00	0	0	0	0	0	0	0	0	0	1	09:05	16:15	n/a
06/09/00	0	0	0	0	0	0	0	0	0	1	09:10	16:00	n/a
06/10/00	0	1	14	0	0	4	0	1	18	1	09:05	16:10	n/a
06/11/00	2	0	4	0	0	1	2	0	5	1	08:50	16:00	n/a
06/12/00	1	0	2	1	0	0	2	0	2	1	16:50	07:30	n/a
06/13/00	0	0	1	0	0	0	0	0	1	1	17:05	07:10	n/a
06/14/00	1	0	1	0	0	0	1	0	1	1	17:25	06:50	n/a
06/15/00	1	0	0	1	0	0	2	0	0	1	16:45	07:00	n/a
06/16/00	0	0	0	1	0	0	1	0	0	1	17:10	07:35	n/a
06/17/00	2	0	0	0	0	0	2	0	0	1	16:25	07:30	n/a
06/18/00	1	0	0	0	0	0	1	0	0	1	16:45	07:15	n/a
06/19/00	0	0	0	0	0	0	0	0	0	1	17:00	06:50	n/a
06/20/00	2	0	1	0	0	0	2	0	1	1	16:45	07:05	n/a
06/21/00	3	1	1	2	0	0	5	1	1	1	17:00	07:05	n/a
06/22/00	0	0	0	0	0	0	0	0	0	1	17:00	07:15	n/a
06/23/00	3	0	0	0	0	0	3	0	0	1	16:40	07:00	n/a
06/24/00	1	0	0	0	0	0	1	0	0	1	17:20	06:45	n/a
06/25/00	0	0	0	0	0	0	0	0	0	1	16:55	07:05	n/a
06/26/00	0	0	0	0	0	0	0	0	0	1	17:00	06:55	n/a
06/27/00	1	0	0	0	0	0	1	0	0	1	17:00	07:05	n/a
06/28/00	1	0	0	0	0	0	1	0	0	1	16:45	07:30	n/a
06/29/00	0	0	0	0	0	0	0	0	0	1	16:40	07:10	n/a
06/30/00	2	0	0	0	0	0	2	0	0	1	16:55	07:00	n/a
07/01/00	3	1	0	0	0	0	3	1	0	1	17:05	07:00	n/a
07/02/00	0	0	0	0	0	0	0	0	0	1	16:55	07:00	n/a
07/03/00	0	0	0	0	0	0	0	0	0	1	16:50	07:10	n/a
07/04/00	0	0	0	0	0	0	0	0	0	1	16:50	07:05	n/a
07/05/00	1	0	0	0	0	0	1	0	0	1	17:00	07:00	n/a
07/06/00	0	0	0	0	0	0	0	0	0	1	16:55	07:00	n/a
07/07/00	4	0	0	0	0	0	4	0	0	1	17:00	07:00	n/a
07/08/00	0	0	0	0	0	0	0	0	0	1	17:00	07:10	n/a
07/09/00	0	0	0	0	0	0	0	0	0	1	16:45	07:15	n/a
07/10/00	0	0	0	0	0	0	0	0	0	1	16:50	07:00	n/a
07/11/00	0	0	0	0	0	0	0	0	0	1	16:35	07:30	n/a
07/12/00	0	1	0	0	0	0	0	1	0	1	16:45	07:10	n/a
07/13/00	1	0	0	0	0	0	1	0	0	1	16:40	07:15	n/a
07/14/00	0	0	0	0	0	0	0	0	0	1	16:50	07:00	n/a
07/15/00	0	1	0	0	0	0	0	1	0	1	17:00	06:55	n/a
07/16/00	1	0	0	1	0	0	2	0	0	1	16:55	07:05	n/a
07/17/00	0	0	0	0	0	0	0	0	0	1	16:45	07:00	n/a
07/18/00	0	0	1	0	0	0	0	0	1	1	16:45	07:15	n/a
07/19/00	0	0	0	0	0	0	0	0	0	1	16:50	07:00	n/a
07/20/00	0	0	0	0	0	0	0	0	0	1	16:55	07:20	n/a
07/21/00	0	0	1	0	0	0	0	0	1	1	16:40	07:10	n/a

Appendix B. Daily trapping abundance of juvenile steelhead: December 15, 1999 -- July 31, 2000.

Date	Nocturnal			Diurnal			Daily Totals**			Trap Operations Data			
	YOY	Age 1+	Age 1+ Ad-clip	YOY	Age 1+	Age 1+ Ad-clip	YOY	Age 1+	Age 1+ Ad-clip	Number Fished	Nocturnal (Hours)	Diurnal (Hours)	Non-Diel Specific* (Hours)
07/22/00	0	0	0	0	0	0	0	0	0	1	16:50	07:05	n/a
07/23/00	0	0	0	0	0	0	0	0	0	1	16:45	07:15	n/a
07/24/00	0	0	0	1	0	0	1	0	0	1	17:00	07:05	n/a
07/25/00	0	0	0	0	0	0	0	0	0	1	16:50	06:45	n/a
07/26/00	0	0	3	1	0	0	1	0	3	1	17:00	07:10	n/a
07/27/00	1	0	0	0	0	0	1	0	0	1	16:55	07:00	n/a
07/28/00	0	0	0	0	0	0	0	0	0	1	16:50	07:00	n/a
07/29/00	0	0	0	0	0	0	0	0	0	1	16:55	07:00	n/a
07/30/00	0	0	0	0	0	0	0	0	0	1	16:45	07:00	n/a
07/31/00	0	0	0	n/a	n/a	n/a	0	0	0	1	16:05	n/a	n/a
TOTALS	109	25	40	16	9	7	125	44	895				

"n/a" - Indicates no data collected or no applicable data available.

"*" Trap checked once daily or every other day without regard to diel (day/night) intervals.

"**" Daily totals include fish captured during nocturnal, diurnal, and non-diel specific periods. Therefore, sum of nocturnal and diurnal counts will not always equal daily total if non-diel specific captures occur.

Appendix C-1. Estimated daily abundance of downstream migrant fall-run chinook salmon: December 15, 1999 - July 31, 2000.

Note: Differences in totals are attributable to rounding.

n/a or na - indicates that separate diel census data and estimates for day and night passage abundance is not available.

Date	YOY# Day	YOY # Night	Est. Trap Eff Day	Est. Trap Eff Night	Est No. YOY Day	Est No. YOY Night	Est No. YOY Total	95% Confidence Limits Hi	Lo
12/15/99	0	1	0.162	0.090	0	11	11	14	9
12/16/99	0	2	0.162	0.090	0	22	22	29	18
12/17/99	1	0	0.162	0.090	6	0	6	7	5
12/18/99	0	0	0.162	0.090	0	0	0	0	0
12/19/99	0	0	0.162	0.090	0	0	0	0	0
12/20/99	0	0	0.162	0.090	0	0	0	0	0
12/21/99	na	na	0.162	0.090	na	na	19	24	16
12/22/99	na	na	0.162	0.090	na	na	0	0	0
12/23/99	na	na	0.162	0.090	na	na	0	0	0
12/24/99	na	na	0.162	0.090	na	na	19	24	16
12/25/99	na	na	0.162	0.090	na	na	0	0	0
12/26/99	na	na	0.162	0.090	na	na	94	118	78
12/27/99	na	na	0.162	0.090	na	na	28	36	23
12/28/99	na	na	0.162	0.090	na	na	75	95	62
12/29/99	na	na	0.162	0.090	na	na	47	59	39
12/30/99	na	na	0.162	0.090	na	na	0	0	0
12/31/99	na	na	0.162	0.090	na	na	9	12	8
01/01/00	na	na	0.162	0.090	na	na	0	0	0
01/02/00	na	na	0.162	0.090	na	na	0	0	0
01/03/00	na	na	0.162	0.090	na	na	19	24	16
01/04/00	na	na	0.162	0.090	na	na	38	47	31
01/05/00	na	na	0.162	0.090	na	na	28	36	23
01/06/00	na	na	0.162	0.090	na	na	0	0	0
01/07/00	na	na	0.162	0.090	na	na	38	47	31
01/08/00	na	na	0.162	0.090	na	na	9	12	8
01/09/00	na	na	0.162	0.090	na	na	38	47	31
01/10/00	na	na	0.162	0.090	na	na	66	83	54
01/11/00	na	na	0.162	0.090	na	na	113	142	93
01/12/00	na	na	0.162	0.090	na	na	47	59	39
01/13/00	na	na	0.162	0.090	na	na	0	0	0
01/14/00	na	na	0.162	0.090	na	na	19	24	16
01/15/00	na	na	0.162	0.090	na	na	66	83	54
01/16/00	na	na	0.162	0.090	na	na	19	24	16
01/17/00	na	na	0.162	0.090	na	na	9	12	8
01/18/00	na	na	0.162	0.090	na	na	9	12	8
01/19/00	na	na	0.162	0.090	na	na	19	24	16
01/20/00	na	na	0.162	0.090	na	na	28	36	23
01/21/00	na	na	0.162	0.090	na	na	19	24	16
01/22/00	na	na	0.162	0.090	na	na	56	71	47
01/23/00	na	na	0.162	0.090	na	na	38	47	31
01/24/00	na	na	0.162	0.090	na	na	28	36	23
01/25/00	na	na	0.162	0.090	na	na	75	95	62
01/26/00	na	na	0.162	0.090	na	na	28	36	23
01/27/00	26	na	0.162	0.090	160	na	21,984	27,759	18,223
01/28/00	40	733	0.162	0.090	247	8,144	8,391	10,763	6,878
01/29/00	3	325	0.162	0.090	19	3,611	3,630	4,665	2,971
01/30/00	4	364	0.162	0.090	25	4,044	4,069	5,229	3,330
01/31/00	2	87	0.162	0.090	12	967	979	1,257	802
02/01/00	14	198	0.162	0.090	86	2,200	2,286	2,931	1,875
02/02/00	13	785	0.040	0.086	325	9,128	9,453	12,216	7,717
02/03/00	24	352	0.040	0.086	600	4,093	4,693	6,177	3,797
02/04/00	3	372	0.040	0.086	75	4,326	4,401	5,668	3,598
02/05/00	16	422	0.040	0.086	400	4,907	5,307	6,914	4,315
02/06/00	13	252	0.040	0.086	325	2,930	3,255	4,261	2,641

Appendix C-1. Estimated daily abundance of downstream migrant fall-run chinook salmon: December 15, 1999 - July 31, 2000.

Note: Differences in totals are attributable to rounding.
n/a or na - indicates that separate diel census data and estimates for day and night passage abundance is not available.

Date	YOY# Day	YOY # Night	Est. Trap Eff Day	Est. Trap Eff Night	Est No. YOY Day	Est No. YOY Night	Est No. YOY Total	95% Confidence Limits Hi	Lo
02/07/00	7	135	0.040	0.086	175	1,570	1,745	2,284	1,415
02/08/00	21	132	0.040	0.086	525	1,535	2,060	2,778	1,646
02/09/00	10	101	0.040	0.086	250	1,174	1,424	1,892	1,147
02/10/00	12	60	0.040	0.086	300	698	998	1,357	794
02/11/00	3	94	0.040	0.086	75	1,093	1,168	1,518	951
02/12/00	8	117	0.040	0.086	200	1,360	1,560	2,054	1,262
02/13/00	16	218	0.040	0.086	400	2,535	2,935	3,869	2,372
02/14/00	9	63	0.040	0.086	225	733	958	1,286	767
02/15/00	9	25	0.040	0.086	225	291	516	719	405
02/16/00	0	40	0.041	0.040	0	1,000	1,000	1,379	784
02/17/00	0	54	0.041	0.040	0	1,350	1,350	1,862	1,059
02/18/00	3	45	0.041	0.040	73	1,125	1,198	1,652	940
02/19/00	3	50	0.041	0.040	73	1,250	1,323	1,824	1,038
02/20/00	0	71	0.041	0.040	0	1,775	1,775	2,448	1,392
02/21/00	2	50	0.041	0.040	49	1,250	1,299	1,791	1,019
02/22/00	2	30	0.041	0.040	49	750	799	1,101	627
02/23/00	4	16	0.041	0.040	98	400	498	685	391
02/24/00	3	141	0.041	0.040	73	3,525	3,598	4,962	2,822
02/25/00	2	50	0.041	0.040	49	1,250	1,299	1,791	1,019
02/26/00	2	56	0.041	0.040	49	1,400	1,449	1,998	1,137
02/27/00	1	38	0.041	0.040	24	950	974	1,344	764
02/28/00	3	32	0.041	0.040	73	800	873	1,203	685
02/29/00	2	28	0.041	0.040	49	700	749	1,032	587
03/01/00	5	27	0.041	0.040	122	675	797	1,098	626
03/02/00	3	35	0.041	0.040	73	875	948	1,307	744
03/03/00	0	37	0.041	0.040	0	925	925	1,276	725
03/04/00	4	38	0.041	0.040	98	950	1,048	1,444	822
03/05/00	1	20	0.041	0.040	24	500	524	723	411
03/06/00	0	5	0.041	0.040	0	125	125	172	98
03/07/00	0	1	0.041	0.040	0	25	25	34	20
03/08/00	2	3	0.041	0.040	49	75	124	170	97
03/09/00	0	5	0.041	0.040	0	125	125	172	98
03/10/00	0	2	0.041	0.040	0	50	50	69	39
03/11/00	1	4	0.041	0.040	24	100	124	171	98
03/12/00	1	7	0.041	0.040	24	175	199	275	156
03/13/00	1	4	0.092	0.045	11	89	100	143	77
03/14/00	0	28	0.092	0.045	0	622	622	903	475
03/15/00	12	6	0.092	0.045	130	133	264	358	210
03/16/00	8	23	0.092	0.045	87	511	598	852	462
03/17/00	5	13	0.092	0.045	54	289	343	488	265
03/18/00	1	5	0.092	0.045	11	111	122	175	94
03/19/00	1	1	0.092	0.045	11	22	33	46	26
03/20/00	1	4	0.092	0.045	11	89	100	143	77
03/21/00	2	3	0.092	0.045	22	67	88	124	69
03/22/00	0	5	0.092	0.045	0	111	111	161	85
03/23/00	0	2	0.020	0.025	0	80	80	400	44
03/24/00	0	0	0.020	0.025	0	0	0	0	0
03/25/00	0	0	0.020	0.025	0	0	0	0	0
03/26/00	0	2	0.020	0.025	0	80	80	400	44
03/27/00	1	0	0.020	0.025	50	0	50	100	33
03/28/00	0	2	0.020	0.025	0	80	80	400	44
03/29/00	1	1	0.020	0.025	50	40	90	300	56
03/30/00	2	11	0.020	0.025	100	440	540	2,400	311
03/31/00	4	9	0.020	0.025	200	360	560	2,200	333

Appendix C-1. Estimated daily abundance of downstream migrant fall-run chinook salmon: December 15, 1999 - July 31, 2000.

Note: Differences in totals are attributable to rounding.
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Date	YOY# Day	YOY # Night	Est. Trap Eff Day	Est. Trap Eff Night	Est No. YOY Day	Est No. YOY Night	Est No. YOY Total	95% Confidence Limits Hi	95% Confidence Limits Lo
04/01/00	0	8	0.020	0.025	0	320	320	1,600	178
04/02/00	3	11	0.020	0.025	150	440	590	2,500	344
04/03/00	0	10	0.020	0.025	0	400	400	2,000	222
04/04/00	2	11	0.136	0.102	15	108	123	152	103
04/05/00	10	28	0.136	0.102	74	275	348	428	293
04/06/00	26	22	0.136	0.102	191	216	407	494	346
04/07/00	1	12	0.136	0.102	7	118	125	155	105
04/08/00	6	4	0.136	0.102	44	39	83	101	71
04/09/00	3	17	0.136	0.102	22	167	189	233	158
04/10/00	9	1	0.136	0.102	66	10	76	90	66
04/11/00	6	18	0.136	0.102	44	176	221	272	186
04/12/00	8	10	0.136	0.102	59	98	157	192	133
04/13/00	6	8	0.136	0.102	44	78	123	150	104
04/14/00	1	8	0.136	0.102	7	78	86	106	72
04/15/00	15	11	0.136	0.102	110	108	218	265	186
04/16/00	3	15	0.136	0.102	22	147	169	209	142
04/17/00	1	11	0.136	0.102	7	108	115	143	97
04/18/00	4	19	0.136	0.102	29	186	216	266	181
04/19/00	1	10	0.136	0.102	7	98	105	131	88
04/20/00	3	5	0.136	0.102	22	49	71	87	60
04/21/00	3	20	0.136	0.102	22	196	218	270	183
04/22/00	0	15	0.136	0.102	0	147	147	183	123
04/23/00	4	15	0.136	0.102	29	147	176	218	148
04/24/00	2	9	0.136	0.102	15	88	103	127	87
04/25/00	9	5	0.136	0.102	66	49	115	139	98
04/26/00	4	10	0.136	0.102	29	98	127	157	107
04/27/00	1	9	0.136	0.102	7	88	96	118	80
04/28/00	0	9	0.136	0.102	0	88	88	110	74
04/29/00	5	30	0.136	0.102	37	294	331	409	278
04/30/00	9	31	0.136	0.102	66	304	370	456	311
05/01/00	30	105	0.161	0.187	186	561	748	867	657
05/02/00	74	112	0.161	0.187	460	599	1,059	1,232	928
05/03/00	35	117	0.161	0.187	217	626	843	978	741
05/04/00	48	56	0.161	0.187	298	299	598	696	524
05/05/00	24	62	0.161	0.187	149	332	481	558	422
05/06/00	0	42	0.161	0.187	0	225	225	259	198
05/07/00	1	85	0.161	0.187	6	455	461	532	406
05/08/00	13	18	0.161	0.187	81	96	177	206	155
05/09/00	42	94	0.161	0.187	261	503	764	887	670
05/10/00	70	101	0.161	0.187	435	540	975	1,134	855
05/11/00	51	60	0.161	0.187	317	321	638	743	559
05/12/00	43	209	0.161	0.187	267	1,118	1,385	1,604	1,218
05/13/00	43	166	0.161	0.187	267	888	1,155	1,339	1,015
05/14/00	22	164	0.161	0.187	137	877	1,014	1,173	893
05/15/00	12	102	0.161	0.187	75	545	620	717	546
05/16/00	20	130	0.161	0.187	124	695	819	948	721
05/17/00	54	196	0.161	0.187	335	1,048	1,384	1,604	1,216
05/18/00	54	188	0.161	0.187	335	1,005	1,341	1,555	1,179
05/19/00	14	124	0.161	0.187	87	663	750	868	661
05/20/00	95	259	0.161	0.187	590	1,385	1,975	2,292	1,735
05/21/00	35	35	0.161	0.187	217	187	405	472	354
05/22/00	29	116	0.161	0.187	180	620	800	928	704
05/23/00	15	81	0.161	0.187	93	433	526	609	463
05/24/00	45	60	0.161	0.187	280	321	600	699	526

Appendix C-1. Estimated daily abundance of downstream migrant fall-run chinook salmon: December 15, 1999 - July 31, 2000.

Note: Differences in totals are attributable to rounding.

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	YOY#	YOY #	Est. Trap Eff	Est. Trap Eff	Est No. YOY	Est No. YOY	Est No. YOY	95% Confidence Limits	
Date	Day	Night	Day	Night	Day	Night	Total	Hi	Lo
05/25/00	25	40	0.161	0.187	155	214	369	429	324
05/26/00	33	99	0.161	0.187	205	529	734	852	645
05/27/00	17	93	0.161	0.187	106	497	603	698	531
05/28/00	38	95	0.161	0.187	236	508	744	864	654
05/29/00	34	69	0.161	0.187	211	369	580	674	509
05/30/00	52	90	0.161	0.187	323	481	804	935	706
05/31/00	36	119	0.161	0.187	224	636	860	997	756
06/01/00	30	115	0.057	0.045	526	2,556	3,082	5,192	2,020
06/02/00	29	85	0.057	0.045	509	1,889	2,398	4,013	1,584
06/03/00	13	75	0.057	0.045	228	1,667	1,895	3,218	1,230
06/04/00	0	60	0.057	0.045	0	1,333	1,333	2,308	845
06/05/00	19	67	0.057	0.045	333	1,489	1,822	3,064	1,197
06/06/00	53	73	0.057	0.045	930	1,622	2,552	4,167	1,735
06/07/00	18	4	0.057	0.045	316	89	405	615	296
06/08/00	31	88	0.057	0.045	544	1,956	2,499	4,179	1,653
06/09/00	23	82	0.057	0.045	404	1,822	2,226	3,744	1,462
06/10/00	23	61	0.057	0.045	404	1,356	1,759	2,936	1,166
06/11/00	36	94	0.057	0.045	632	2,089	2,720	4,538	1,804
06/12/00	11	47	0.057	0.045	193	1,044	1,237	2,090	809
06/13/00	31	23	0.057	0.045	544	511	1,055	1,679	737
06/14/00	9	12	0.057	0.045	158	267	425	692	289
06/15/00	10	30	0.068	0.148	147	203	350	446	290
06/16/00	5	13	0.068	0.148	74	88	161	207	133
06/17/00	8	10	0.068	0.148	118	68	185	246	150
06/18/00	6	16	0.068	0.148	88	108	196	252	162
06/19/00	3	17	0.068	0.148	44	115	159	197	134
06/20/00	1	29	0.068	0.148	15	196	211	251	182
06/21/00	5	13	0.068	0.148	74	88	161	207	133
06/22/00	2	1	0.068	0.148	29	7	36	50	29
06/23/00	5	19	0.068	0.148	74	128	202	255	169
06/24/00	1	2	0.068	0.148	15	14	28	37	23
06/25/00	0	2	0.068	0.148	0	14	14	16	12
06/26/00	2	11	0.068	0.148	29	74	104	129	87
06/27/00	3	4	0.068	0.148	44	27	71	94	58
06/28/00	0	1	0.068	0.148	0	7	7	8	6
06/29/00	1	5	0.068	0.148	15	34	48	61	41
06/30/00	0	0	0.068	0.148	0	0	0	0	0
07/01/00	0	6	0.068	0.148	0	41	41	48	35
07/02/00	0	4	0.068	0.148	0	27	27	32	24
07/03/00	0	3	0.022	0.046	0	65	65	130	43
07/04/00	1	2	0.022	0.046	45	43	89	254	55
07/05/00	0	1	0.022	0.046	0	22	22	43	14
07/06/00	1	0	0.022	0.046	45	0	45	167	26
07/07/00	0	1	0.022	0.046	0	22	22	43	14
07/08/00	2	1	0.022	0.046	91	22	113	377	67
07/09/00	1	1	0.022	0.046	45	22	67	210	41
07/10/00	0	3	0.022	0.046	0	65	65	130	43
07/11/00	1	0	0.022	0.046	45	0	45	167	26
07/12/00	1	1	0.022	0.046	45	22	67	210	41
07/13/00	0	1	0.022	0.046	0	22	22	43	14
07/14/00	0	1	0.022	0.046	0	22	22	43	14
07/15/00	0	0	0.022	0.046	0	0	0	0	0
07/16/00	0	1	0.022	0.046	0	22	22	43	14
07/17/00	0	2	0.022	0.046	0	43	43	87	29

Appendix C-1. Estimated daily abundance of downstream migrant fall-run chinook salmon: December 15, 1999 - July 31, 2000.

Note: Differences in totals are attributable to rounding.

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Date	YOY# Day	YOY # Night	Est. Trap Eff Day	Est. Trap Eff Night	Est No. YOY Day	Est No. YOY Night	Est No. YOY Total	95% Confidence Limits Hi	Lo
07/18/00	0	0	0.043	0.079	0	0	0	0	0
07/19/00	0	0	0.043	0.079	0	0	0	0	0
07/20/00	0	0	0.043	0.079	0	0	0	0	0
07/21/00	0	0	0.043	0.079	0	0	0	0	0
07/22/00	0	0	0.043	0.079	0	0	0	0	0
07/23/00	0	1	0.043	0.079	0	13	13	17	10
07/24/00	0	0	0.043	0.079	0	0	0	0	0
07/25/00	0	0	0.043	0.079	0	0	0	0	0
07/26/00	0	0	0.043	0.079	0	0	0	0	0
07/27/00	0	0	0.043	0.079	0	0	0	0	0
07/28/00	0	0	0.043	0.079	0	0	0	0	0
07/29/00	1	0	0.043	0.079	23	0	23	37	17
07/30/00	0	1	0.043	0.079	0	13	13	17	10
07/31/00	n/a	0	0.043	0.079	0	0	0	0	0
TOTAL:	1,972	10,610			21,342	124,260	168,525	235,713	133,823

Appendix C-2. Estimated daily abundance of downstream migrant YOY steelhead: April 1, 2000 - July 31, 2000.

Note: Any differences among totals are attributable to rounding.

Date	YOY# Day	YOY # Night	Est. Trap Eff Day	Est. Trap Eff Night	Est No. YOY Day	Est No. YOY Night	Est No. YOY Total	95% Confidence Limits Hi	Lo
04/01/00	0	0	0.131	0.152	0	0	0	0	0
04/02/00	1	0	0.131	0.152	8	0	8	10	6
04/03/00	0	0	0.131	0.152	0	0	0	0	0
04/04/00	0	2	0.131	0.152	0	13	13	17	11
04/05/00	0	2	0.131	0.152	0	13	13	17	11
04/06/00	0	0	0.131	0.152	0	0	0	0	0
04/07/00	0	0	0.131	0.152	0	0	0	0	0
04/08/00	0	0	0.131	0.152	0	0	0	0	0
04/09/00	0	0	0.131	0.152	0	0	0	0	0
04/10/00	0	1	0.131	0.152	0	7	7	8	5
04/11/00	0	0	0.131	0.152	0	0	0	0	0
04/12/00	0	1	0.131	0.152	0	7	7	8	5
04/13/00	0	0	0.131	0.152	0	0	0	0	0
04/14/00	0	1	0.131	0.152	0	7	7	8	5
04/15/00	0	0	0.131	0.152	0	0	0	0	0
04/16/00	0	0	0.131	0.152	0	0	0	0	0
04/17/00	0	1	0.131	0.152	0	7	7	8	5
04/18/00	0	1	0.131	0.152	0	7	7	8	5
04/19/00	0	0	0.131	0.152	0	0	0	0	0
04/20/00	0	1	0.131	0.152	0	7	7	8	5
04/21/00	0	1	0.131	0.152	0	7	7	8	5
04/22/00	0	2	0.131	0.152	0	13	13	17	11
04/23/00	0	0	0.131	0.152	0	0	0	0	0
04/24/00	0	0	0.131	0.152	0	0	0	0	0
04/25/00	0	0	0.131	0.152	0	0	0	0	0
04/26/00	0	1	0.131	0.152	0	7	7	8	5
04/27/00	0	1	0.131	0.152	0	7	7	8	5
04/28/00	0	2	0.131	0.152	0	13	13	17	11
04/29/00	0	1	0.131	0.152	0	7	7	8	5
04/30/00	1	1	0.131	0.152	8	7	14	18	12
05/01/00	0	2	0.195	0.193	0	10	10	13	9
05/02/00	0	3	0.195	0.193	0	16	16	19	13
05/03/00	0	2	0.195	0.193	0	10	10	13	9
05/04/00	1	3	0.195	0.193	5	16	21	26	17
05/05/00	0	2	0.195	0.193	0	10	10	13	9
05/06/00	0	1	0.195	0.193	0	5	5	6	4
05/07/00	0	0	0.195	0.193	0	0	0	0	0
05/08/00	0	0	0.195	0.193	0	0	0	0	0
05/09/00	0	0	0.195	0.193	0	0	0	0	0
05/10/00	0	1	0.195	0.193	0	5	5	6	4
05/11/00	0	1	0.195	0.193	0	5	5	6	4
05/12/00	1	0	0.195	0.193	5	0	5	6	4
05/13/00	0	0	0.195	0.193	0	0	0	0	0
05/14/00	1	1	0.195	0.193	5	5	10	13	9
05/15/00	1	4	0.195	0.193	5	21	26	32	22
05/16/00	0	0	0.195	0.193	0	0	0	0	0
05/17/00	0	2	0.195	0.193	0	10	10	13	9
05/18/00	0	1	0.195	0.193	0	5	5	6	4
05/19/00	0	5	0.195	0.193	0	26	26	32	22
05/20/00	0	4	0.195	0.193	0	21	21	26	17
05/21/00	0	0	0.195	0.193	0	0	0	0	0
05/22/00	0	1	0.195	0.193	0	5	5	6	4
05/23/00	1	3	0.195	0.193	5	16	21	26	17

Appendix C-2. Estimated daily abundance of downstream migrant YOY steelhead: April 1, 2000 - July 31, 2000.

Note: Any differences among totals are attributable to rounding.

Date	YOY# Day	YOY # Night	Est. Trap Eff Day	Est. Trap Eff Night	Est No. YOY Day	Est No. YOY Night	Est No. YOY Total	95% Confidence Limits Hi	Lo
05/24/00	0	4	0.195	0.193	0	21	21	26	17
05/25/00	0	0	0.195	0.193	0	0	0	0	0
05/26/00	0	3	0.195	0.193	0	16	16	19	13
05/27/00	0	1	0.195	0.193	0	5	5	6	4
05/28/00	0	2	0.195	0.193	0	10	10	13	9
05/29/00	0	0	0.195	0.193	0	0	0	0	0
05/30/00	0	2	0.195	0.193	0	10	10	13	9
05/31/00	0	2	0.195	0.193	0	10	10	13	9
06/01/00	1	1	0.071	0.063	14	16	30	52	21
06/02/00	0	0	0.071	0.063	0	0	0	0	0
06/03/00	0	1	0.071	0.063	0	16	16	28	11
06/04/00	0	0	0.071	0.063	0	0	0	0	0
06/05/00	0	0	0.071	0.063	0	0	0	0	0
06/06/00	0	0	0.071	0.063	0	0	0	0	0
06/07/00	0	0	0.071	0.063	0	0	0	0	0
06/08/00	0	0	0.071	0.063	0	0	0	0	0
06/09/00	0	0	0.071	0.063	0	0	0	0	0
06/10/00	0	0	0.071	0.063	0	0	0	0	0
06/11/00	0	2	0.071	0.063	0	32	32	56	22
06/12/00	1	1	0.071	0.063	14	16	30	52	21
06/13/00	0	0	0.071	0.063	0	0	0	0	0
06/14/00	0	1	0.071	0.063	0	16	16	28	11
06/15/00	1	1	0.082	0.089	12	11	23	34	18
06/16/00	1	0	0.082	0.089	12	0	12	18	9
06/17/00	0	2	0.082	0.089	0	22	22	32	17
06/18/00	0	1	0.082	0.089	0	11	11	16	9
06/19/00	0	0	0.082	0.089	0	0	0	0	0
06/20/00	0	2	0.082	0.089	0	22	22	32	17
06/21/00	2	3	0.082	0.089	24	34	58	84	44
06/22/00	0	0	0.082	0.089	0	0	0	0	0
06/23/00	0	3	0.082	0.089	0	34	34	48	26
06/24/00	0	1	0.082	0.089	0	11	11	16	9
06/25/00	0	0	0.082	0.089	0	0	0	0	0
06/26/00	0	0	0.082	0.089	0	0	0	0	0
06/27/00	0	1	0.082	0.089	0	11	11	16	9
06/28/00	0	1	0.082	0.089	0	11	11	16	9
06/29/00	0	0	0.082	0.089	0	0	0	0	0
06/30/00	0	2	0.082	0.089	0	22	22	32	17
07/01/00	0	3	0.082	0.089	0	34	34	48	26
07/02/00	0	0	0.082	0.089	0	0	0	0	0
07/03/00	0	0	0.048	0.032	0	0	0	0	0
07/04/00	0	0	0.048	0.032	0	0	0	0	0
07/05/00	0	1	0.048	0.032	0	31	31	77	20
07/06/00	0	0	0.048	0.032	0	0	0	0	0
07/07/00	0	4	0.048	0.032	0	125	125	308	78
07/08/00	0	0	0.048	0.032	0	0	0	0	0
07/09/00	0	0	0.048	0.032	0	0	0	0	0
07/10/00	0	0	0.048	0.032	0	0	0	0	0
07/11/00	0	0	0.048	0.032	0	0	0	0	0
07/12/00	0	0	0.048	0.032	0	0	0	0	0
07/13/00	0	1	0.048	0.032	0	31	31	77	20
07/14/00	0	0	0.048	0.032	0	0	0	0	0
07/15/00	0	0	0.048	0.032	0	0	0	0	0

Appendix C-2. Estimated daily abundance of downstream migrant YOY steelhead: April 1, 2000 - July 31, 2000.

Note: Any differences among totals are attributable to rounding.

Date	YOY# Day	YOY # Night	Est. Trap Eff Day	Est. Trap Eff Night	Est No. YOY Day	Est No. YOY Night	Est No. YOY Total	95% Confidence Limits Hi	Lo
07/16/00	1	1	0.048	0.032	21	31	52	105	36
07/17/00	0	0	0.048	0.032	0	0	0	0	0
07/18/00	0	0	0.097	0.118	0	0	0	0	0
07/19/00	0	0	0.097	0.118	0	0	0	0	0
07/20/00	0	0	0.097	0.118	0	0	0	0	0
07/21/00	0	0	0.097	0.118	0	0	0	0	0
07/22/00	0	0	0.097	0.118	0	0	0	0	0
07/23/00	0	0	0.097	0.118	0	0	0	0	0
07/24/00	1	0	0.097	0.118	10	0	10	16	8
07/25/00	0	0	0.097	0.118	0	0	0	0	0
07/26/00	1	0	0.097	0.118	10	0	10	16	8
07/27/00	0	1	0.097	0.118	0	8	8	12	6
07/28/00	0	0	0.097	0.118	0	0	0	0	0
07/29/00	0	0	0.097	0.118	0	0	0	0	0
07/30/00	0	0	0.097	0.118	0	0	0	0	0
07/31/00	n/a	0	0.097	0.118	0	0	0	0	0
TOTAL:	16	103			159	931	1,091	1,753	825

"n/a" - Indicates no data collected or no applicable data available.

Appendix D-1. Daily average size and condition factor (K) of YOY fall-run chinook salmon captured at Woodbridge Dam: December 15, 1999 - July 31, 2000.

Date	Avg TL, mm	StDev TL, mm	Min TL, mm	Max TL, mm	Avg FL, mm	StDev FL, mm	Min FL, mm	Max FL, mm	Avg WT, g	StDev WT, g	Min WT, g	Max WT, g	Avg K	StDev K	Min K	Max K	N
12/15/99	33	0.0	33	33	30	0.0	30	30	0.1	0.00	0.1	0.1	2.78E-004	0.00E+000	2.78E-004	2.78E-004	1
12/16/99	33	0.5	32	33	30	0.0	30	30	0.3	0.05	0.2	0.3	7.36E-004	1.79E-004	5.57E-004	9.16E-004	2
12/17/99	36	0.0	36	36	35	0.0	35	35	0.8	0.00	0.8	0.8	1.71E-003	0.00E+000	1.71E-003	1.71E-003	1
12/18/99	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
12/19/99	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
12/20/99	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
12/21/99	35	1.0	34	36	34	1.0	33	35	0.3	0.10	0.2	0.4	6.83E-004	1.74E-004	5.09E-004	8.57E-004	2
12/22/99	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
12/23/99	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
12/24/99	36	0.5	35	36	34	0.5	33	34	0.3		0.3	0.3	6.71E-004	2.84E-005	6.43E-004	7.00E-004	2
12/25/99	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
12/26/99	36	0.8	35	37	34	0.9	33	35	0.3		0.3	0.3	6.67E-004	4.33E-005	5.92E-004	7.00E-004	5
12/27/99	35	1.7	33	37	33	1.2	32	35	0.3	0.05	0.2	0.3	6.45E-004	1.38E-004	0.0005089	8.35E-004	3
12/28/99	36	0.7	35	37	35	0.7	34	36	0.3	0.07	0.2	0.4	6.93E-004	1.23E-004	0.0004665	8.57E-004	6
12/29/99	35	0.0	35	35	34	0.0	34	34	0.2	0.00	0.2	0.2	4.66E-004	0.00E+000	0.0004665	4.66E-004	1
12/30/99	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
12/31/99	39	0.0	39	39	38	0.0	38	38	0.3	0.00	0.3	0.3	5.06E-004	0.00E+000	0.0005057	5.06E-004	1
01/01/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
01/02/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
01/03/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
01/04/00	37	1.5	35	39	36	1.5	34	38	0.3	0.08	0.2	0.4	5.40E-004	9.82E-005	4.29E-004	6.74E-004	4
01/05/00	37	2.6	33	39	36	2.6	32	38	0.3	0.05	0.2	0.3	5.36E-004	2.20E-005	5.06E-004	5.57E-004	3
01/06/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
01/07/00	35	0.0	35	35	33	0.0	33	33	0.3	0.00	0.3	0.3	7.00E-004	0.00E+000	7.00E-004	7.00E-004	1
01/08/00	35	0.0	35	35	34	0.0	34	34	0.2	0.00	0.2	0.2	4.66E-004	0.00E+000	4.66E-004	4.66E-004	1
01/09/00	37	0.0	37	37	36	0.5	35	36	0.4	0.05	0.3	0.4	6.91E-004	9.87E-005	5.92E-004	7.90E-004	2
01/10/00	38	0.9	37	39	37	0.9	36	38	0.3	0.00	0.3	0.3	5.63E-004	4.08E-005	5.06E-004	5.92E-004	3
01/11/00	36	1.6	34	38	35	1.5	33	37	0.3	0.05	0.2	0.4	6.38E-004	9.93E-005	5.09E-004	7.90E-004	11
01/12/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
01/13/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
01/14/00	35	0.0	35	35	34	0.0	34	34	0.3	0.00	0.3	0.3	7.00E-004	0.00E+000	7.00E-004	7.00E-004	2
01/15/00	37	2.3	34	41	36	2.2	33	39	0.3	0.06	0.2	0.4	5.43E-004	5.81E-005	4.66E-004	6.43E-004	7
01/16/00	36	0.0	36	36	35	0.0	35	35	0.4	0.00	0.4	0.4	8.57E-004	0.00E+000	8.57E-004	8.57E-004	1
01/17/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
01/18/00	36	0.0	36	36	35	0.0	35	35	0.3	0.00	0.3	0.3	6.43E-004	0.00E+000	6.43E-004	6.43E-004	1
01/19/00	39	0.5	38	39	37	0.5	36	37	0.4	0.00	0.4	0.4	7.02E-004	2.73E-005	6.74E-004	7.29E-004	2
01/20/00	39	0.8	38	40	37	0.5	37	38	0.4	0.05	0.3	0.3	6.20E-004	9.12E-005	5.06E-004	7.29E-004	3
01/21/00	38	1.0	37	39	37	1.0	36	38	0.4	0.05	0.3	0.3	6.48E-004	1.42E-004	5.06E-004	7.90E-004	2
01/22/00	38	1.5	36	40	36	1.5	35	38	0.3	0.05	0.3	0.3	6.25E-004	3.13E-005	5.92E-004	6.74E-004	5
01/23/00	33	2.5	29	36	32	2.5	28	35	0.3	0.08	0.2	0.2	7.67E-004	1.22E-004	5.57E-004	8.57E-004	4
01/24/00	32	2.2	30	35	31	2.2	29	34	0.3	0.12	0.2	0.5	9.71E-004	1.76E-004	7.41E-004	1.17E-003	3
01/25/00	36	2.3	31	38	35	2.2	30	37	0.4	0.12	0.2	0.6	8.10E-004	1.57E-004	6.71E-004	1.18E-003	8
01/26/00	39	0.5	38	39	36	0.9	35	37	0.4	0.05	0.3	0.4	6.32E-004	6.01E-005	5.47E-004	6.74E-004	3
01/27/00	38	2.0	33	40	36	1.8	31	38	0.4	0.07	0.2	0.6	6.83E-004	1.02E-004	4.69E-004	9.38E-004	60
01/28/00	38	1.2	35	40	36	1.2	33	38	0.4	0.06	0.2	0.4	6.36E-004	9.26E-005	3.37E-004	7.90E-004	40
01/29/00	36	2.2	31	40	35	2.1	30	38	0.3	0.07	0.2	0.4	6.70E-004	9.54E-005	5.09E-004	9.33E-004	40
01/30/00	37	1.9	32	40	35	1.7	30	38	0.3	0.07	0.2	0.5	6.41E-004	1.17E-004	4.29E-004	8.57E-004	40

Appendix D-1. Daily average size and condition factor (K) of YOY fall-run chinook salmon captured at Woodbridge Dam: December 15, 1999 - July 31, 2000.

Date	Avg TL, mm	StDev TL, mm	Min TL, mm	Max TL, mm	Avg FL, mm	StDev FL, mm	Min FL, mm	Max FL, mm	Avg WT, g	StDev WT, g	Min WT, g	Max WT, g	Avg K	StDev K	Min K	Max K	N
01/31/00	38	1.6	33	41	36	1.7	30	39	0.4	0.06	0.2	0.5	6.62E-004	1.19E-004	3.95E-004	1.11E-003	40
02/01/00	38	2.2	33	41	36	2.1	31	38	0.3	0.08	0.2	0.5	6.15E-004	8.45E-005	4.69E-004	8.43E-004	40
02/02/00	37	2.9	31	48	35	2.8	30	45	0.4	0.10	0.2	0.8	7.24E-004	1.86E-004	3.95E-004	1.27E-003	40
02/03/00	37	2.8	32	41	35	2.7	30	39	0.3	0.10	0.2	0.6	6.41E-004	1.22E-004	4.66E-004	9.33E-004	40
02/04/00	37	1.8	33	41	35	1.8	31	39	0.4	0.07	0.2	0.6	6.71E-004	8.67E-005	4.66E-004	9.38E-004	40
02/05/00	36	1.7	34	40	36	1.7	32	38	0.4	0.06	0.2	0.4	6.64E-004	9.29E-005	5.06E-004	8.57E-004	40
02/06/00	36	1.9	32	40	35	1.9	30	38	0.3	0.07	0.2	0.4	6.43E-004	9.16E-005	4.29E-004	8.57E-004	40
02/07/00	37	2.6	31	42	35	2.5	30	40	0.3	0.06	0.1	0.5	6.18E-004	1.03E-004	3.36E-004	9.33E-004	40
02/08/00	37	2.4	32	42	35	2.4	30	40	0.3	0.08	0.2	0.5	6.89E-004	1.06E-004	5.09E-004	1.02E-003	40
02/09/00	38	1.9	34	41	36	1.9	32	39	0.4	0.08	0.2	0.5	6.89E-004	1.22E-004	4.66E-004	1.07E-003	40
02/10/00	38	1.6	35	41	36	1.6	33	39	0.4	0.06	0.3	0.5	7.14E-004	9.76E-005	4.69E-004	9.33E-004	40
02/11/00	39	1.8	34	42	37	1.5	33	40	0.4	0.08	0.2	0.6	6.62E-004	9.76E-005	4.66E-004	8.43E-004	40
02/12/00	38	2.0	34	44	36	1.9	32	42	0.3	0.07	0.2	0.5	6.20E-004	8.82E-005	4.66E-004	8.43E-004	40
02/13/00	38	2.3	33	42	36	2.2	31	40	0.4	0.08	0.2	0.5	6.53E-004	7.63E-005	5.09E-004	8.57E-004	40
02/14/00	38	2.7	33	47	36	2.4	32	44	0.3	0.09	0.2	0.7	6.44E-004	8.29E-005	4.66E-004	7.90E-004	36
02/15/00	38	2.5	33	45	36	2.4	32	43	0.4	0.10	0.2	0.8	7.01E-004	8.68E-005	5.57E-004	9.11E-004	33
02/16/00	37	2.1	32	41	35	2.0	31	39	0.4	0.06	0.2	0.5	7.04E-004	9.48E-005	5.47E-004	8.57E-004	22
02/17/00	38	2.7	31	43	36	2.5	30	41	0.4	0.10	0.2	0.6	6.71E-004	1.10E-004	4.66E-004	9.33E-004	40
02/18/00	38	2.7	33	43	36	2.7	31	41	0.4	0.12	0.2	0.6	6.64E-004	1.08E-004	4.29E-004	8.57E-004	41
02/19/00	39	2.3	32	42	37	2.2	30	40	0.4	0.11	0.2	0.7	7.04E-004	1.04E-004	5.06E-004	9.45E-004	40
02/20/00	39	2.7	35	51	36	2.3	33	47	0.4	0.13	0.2	1.0	6.76E-004	9.84E-005	4.66E-004	8.43E-004	40
02/21/00	39	3.0	34	51	37	2.9	32	48	0.4	0.12	0.3	1.0	6.47E-004	9.05E-005	4.69E-004	8.43E-004	40
02/22/00	38	1.9	34	43	36	1.8	32	41	0.4	0.09	0.2	0.6	6.90E-004	1.16E-004	5.06E-004	9.38E-004	31
02/23/00	38	1.0	37	40	36	0.9	35	38	0.4	0.04	0.3	0.4	6.67E-004	7.93E-005	5.47E-004	7.90E-004	18
02/24/00	38	2.0	32	41	36	2.0	30	39	0.4	0.08	0.2	0.6	6.72E-004	1.37E-004	3.95E-004	1.22E-003	40
02/25/00	38	2.3	33	42	36	2.2	31	40	0.4	0.08	0.2	0.6	6.69E-004	1.16E-004	4.66E-004	1.02E-003	40
02/26/00	37	1.6	33	39	35	1.4	31	37	0.4	0.06	0.2	0.5	6.99E-004	1.01E-004	5.06E-004	9.11E-004	40
02/27/00	38	1.7	33	40	36	1.7	31	38	0.4	0.08	0.2	0.5	6.64E-004	8.66E-005	4.29E-004	8.43E-004	36
02/28/00	37	1.8	33	40	35	1.6	32	38	0.3	0.07	0.2	0.4	6.00E-004	1.15E-004	3.64E-004	8.57E-004	30
02/29/00	39	1.6	33	40	37	1.6	31	38	0.4	0.05	0.3	0.5	6.64E-004	9.31E-005	5.06E-004	8.57E-004	24
03/01/00	42	11.0	33	90	39	10.0	31	83	0.7	1.01	0.2	5.7	6.70E-004	9.92E-005	5.06E-004	8.43E-004	30
03/02/00	40	3.3	34	56	38	3.0	32	52	0.4	0.16	0.3	1.3	6.74E-004	8.99E-005	5.47E-004	1.02E-003	36
03/03/00	40	2.1	34	42	38	1.8	33	40	0.4	0.09	0.2	0.6	6.88E-004	9.48E-005	4.35E-004	8.71E-004	36
03/04/00	41	7.7	34	86	39	7.1	32	80	0.5	0.73	0.2	5.1	6.37E-004	8.52E-005	5.03E-004	8.14E-004	41
03/05/00	39	3.3	34	49	37	3.1	32	46	0.4	0.15	0.2	0.9	6.26E-004	6.97E-005	5.09E-004	7.65E-004	21
03/06/00	37	3.1	33	40	35	3.1	31	38	0.3	0.08	0.2	0.4	6.49E-004	6.84E-005	5.57E-004	7.63E-004	5
03/07/00	93	0.0	93	93	85	0.0	85	85	6.6	0.00	6.6	6.6	8.21E-004	0.00E+000	8.21E-004	8.21E-004	1
03/08/00	45	9.0	36	62	42	8.2	34	58	0.7	0.51	0.3	1.7	6.73E-004	5.18E-005	6.25E-004	7.55E-004	5
03/09/00	38	1.8	36	40	36	1.8	34	38	0.4	0.12	0.2	0.5	6.64E-004	1.44E-004	4.29E-004	8.43E-004	5
03/10/00	37	0.0	37	37	35	0.0	35	35	0.4	0.05	0.3	0.4	6.91E-004	9.87E-005	5.92E-004	7.90E-004	2
03/11/00	41	4.3	37	48	39	4.3	35	46	0.5	0.26	0.3	0.9	6.05E-004	1.28E-004	4.69E-004	8.14E-004	4
03/12/00	44	14.8	37	80	41	13.8	35	75	0.9	1.43	0.3	4.4	6.29E-004	1.02E-004	5.47E-004	8.59E-004	7
03/13/00	49	13.0	35	72	46	11.9	33	67	1.0	0.88	0.3	2.7	6.76E-004	7.01E-005	5.43E-004	7.39E-004	5
03/14/00	56	16.1	32	76	52	14.1	30	69	1.6	1.18	0.2	3.4	7.12E-004	9.71E-005	4.29E-004	8.33E-004	28
03/15/00	65	12.4	38	85	60	11.3	36	77	2.3	1.11	0.3	4.7	7.30E-004	7.76E-005	5.47E-004	9.11E-004	18
03/16/00	68	11.2	38	90	63	10.2	36	83	2.5	1.10	0.3	5.8	7.27E-004	6.20E-005	5.47E-004	8.04E-004	31
03/17/00	62	12.7	37	84	57	11.4	35	79	2.0	1.16	0.3	5.0	7.35E-004	1.11E-004	5.06E-004	9.18E-004	17

Appendix D-1. Daily average size and condition factor (K) of YOY fall-run chinook salmon captured at Woodbridge Dam: December 15, 1999 - July 31, 2000.

Date	Avg TL, mm	StDev TL, mm	Min TL, mm	Max TL, mm	Avg FL, mm	StDev FL, mm	Min FL, mm	Max FL, mm	Avg WT, g	StDev WT, g	Min WT, g	Max WT, g	Avg K	StDev K	Min K	Max K	N
03/18/00	60	19.2	37	90	56	16.9	35	82	2.3	2.13	0.3	6.4	7.49E-004	8.72E-005	5.92E-004	8.78E-004	6
03/19/00	80	14.5	65	94	74	13.5	60	87	5.0	2.85	2.1	7.8	8.52E-004	8.72E-005	7.65E-004	9.39E-004	2
03/20/00	54	21.5	33	80	51	19.5	31	74	1.7	1.54	0.2	3.6	6.57E-004	1.07E-004	5.57E-004	8.10E-004	4
03/21/00	55	17.7	34	75	52	15.7	33	69	1.7	1.30	0.2	3.4	6.91E-004	1.49E-004	5.09E-004	8.31E-004	5
03/22/00	55	26.1	35	98	53	24.5	33	92	2.4	3.03	0.3	8.2	8.11E-004	1.29E-004	6.17E-004	9.33E-004	5
03/23/00	73	7.5	65	80	68	7.0	61	75	3.3	0.95	2.3	4.2	8.29E-004	8.60E-006	8.20E-004	8.38E-004	2
03/24/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
03/25/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
03/26/00	95	2.0	93	97	89	2.0	87	91	6.9	0.65	6.2	7.5	7.96E-004	2.55E-005	7.71E-004	8.22E-004	2
03/27/00	94	0.0	94	94	86	0.0	86	86	6.0	0.00	6.0	6.0	7.22E-004	0.00E+000	7.22E-004	7.22E-004	1
03/28/00	63	23.5	39	86	58	21.0	37	79	2.6	2.15	0.4	4.7	7.07E-004	3.23E-005	6.74E-004	7.39E-004	2
03/29/00	65	2.5	62	67	60	3.0	57	63	2.2	0.15	2.0	2.3	8.02E-004	3.72E-005	7.65E-004	8.39E-004	2
03/30/00	77	21.0	36	112	71	18.8	34	102	4.2	2.93	0.2	11.1	7.28E-004	1.19E-004	4.29E-004	8.55E-004	13
03/31/00	85	11.6	69	114	81	10.7	64	106	5.7	2.50	2.8	12.2	7.99E-004	5.48E-005	7.16E-004	8.92E-004	13
04/01/00	68	20.0	34	89	63	17.9	33	82	3.1	1.81	0.3	5.7	7.92E-004	4.87E-005	7.00E-004	8.66E-004	6
04/02/00	64	32.1	34	116	59	27.8	33	105	3.5	4.04	0.2	11.6	6.92E-004	1.27E-004	4.29E-004	8.70E-004	14
04/03/00	99	7.8	87	112	90	6.7	80	102	7.2	1.67	4.9	10.1	7.44E-004	5.00E-005	6.85E-004	8.75E-004	10
04/04/00	94	19.5	36	120	87	17.8	34	109	7.2	3.23	0.3	13.2	7.55E-004	4.73E-005	6.43E-004	8.09E-004	14
04/05/00	96	10.2	66	119	87	9.2	60	109	6.8	2.35	2.2	12.9	7.47E-004	7.73E-005	5.47E-004	1.09E-003	38
04/06/00	91	13.2	37	121	84	11.7	35	109	5.9	2.38	0.3	13.2	7.42E-004	8.75E-005	3.27E-004	9.31E-004	46
04/07/00	94	6.1	79	103	87	6.1	73	98	6.2	1.51	3.5	9.6	7.32E-004	6.51E-005	6.48E-004	9.05E-004	13
04/08/00	94	13.9	60	115	86	11.8	56	98	6.4	2.27	1.6	9.2	7.35E-004	9.26E-005	5.26E-004	8.50E-004	10
04/09/00	92	15.6	34	113	85	14.2	33	104	6.4	2.18	0.3	10.6	7.69E-004	4.64E-005	6.98E-004	8.79E-004	19
04/10/00	93	8.7	75	106	85	8.1	67	96	6.0	1.66	2.7	8.4	7.24E-004	4.47E-005	6.40E-004	7.86E-004	10
04/11/00	98	6.6	87	108	89	6.2	80	100	6.9	1.53	4.6	10.0	7.32E-004	4.29E-005	6.40E-004	8.40E-004	24
04/12/00	98	10.7	76	129	91	10.4	70	121	7.3	2.39	3.8	14.7	7.53E-004	4.73E-005	6.85E-004	8.66E-004	18
04/13/00	98	8.5	81	115	90	7.9	72	107	7.2	2.05	4.2	13.0	7.50E-004	4.90E-005	6.80E-004	8.55E-004	15
04/14/00	97	4.3	89	104	89	4.0	82	95	6.7	0.77	5.4	7.8	7.31E-004	3.27E-005	6.93E-004	7.81E-004	7
04/15/00	91	11.7	73	121	83	10.3	68	110	6.0	2.51	3.1	13.4	7.67E-004	4.55E-005	6.86E-004	8.73E-004	27
04/16/00	90	10.2	73	114	83	9.2	67	103	6.0	1.93	3.4	11.7	7.88E-004	7.19E-005	6.84E-004	9.74E-004	17
04/17/00	89	12.2	67	110	82	10.4	63	99	5.9	2.01	2.8	9.6	7.96E-004	7.46E-005	6.84E-004	9.31E-004	13
04/18/00	99	4.3	90	110	90	4.0	81	100	7.3	1.09	5.4	10.0	7.41E-004	3.50E-005	6.60E-004	8.40E-004	23
04/19/00	97	6.6	85	106	89	5.7	79	97	7.2	1.51	4.3	9.6	7.78E-004	4.95E-005	7.00E-004	8.76E-004	9
04/20/00	100	5.2	94	110	91	4.5	87	100	7.6	1.54	6.0	11.0	7.61E-004	4.31E-005	7.01E-004	8.31E-004	9
04/21/00	95	6.4	84	110	87	5.7	77	100	6.7	1.28	4.9	9.7	7.73E-004	3.48E-005	7.13E-004	8.27E-004	23
04/22/00	98	12.1	75	130	89	10.3	69	116	7.8	2.97	3.8	17.3	8.00E-004	6.25E-005	6.59E-004	9.01E-004	15
04/23/00	100	6.8	81	109	91	6.2	75	100	7.9	1.75	4.0	10.9	7.85E-004	5.65E-005	6.89E-004	9.15E-004	19
04/24/00	92	9.6	65	102	83	8.3	61	92	6.1	1.50	2.5	8.1	7.61E-004	5.27E-005	7.10E-004	9.10E-004	11
04/25/00	100	6.1	91	115	91	5.9	84	105	7.7	1.50	5.8	12.0	7.67E-004	4.96E-005	6.88E-004	8.86E-004	14
04/26/00	101	5.6	90	111	92	4.7	83	101	7.8	1.15	5.3	9.8	7.52E-004	5.15E-005	6.94E-004	8.77E-004	15
04/27/00	100	4.3	95	111	92	3.2	86	96	7.8	0.86	6.1	9.1	7.69E-004	7.61E-005	5.92E-004	9.03E-004	11
04/28/00	99	7.1	90	112	92	6.5	84	104	7.8	1.96	5.6	12.3	7.79E-004	4.46E-005	7.19E-004	8.75E-004	9
04/29/00	100	6.4	90	113	91	5.7	82	102	8.1	1.52	5.8	11.5	8.08E-004	5.66E-005	7.45E-004	9.95E-004	30
04/30/00	99	7.4	83	116	91	6.6	76	104	7.5	1.68	4.4	11.3	7.66E-004	4.68E-005	6.46E-004	8.76E-004	38
05/01/00	100	7.5	90	127	91	6.6	81	115	8.0	2.24	5.7	17.6	7.76E-004	5.51E-005	5.78E-004	8.67E-004	33
05/02/00	100	6.2	88	115	91	5.8	80	105	7.9	1.65	5.3	12.3	7.89E-004	5.44E-005	7.05E-004	9.80E-004	31
05/03/00	100	8.3	87	123	91	7.5	78	111	8.0	2.27	4.8	15.2	7.78E-004	3.91E-005	7.02E-004	8.86E-004	40

Appendix D-1. Daily average size and condition factor (K) of YOY fall-run chinook salmon captured at Woodbridge Dam: December 15, 1999 - July 31, 2000.

Date	Avg TL, mm	StDev TL, mm	Min TL, mm	Max TL, mm	Avg FL, mm	StDev FL, mm	Min FL, mm	Max FL, mm	Avg WT, g	StDev WT, g	Min WT, g	Max WT, g	Avg K	StDev K	Min K	Max K	N
05/04/00	100	8.0	83	117	91	7.6	75	109	8.2	2.05	5.4	14.2	8.15E-004	4.72E-005	7.29E-004	9.44E-004	31
05/05/00	102	6.0	87	115	93	5.6	80	105	8.4	1.60	5.2	12.8	7.92E-004	4.28E-005	6.91E-004	9.12E-004	30
05/06/00	100	7.5	76	115	91	6.9	70	106	8.3	2.03	3.4	13.9	8.04E-004	4.41E-005	7.22E-004	9.14E-004	30
05/07/00	103	6.8	91	117	95	6.2	84	108	9.0	2.03	5.6	14.7	8.08E-004	6.03E-005	6.35E-004	9.42E-004	31
05/08/00	101	7.2	93	122	93	6.8	85	110	8.4	2.15	6.0	14.5	7.92E-004	4.98E-005	7.11E-004	8.98E-004	30
05/09/00	101	5.6	85	114	92	5.5	79	105	8.2	1.44	5.5	12.2	7.93E-004	4.30E-005	6.89E-004	8.96E-004	30
05/10/00	101	6.5	88	117	93	6.2	81	110	8.5	1.81	5.2	13.6	8.14E-004	4.76E-005	7.38E-004	9.66E-004	30
05/11/00	107	8.9	92	131	100	8.3	85	121	10.3	2.56	6.2	17.3	8.20E-004	5.75E-005	7.08E-004	9.50E-004	30
05/12/00	101	6.4	90	116	93	6.4	82	109	8.7	2.06	5.8	13.9	8.25E-004	6.12E-005	7.11E-004	1.01E-003	30
05/13/00	105	7.0	89	119	96	6.8	81	106	9.4	2.11	5.2	13.2	7.97E-004	7.02E-005	7.08E-004	1.11E-003	30
05/14/00	102	7.6	88	121	93	7.0	80	110	8.7	2.27	5.1	15.5	8.02E-004	5.58E-005	7.19E-004	1.05E-003	30
05/15/00	104	7.3	94	118	95	6.9	85	107	9.2	2.02	6.2	13.2	7.93E-004	3.69E-005	7.35E-004	8.83E-004	30
05/16/00	103	7.3	92	118	94	6.9	85	108	9.1	2.14	6.5	13.9	8.08E-004	3.56E-005	7.50E-004	8.82E-004	30
05/17/00	104	7.0	93	129	96	6.7	83	118	9.4	2.18	6.3	18.3	8.17E-004	4.87E-005	7.26E-004	9.20E-004	30
05/18/00	104	6.4	87	118	95	5.9	80	108	9.2	1.90	5.4	14.0	8.16E-004	3.75E-005	7.33E-004	8.73E-004	30
05/19/00	104	8.8	76	122	94	8.1	69	111	9.3	2.38	3.7	15.1	8.18E-004	4.58E-005	7.05E-004	9.33E-004	30
05/20/00	107	7.6	97	124	99	7.0	90	115	10.1	2.41	7.2	16.5	8.08E-004	4.00E-005	7.41E-004	8.77E-004	30
05/21/00	105	7.4	90	121	97	6.6	83	111	10.0	2.23	6.0	16.1	8.43E-004	5.68E-005	6.84E-004	9.24E-004	30
05/22/00	105	6.4	91	117	98	5.9	84	109	9.9	1.85	6.2	13.4	8.43E-004	3.42E-005	7.73E-004	9.07E-004	30
05/23/00	102	7.4	85	116	95	7.0	79	108	9.2	2.14	5.3	13.8	8.45E-004	6.31E-005	6.35E-004	9.42E-004	30
05/24/00	107	6.3	94	117	97	5.5	85	105	10.1	1.87	6.8	13.3	8.08E-004	4.94E-005	7.38E-004	9.22E-004	30
05/25/00	108	6.5	93	123	98	5.5	89	111	10.5	1.95	6.5	15.8	8.17E-004	4.66E-005	7.07E-004	9.11E-004	30
05/26/00	107	8.3	91	123	98	7.3	84	112	10.3	2.49	6.2	15.6	8.27E-004	3.85E-005	7.40E-004	9.08E-004	30
05/27/00	106	5.6	94	120	96	5.1	85	108	9.8	1.64	6.5	14.1	8.20E-004	3.82E-005	7.47E-004	8.88E-004	30
05/28/00	106	8.4	87	123	97	7.6	80	113	10.1	2.39	5.3	16.7	8.25E-004	3.59E-005	7.53E-004	8.96E-004	30
05/29/00	105	8.6	78	123	95	7.6	71	111	9.7	2.25	4.0	14.9	8.32E-004	3.01E-005	7.81E-004	9.34E-004	30
05/30/00	107	8.6	88	127	97	7.7	80	114	10.3	2.53	5.6	17.1	8.21E-004	5.87E-005	5.62E-004	8.83E-004	30
05/31/00	106	8.9	89	125	96	7.8	81	111	10.1	2.44	5.9	16.3	8.35E-004	3.23E-005	7.64E-004	9.07E-004	30
06/01/00	107	8.8	90	128	98	7.8	83	116	10.0	2.44	6.3	16.9	7.99E-004	7.10E-005	5.20E-004	8.72E-004	30
06/02/00	106	9.7	91	133	98	9.1	85	124	10.1	3.23	6.5	21.8	8.15E-004	4.81E-005	7.18E-004	9.27E-004	30
06/03/00	107	8.1	90	119	98	7.4	84	110	10.3	2.19	6.6	15.9	8.27E-004	6.20E-005	7.06E-004	9.68E-004	30
06/04/00	108	8.7	90	127	99	8.1	84	120	10.6	2.68	6.3	16.3	8.38E-004	4.69E-005	7.69E-004	9.39E-004	30
06/05/00	104	10.0	92	135	95	9.0	84	122	9.8	3.19	6.1	20.1	8.48E-004	4.15E-005	7.70E-004	9.55E-004	30
06/06/00	106	7.5	90	120	97	7.0	81	111	10.0	1.91	5.9	14.1	8.22E-004	4.06E-005	6.98E-004	9.07E-004	30
06/07/00	108	9.9	97	123	99	7.9	90	111	11.0	2.69	8.0	15.1	8.70E-004	3.49E-005	8.11E-004	9.03E-004	4
06/08/00	106	7.6	91	125	97	7.4	84	117	10.2	2.17	6.5	15.9	8.45E-004	6.55E-005	6.00E-004	9.54E-004	30
06/09/00	106	9.7	86	132	97	8.6	79	120	10.2	2.68	5.5	19.4	8.33E-004	5.65E-005	6.37E-004	9.42E-004	30
06/10/00	106	7.4	93	123	97	6.9	85	113	10.5	2.11	7.7	16.9	8.67E-004	5.42E-005	7.56E-004	9.99E-004	30
06/11/00	107	8.2	97	130	98	7.8	88	120	10.6	2.79	7.6	20.3	8.46E-004	5.35E-005	7.07E-004	9.24E-004	30
06/12/00	106	7.5	87	125	96	6.4	80	112	9.8	1.92	5.5	14.1	8.27E-004	9.63E-005	5.05E-004	1.01E-003	30
06/13/00	106	7.4	90	122	98	6.9	83	115	10.4	2.23	6.1	15.7	8.48E-004	5.59E-005	6.50E-004	9.61E-004	30
06/14/00	110	13.3	99	144	100	12.1	90	131	11.8	5.12	8.1	25.5	8.37E-004	4.07E-005	7.60E-004	9.07E-004	9
06/15/00	106	6.3	93	121	96	6.2	84	112	10.0	2.11	6.5	15.6	8.40E-004	6.01E-005	6.79E-004	9.48E-004	30
06/16/00	106	7.0	87	119	97	6.5	81	111	9.8	1.89	5.4	14.2	8.18E-004	6.97E-005	6.97E-004	9.59E-004	15
06/17/00	106	7.5	95	123	97	6.3	87	114	9.8	1.78	7.3	14.4	8.17E-004	8.18E-005	5.84E-004	9.91E-004	17
06/18/00	107	11.7	90	147	98	10.9	84	138	10.6	4.02	6.2	26.4	8.39E-004	6.67E-005	7.37E-004	1.05E-003	22
06/19/00	107	9.0	96	130	99	8.4	87	119	10.7	2.89	6.4	17.7	8.40E-004	4.06E-005	7.23E-004	8.83E-004	19

Appendix D-1. Daily average size and condition factor (K) of YOY fall-run chinook salmon captured at Woodbridge Dam: December 15, 1999 - July 31, 2000.

Date	Avg TL, mm	StDev TL, mm	Min TL, mm	Max TL, mm	Avg FL, mm	StDev FL, mm	Min FL, mm	Max FL, mm	Avg WT, g	StDev WT, g	Min WT, g	Max WT, g	Avg K	StDev K	Min K	Max K	N
06/20/00	105	7.1	89	117	95	6.3	81	106	9.7	1.87	5.8	13.2	8.39E-004	3.72E-005	7.60E-004	9.21E-004	29
06/21/00	108	6.4	98	120	99	6.1	89	110	10.5	1.72	7.2	13.8	8.27E-004	4.12E-005	7.62E-004	9.24E-004	18
06/22/00	105	4.0	101	109	96	2.5	93	98	9.5	0.65	8.8	10.1	8.17E-004	3.71E-005	7.80E-004	8.54E-004	2
06/23/00	106	6.5	88	119	98	6.3	81	109	10.3	1.96	5.4	14.6	8.53E-004	3.71E-005	7.78E-004	9.16E-004	23
06/24/00	107	2.0	105	109	99	2.0	97	101	10.2	0.50	9.7	10.7	8.32E-004	5.84E-006	8.26E-004	8.38E-004	2
06/25/00	107	3.5	103	110	98	3.5	94	101	10.0	1.00	9.0	11.0	8.25E-004	1.41E-006	8.24E-004	8.26E-004	2
06/26/00	113	10.5	98	130	103	9.2	91	120	11.8	3.24	7.8	18.4	8.08E-004	3.46E-005	7.71E-004	8.92E-004	13
06/27/00	105	5.6	96	112	95	5.6	86	102	9.4	1.89	7.1	11.9	8.06E-004	4.57E-005	7.20E-004	8.47E-004	7
06/28/00	100	0.0	100	100	90	0.0	90	90	7.5	0.00	7.5	7.5	7.50E-004	0.00E+000	7.50E-004	7.50E-004	1
06/29/00	102	3.3	98	107	92	2.5	89	95	8.8	1.05	7.2	10.4	8.26E-004	3.21E-005	7.65E-004	8.61E-004	6
06/30/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/01/00	107	9.5	87	116	97	8.1	80	105	10.8	3.19	4.6	15.4	8.38E-004	8.67E-005	6.99E-004	9.87E-004	6
07/02/00	127	7.8	115	136	118	9.0	105	130	17.8	3.05	13.2	21.4	8.64E-004	9.01E-006	8.51E-004	8.76E-004	4
07/03/00	109	5.9	101	115	99	5.7	92	106	10.5	1.74	8.6	12.8	8.05E-004	4.71E-005	7.39E-004	8.42E-004	3
07/04/00	103	9.5	90	113	94	8.0	83	102	9.4	2.22	6.5	11.9	8.54E-004	2.79E-005	8.25E-004	8.92E-004	3
07/05/00	105	0.0	105	105	95	0.0	95	95	9.0	0.00	9.0	9.0	7.77E-004	0.00E+000	7.77E-004	7.77E-004	1
07/06/00	111	0.0	111	111	101	0.0	101	101	10.8	0.00	10.8	10.8	7.90E-004	0.00E+000	7.90E-004	7.90E-004	1
07/07/00	112	0.0	112	112	102	0.0	102	102	11.5	0.00	11.5	11.5	8.19E-004	0.00E+000	8.19E-004	8.19E-004	1
07/08/00	108	2.2	106	111	98	2.5	95	101	10.5	0.86	9.7	11.7	8.31E-004	1.75E-005	8.14E-004	8.55E-004	3
07/09/00	107	3.5	103	110	97	2.5	94	99	10.0	1.10	8.9	11.1	8.24E-004	9.74E-006	8.14E-004	8.34E-004	2
07/10/00	104	5.7	97	111	97	5.3	90	103	9.8	1.81	8.2	12.3	8.53E-004	6.54E-005	7.60E-004	8.99E-004	3
07/11/00	103	0.0	103	103	95	0.0	95	95	9.1	0.00	9.1	9.1	8.33E-004	0.00E+000	8.33E-004	8.33E-004	1
07/12/00	103	2.5	100	105	93	2.0	91	95	8.7	0.80	7.9	9.5	8.05E-004	1.53E-005	7.90E-004	8.21E-004	2
07/13/00	110	0.0	110	110	100	0.0	100	100	10.9	0.00	10.9	10.9	8.19E-004	0.00E+000	8.19E-004	8.19E-004	1
07/14/00	105	0.0	105	105	96	0.0	96	96	9.1	0.00	9.1	9.1	7.86E-004	0.00E+000	7.86E-004	7.86E-004	1
07/15/00	0	0.0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/16/00	107	0.0	107	107	96	0.0	96	96	9.2	0.00	9.2	9.2	7.51E-004	0.00E+000	7.51E-004	7.51E-004	1
07/17/00	110	0.5	109	110	100	0.0	100	100	11.2	0.50	10.7	11.7	8.54E-004	4.98E-005	8.04E-004	9.03E-004	2
07/18/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/19/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/20/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/21/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/22/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/23/00	109	0.0	109	109	100	0.0	100	100	10.4	0.00	10.4	10.4	8.03E-004	0.00E+000	8.03E-004	8.03E-004	1
07/24/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/25/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/26/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/27/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/28/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/29/00	99	0.0	99	99	99	0.0	99	99	7.4	0.00	7.4	7.4	7.63E-004	0.00E+000	7.63E-004	7.63E-004	1
07/30/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/31/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0

"n/a" - indicates no data collected or no applicable data available.

Appendix D-2. Daily average size and condition factor (K) of YOY steelhead captured at Woodbridge Dam: March 1, 2000 - July 31, 2000.

Date	Avg TL, mm	StDev TL, mm	Min TL, mm	Max TL, mm	Avg FL, mm	StDev FL, mm	Min FL, mm	Max FL, mm	Avg WT, g	StDev WT, g	Min WT, g	Max WT, g	Avg K	StDev K	Min K	Max K	N
03/01/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
03/02/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
03/03/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
03/04/00	30	0.5	29	30	29	0.5	28	29	0.2	0.05	0.1	0.2	0.0005754	0.0001654	0.00041	0.0007407	2
03/05/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
03/06/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
03/07/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
03/08/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
03/09/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
03/10/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
03/11/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
03/12/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
03/13/00	27	0.0	27	27	26	0.0	26	26	0.2	0.00	0.2	0.2	1.02E-003	0.00E+000	1.02E-003	1.02E-003	1
03/14/00	24	0.0	24	24	23	0.0	23	23	0.1	0.00	0.1	0.1	7.23E-004	0.00E+000	7.23E-004	7.23E-004	1
03/15/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
03/16/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
03/17/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
03/18/00	27	0.0	27	27	26	0.0	26	26	0.1	0.00	0.1	0.1	5.08E-004	0.00E+000	5.08E-004	5.08E-004	1
03/19/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
03/20/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
03/21/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
03/22/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
03/23/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
03/24/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
03/25/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
03/26/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
03/27/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
03/28/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
03/29/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
03/30/00	34	0.0	34	34	33	0.0	33	33	0.3	0.00	0.3	0.3	7.63E-004	0.00E+000	7.63E-004	7.63E-004	1
03/31/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
04/01/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
04/02/00	26	0.0	26	26	25	0.0	25	25	0.2	0.00	0.2	0.2	1.14E-003	0.00E+000	1.14E-003	1.14E-003	1
04/03/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
04/04/00	26	1.5	24	27	25	1.5	23	26	0.1	0.00	0.1	0.1	6.16E-004	1.08E-004	5.08E-004	7.23E-004	2
04/05/00	32	5.5	26	37	30	5.0	25	35	0.3	0.15	0.1	0.4	6.79E-004	1.10E-004	5.69E-004	7.90E-004	2
04/06/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
04/07/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
04/08/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
04/09/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
04/10/00	36	0.0	36	36	34	0.0	34	34	0.4	0.00	0.4	0.4	8.57E-004	0.00E+000	8.57E-004	8.57E-004	1
04/11/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
04/12/00	43	0.0	43	43	41	0.0	41	41	0.7	0.00	0.7	0.7	8.80E-004	0.00E+000	8.80E-004	8.80E-004	1
04/13/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
04/14/00	29	0.0	29	29	28	0.0	28	28	0.2	0.00	0.2	0.2	8.20E-004	0.00E+000	8.20E-004	8.20E-004	1
04/15/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
04/16/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0

Appendix D-2. Daily average size and condition factor (K) of YOY steelhead captured at Woodbridge Dam: March 1, 2000 - July 31, 2000.

Date	Avg TL, mm	StDev TL, mm	Min TL, mm	Max TL, mm	Avg FL, mm	StDev FL, mm	Min FL, mm	Max FL, mm	Avg WT, g	StDev WT, g	Min WT, g	Max WT, g	Avg K	StDev K	Min K	Max K	N
04/17/00	35	0.0	35	35	34	0.0	34	34	0.3	0.00	0.3	0.3	7.00E-004	0.00E+000	7.00E-004	7.00E-004	1
04/18/00	41	0.0	41	41	39	0.0	39	39	0.5	0.00	0.5	0.5	7.25E-004	0.00E+000	7.25E-004	7.25E-004	1
04/19/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
04/20/00	45	0.0	45	45	43	0.0	43	43	0.8	0.00	0.8	0.8	8.78E-004	0.00E+000	8.78E-004	8.78E-004	1
04/21/00	43	0.0	43	43	41	0.0	41	41	0.6	0.00	0.6	0.6	7.55E-004	0.00E+000	7.55E-004	7.55E-004	1
04/22/00	43	3.5	39	46	42	3.5	38	45	0.8	0.25	0.5	1.0	9.35E-004	9.22E-005	8.43E-004	1.03E-003	2
04/23/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
04/24/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
04/25/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
04/26/00	45	0.0	45	45	44	0.0	44	44	0.9	0.00	0.9	0.9	9.88E-004	0.00E+000	9.88E-004	9.88E-004	1
04/27/00	53	0.0	53	53	49	0.0	49	49	1.1	0.00	1.1	1.1	7.39E-004	0.00E+000	7.39E-004	7.39E-004	1
04/28/00	53	4.9	47	59	50	4.5	45	56	1.3	0.34	1.0	1.8	8.98E-004	4.73E-005	8.53E-004	9.63E-004	3
04/29/00	67	0.0	67	67	64	0.0	64	64	2.8	0.00	2.8	2.8	9.31E-004	0.00E+000	9.31E-004	9.31E-004	1
04/30/00	45	4.5	40	49	41	1.5	39	42	0.7	0.20	0.5	0.9	7.73E-004	8.13E-006	7.65E-004	7.81E-004	2
05/01/00	45	1.0	44	46	43	1.0	42	44	0.9	0.05	0.8	0.9	9.39E-004	1.17E-004	8.22E-004	1.06E-003	2
05/02/00	59	4.9	53	65	56	5.4	50	63	1.7	0.29	1.3	2.0	8.10E-004	6.05E-005	7.28E-004	8.73E-004	3
05/03/00	50	7.5	42	57	48	7.0	41	55	1.2	0.50	0.7	1.7	9.31E-004	1.34E-005	9.18E-004	9.45E-004	2
05/04/00	49	5.6	42	57	48	5.3	41	55	0.9	0.22	0.7	1.2	8.90E-004	5.12E-005	8.22E-004	9.45E-004	4
05/05/00	58	1.5	56	59	54	2.0	52	56	1.6	0.10	1.5	1.7	8.41E-004	1.32E-005	8.28E-004	8.54E-004	2
05/06/00	51	0.0	51	51	50	0.0	50	50	1.2	0.00	1.2	1.2	9.05E-004	0.00E+000	9.05E-004	9.05E-004	1
05/07/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
05/08/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
05/09/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
05/10/00	46	0.0	46	46	45	0.0	45	45	0.8	0.00	0.8	0.8	8.22E-004	0.00E+000	8.22E-004	8.22E-004	1
05/11/00	72	0.0	72	72	69	0.0	69	69	2.8	0.00	2.8	2.8	7.50E-004	0.00E+000	7.50E-004	7.50E-004	1
05/12/00	42	0.0	42	42	41	0.0	41	41	0.6	0.00	0.6	0.6	8.10E-004	0.00E+000	8.10E-004	8.10E-004	1
05/13/00	46	0.0	46	46	44	0.0	44	44	0.8	0.00	0.8	0.8	8.22E-004	0.00E+000	8.22E-004	8.22E-004	1
05/14/00	51	0.5	50	51	48	0.0	48	48	0.9	0.00	0.9	0.9	6.78E-004	0.00E+000	6.78E-004	6.78E-004	1
05/15/00	56	6.4	45	65	53	5.4	44	61	1.6	0.49	0.8	2.3	8.89E-004	4.70E-005	8.38E-004	9.72E-004	5
05/16/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
05/17/00	57	10.5	46	67	55	9.5	45	64	1.6	0.70	0.9	2.3	8.45E-004	8.00E-005	7.65E-004	9.25E-004	2
05/18/00	56	0.0	56	56	53	0.0	53	53	1.3	0.00	1.3	1.3	7.40E-004	0.00E+000	7.40E-004	7.40E-004	1
05/19/00	57	14.4	32	69	54	13.2	31	65	1.7	0.79	0.4	2.5	9.05E-004	1.84E-004	7.61E-004	1.22E-003	4
05/20/00	61	6.4	52	66	59	6.4	50	64	1.8	0.49	1.2	2.4	7.81E-004	8.93E-005	6.55E-004	8.53E-004	3
05/21/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
05/22/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
05/23/00	67	5.6	61	75	63	5.0	58	70	3.0	0.99	2.0	4.6	9.59E-004	8.12E-005	8.81E-004	1.09E-003	4
05/24/00	57	18.6	32	76	54	16.9	31	71	2.3	1.14	0.9	3.7	1.48E-003	8.98E-004	8.39E-004	2.75E-003	3
05/25/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
05/26/00	62	15.3	45	82	59	14.5	43	78	2.3	1.65	0.8	4.6	8.27E-004	4.48E-005	7.69E-004	8.78E-004	3
05/27/00	28	0.0	28	28	27	0.0	27	27	0.1	0.00	0.1	0.1	4.56E-004	0.00E+000	4.56E-004	4.56E-004	1
05/28/00	67	25.0	42	92	64	23.5	40	87	3.7	3.05	0.6	6.7	8.35E-004	2.53E-005	8.10E-004	8.60E-004	2
05/29/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
05/30/00	68	12.0	56	80	65	11.5	53	76	3.0	1.50	1.5	4.5	8.67E-004	1.24E-005	8.54E-004	8.54E-004	2
05/31/00	86	1.5	84	87	81	1.0	80	82	6.0	0.15	5.8	6.1	9.52E-004	2.61E-005	9.26E-004	9.26E-004	2
06/01/00	64	2.5	61	66	59	2.0	57	61	2.2	0.15	2.0	2.3	8.41E-004	4.06E-005	8.00E-004	8.00E-004	2
06/02/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0

Appendix D-2. Daily average size and condition factor (K) of YOY steelhead captured at Woodbridge Dam: March 1, 2000 - July 31, 2000.

Date	Avg TL, mm	StDev TL, mm	Min TL, mm	Max TL, mm	Avg FL, mm	StDev FL, mm	Min FL, mm	Max FL, mm	Avg WT, g	StDev WT, g	Min WT, g	Max WT, g	Avg K	StDev K	Min K	Max K	N
06/03/00	82	0.0	82	82	78	0.0	78	78	4.8	0.00	4.8	4.8	8.71E-004	0.00E+000	8.71E-004	8.71E-004	1
06/04/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
06/05/00	30	0.0	30	30	29	0.0	29	29	0.2	0.00	0.2	0.2	7.41E-004	0.00E+000	7.41E-004	7.41E-004	1
06/06/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
06/07/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
06/08/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
06/09/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
06/10/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
06/11/00	86	18.5	67	104	82	17.0	65	99	6.1	3.35	2.7	9.4	8.67E-004	3.10E-005	8.36E-004	8.98E-004	2
06/12/00	88	1.5	86	89	81	0.5	80	81	5.4	0.30	5.1	5.7	8.05E-004	3.36E-006	8.02E-004	8.09E-004	2
06/13/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
06/14/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
06/15/00	95	9.5	85	104	89	7.5	81	96	7.8	2.20	5.6	10.0	9.00E-004	1.14E-005	8.89E-004	9.12E-004	2
06/16/00	90	0.0	90	90	85	0.0	85	85	6.7	0.00	6.7	6.7	9.19E-004	0.00E+000	9.19E-004	9.19E-004	1
06/17/00	97	11.5	85	108	91	11.0	80	102	8.9	3.15	5.7	12.0	9.40E-004	1.22E-005	9.28E-004	9.53E-004	2
06/18/00	88	0.0	88	88	83	0.0	83	83	6.4	0.00	6.4	6.4	9.39E-004	0.00E+000	9.39E-004	9.39E-004	1
06/19/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
06/20/00	80	4.5	75	84	76	3.5	72	79	4.4	0.65	3.7	5.0	8.60E-004	1.67E-005	8.44E-004	8.77E-004	2
06/21/00	95	8.6	85	108	90	7.9	80	102	7.6	2.09	5.0	10.9	8.49E-004	2.65E-005	8.14E-004	8.79E-004	5
06/22/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
06/23/00	71	8.0	63	79	66	8.0	60	76	3.3	1.10	2.2	4.4	8.86E-004	6.29E-006	8.80E-004	8.92E-004	2
06/24/00	93	0.0	93	93	86	0.0	86	86	6.5	0.00	6.5	6.5	8.08E-004	0.00E+000	8.08E-004	8.08E-004	1
06/25/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
06/26/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
06/27/00	87	0.0	87	87	84	0.0	84	84	5.9	0.00	5.9	5.9	8.96E-004	0.00E+000	8.96E-004	8.96E-004	1
06/28/00	112	0.0	112	112	105	0.0	105	105	12.0	0.00	12.0	12.0	8.54E-004	0.00E+000	8.54E-004	8.54E-004	1
06/29/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
06/30/00	72	3.5	68	75	66	4.5	63	72	3.4	0.65	2.7	4.0	9.03E-004	4.47E-005	8.59E-004	9.48E-004	2
07/01/00	96	19.6	72	120	90	18.8	68	114	11.2	8.70	3.3	23.3	1.01E-003	2.40E-004	8.05E-004	1.35E-003	3
07/02/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/03/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/04/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/05/00	84	0.0	84	84	81	0.0	81	81	5.4	0.00	5.4	5.4	9.11E-004	0.00E+000	9.11E-004	9.11E-004	1
07/06/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/07/00	83	22.5	59	113	77	20.6	56	105	6.0	4.41	1.7	12.4	8.59E-004	3.13E-005	8.28E-004	9.10E-004	4
07/08/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/09/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/10/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/11/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/12/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/13/00	100	0.0	100	100	93	0.0	93	93	9.3	0.00	9.3	9.3	9.30E-004	0.00E+000	9.30E-004	9.30E-004	1
07/14/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/15/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/16/00	105	1.0	104	106	99	0.5	98	99	10.2	0.20	10.0	10.4	8.81E-004	7.90E-006	8.73E-004	8.89E-004	2
07/17/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/18/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/19/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0

Appendix D-2. Daily average size and condition factor (K) of YOY steelhead captured at Woodbridge Dam: March 1, 2000 - July 31, 2000.

Date	Avg TL, mm	StDev TL, mm	Min TL, mm	Max TL, mm	Avg FL, mm	StDev FL, mm	Min FL, mm	Max FL, mm	Avg WT, g	StDev WT, g	Min WT, g	Max WT, g	Avg K	StDev K	Min K	Max K	N
07/20/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/21/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/22/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/23/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/24/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/25/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	7.5	0.00	7.5	7.5	9.32E-004	0.00E+000	9.32E-004	9.32E-004	1
07/26/00	93	0.0	93	93	89	0.0	89	89	12.8	0.00	12.8	12.8	8.42E-004	0.00E+000	8.42E-004	8.42E-004	1
07/27/00	115	0.0	115	115	106	0.0	106	106	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/28/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/29/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/30/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
07/31/00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0

"n/a" - Indicates no data collected or no applicable data available.

APPENDIX E: Daily environmental conditions at Woodbridge Dam: December 1999 – July 2000

Date	River Flow	Canal Flow	Water Temp (C)			Secchi Depth (cm)			Turbidity (NTUs)			Rainfall (mm)		Baropress	Moon Age		
	(cfs)	(cfs)	Avg	Max	Min	AM	PM	Avg	AM	PM	Avg	Camanche	Woodbridge	(mm Hg)	(days)	Sunrise	Sunset
12/01/99	274	n/a	13.7	14.1	13.4	130.0	200.0	165.0	4.71	3.21	3.96	3.3	0.0	767.5	24	07:05	16:45
12/02/99	272	n/a	12.9	13.4	12.6	150.0	140.0	145.0	2.74	2.25	2.50	0.0	0.0	766.8	25	07:06	16:45
12/03/99	274	n/a	12.0	12.6	11.2	140.0	160.0	150.0	3.03	2.10	2.57	0.0	0.0	766.1	26	07:07	16:45
12/04/99	274	n/a	11.8	12.1	11.2	160.0	160.0	160.0	2.48	1.80	2.14	0.0	0.0	766.6	27	07:08	16:45
12/05/99	275	n/a	11.8	12.2	11.2	150.0	160.0	155.0	2.63	1.94	2.29	0.0	0.0	766.9	28	07:09	16:45
12/06/99	271	n/a	11.9	12.3	11.3	140.0	160.0	150.0	1.95	2.03	1.99	0.0	0.0	768.0	29	07:10	16:45
12/07/99	271	n/a	12.1	12.5	11.6	180.0	160.0	170.0	2.54	2.23	2.39	0.0	0.0	765.3	0	07:11	16:45
12/08/99	274	n/a	11.6	12.1	11.2	160.0	130.0	145.0	2.48	2.40	2.44	0.0	0.0	766.4	1	07:11	16:45
12/09/99	277	n/a	11.4	12.0	10.8	220.0	170.0	195.0	2.37	2.08	2.23	0.0	3.0	764.4	2	07:12	16:45
12/10/99	277	n/a	11.7	12.0	11.4	170.0	160.0	165.0	2.48	1.95	2.22	4.6	0.3	764.7	3	07:13	16:45
12/11/99	276	n/a	11.1	11.4	10.6	190.0	170.0	180.0	2.09	1.79	1.94	0.0	0.0	766.8	4	07:14	16:45
12/12/99	276	n/a	10.9	11.5	10.2	170.0	190.0	180.0	1.93	2.02	1.98	0.0	0.0	766.2	5	07:15	16:45
12/13/99	273	n/a	11.4	11.7	11.1	160.0	170.0	165.0	1.89	2.05	1.97	0.0	0.0	766.6	6	07:16	16:45
12/14/99	273	n/a	10.9	11.3	10.4	180.0	180.0	180.0	2.16	1.76	1.96	0.0	0.0	768.8	7	07:16	04:46
12/15/99	275	n/a	10.3	10.7	9.7	290.0	290.0	290.0	2.4	1.8	2.1	0.0	0.0	770.0	8	07:17	04:46
12/16/99	275	n/a	10.1	10.6	9.5	180.0	210.0	195.0	2.61	1.90	2.26	0.0	0.0	768.0	9	07:17	04:46
12/17/99	276	n/a	10.2	10.7	9.6	170.0	180.0	175.0	2.33	2.05	2.19	0.0	0.0	766.4	10	07:18	04:46
12/18/99	275	n/a	10.6	11.0	10.0	190.0	180.0	185.0	2.31	2.46	2.39	0.0	0.0	765.9	11	07:19	16:47
12/19/99	273	n/a	10.6	11.0	10.0	180.0	170.0	175.0	2.29	2.07	2.18	0.0	0.0	764.5	12	07:19	16:47
12/20/99	271	n/a	10.6	11.0	9.9	170.0	190.0	180.0	1.82	2.14	1.98	0.0	0.0	764.5	13	07:20	16:48
12/21/99	272	n/a	10.5	10.9	9.9	180.0	220.0	200.0	2.22	2.51	2.37	0.0	0.0	762.7	14	07:20	16:48
12/22/99	275	n/a	10.5	10.9	9.8	150.0	200.0	175.0	2.10	2.13	2.12	0.0	0.0	767.9	15	07:21	16:49
12/23/99	272	n/a	10.3	10.6	9.7	180.0	180.0	180.0	2.37	2.24	2.31	0.0	0.0	771.3	16	07:21	16:49
12/24/99	273	n/a	10.0	10.5	9.4	170.0	190.0	180.0	2.13	1.78	1.96	0.0	0.0	771.1	17	07:22	16:50
12/25/99	274	n/a	10.0	10.4	9.3	180.0	180.0	180.0	2.3	1.8	2.0	0.0	0.0	768.2	18	07:22	16:50
12/26/99	273	n/a	10.0	10.4	9.3	180.0	180.0	180.0	2.45	2.08	2.27	0.0	0.0	768.0	19	07:23	16:51
12/27/99	272	n/a	9.9	10.4	9.3	180.0	180.0	180.0	2.64	2.03	2.34	0.0	0.0	769.5	20	07:23	16:52
12/28/99	272	n/a	9.9	10.4	9.2	180.0	170.0	175.0	2.11	2.08	2.10	0.0	0.0	768.3	21	07:23	16:52
12/29/99	272	n/a	9.8	10.2	9.1	180.0	170.0	175.0	2.36	1.91	2.14	0.0	0.0	764.1	22	07:23	16:53
12/30/99	272	n/a	9.6	9.9	9.0	180.0	170.0	175.0	2.93	2.50	2.72	0.0	0.0	762.3	23	07:24	16:54
12/31/99	273	n/a	9.8	10.4	9.2	180.0	170.0	175.0	2.30	2.41	2.36	0.0	0.0	761.0	24	07:24	16:54
01/01/00	273	n/a	10.2	10.6	9.8	170.0	160.0	165.0	1.46	2.11	1.79	0.0	0.0	762.2	25	07:23	16:55
01/02/00	273	n/a	10.2	10.5	9.5	170.0	170.0	170.0	4.60	2.30	3.45	0.0	0.0	767.6	26	07:24	16:57
01/03/00	272	n/a	9.4	9.8	9.0	180.0	180.0	180.0	2.61	2.07	2.34	0.0	0.0	771.4	27	07:24	16:58
01/04/00	269	n/a	9.4	9.8	8.9	160.0	160.0	160.0	2.10	2.71	2.41	0.0	0.0	771.0	28	07:24	16:59
01/05/00	267	n/a	9.6	10.0	9.1	170.0	180.0	175.0	2.94	2.81	2.88	0.0	0.0	767.9	29	07:24	16:59
01/06/00	266	n/a	9.3	9.8	8.7	170.0	180.0	175.0	2.73	2.43	2.58	0.0	0.0	769.7	0	07:24	17:00
01/07/00	265	n/a	9.5	10.0	9.0	160.0	190.0	175.0	2.91	3.00	2.96	0.0	0.0	768.3	1	07:23	17:01
01/08/00	265	n/a	9.5	9.9	9.1	170.0	170.0	170.0	2.79	2.69	2.74	0.0	0.0	767.6	2	07:23	17:02
01/09/00	266	n/a	9.6	10.1	9.1	170.0	170.0	170.0	2.41	2.46	2.44	0.0	0.0	767.1	3	07:23	17:03
01/10/00	266	n/a	10.0	10.4	9.4	170.0	170.0	170.0	2.90	2.76	2.83	0.0	0.0	765.4	4	07:23	17:04
01/11/00	269	n/a	10.1	10.5	9.6	170.0	160.0	165.0	2.44	3.35	2.90	0.0	4.1	762.4	5	07:23	17:05
01/12/00	262	n/a	10.2	10.5	9.9	160.0	140.0	150.0	3.09	2.60	2.85	4.8	0.0	765.8	6	07:22	17:06
01/13/00	260	n/a	10.1	10.5	9.6	160.0	160.0	160.0	2.54	3.25	2.90	0.0	0.0	765.7	7	07:22	17:07
01/14/00	266	n/a	10.3	10.8	9.8	120.0	150.0	135.0	2.66	2.64	2.65	0.0	0.0	764.4	8	07:22	17:08
01/15/00	276	n/a	10.7	11.0	10.4	160.0	130.0	145.0	3.57	3.04	3.31	3.1	2.3	769.7	9	07:21	17:09

APPENDIX E: Daily environmental conditions at Woodbridge Dam: December 1999 – July 2000

Date	River Flow	Canal Flow	Water Temp (C)			Secchi Depth (cm)			Turbidity (NTUs)			Rainfall (mm)		Baropress	Moon Age		
	(cfs)	(cfs)	Avg	Max	Min	AM	PM	Avg	AM	PM	Avg	Camanche	Woodbridge	(mm Hg)	(days)	Sunrise	Sunset
01/16/00	285	n/a	11.1	11.5	10.7	100.0	110.0	105.0	5.93	5.35	5.64	5.1	5.6	762.6	10	07:21	17:10
01/17/00	280	n/a	10.8	11.1	10.7	150.0	110.0	130.0	2.48	2.80	2.64	3.3	2.3	764.0	11	07:20	17:12
01/18/00	313	n/a	10.8	11.2	10.5	70.0	70.0	70.0	16.45	11.16	13.81	25.4	15.0	762.6	12	07:20	17:13
01/19/00	285	n/a	11.3	11.6	11.1	120.0	100.0	110.0	3.01	3.76	3.39	3.3	1.5	763.4	13	07:19	17:14
01/20/00	284	n/a	11.4	11.6	11.1	140.0	140.0	140.0	3.51	3.72	3.62	1.3	2.0	763.4	14	07:18	17:15
01/21/00	282	n/a	11.0	11.3	10.5	160.0	190.0	175.0	2.66	2.71	2.69	1.8	0.5	763.3	15	07:18	17:16
01/22/00	279	n/a	10.9	11.3	10.3	160.0	n/a	160.0	2.96	2.87	2.92	2.0	0.5	763.0	16	07:17	17:18
01/23/00	333	n/a	11.0	11.3	10.7	150.0	40.0	95.0	7.33	28.40	17.87	5.8	32.3	761.7	17	07:21	17:19
01/24/00	421	n/a	11.5	11.9	11.0	40.0	40.0	40.0	21.30	19.40	20.35	33.0	49.8	760.4	18	07:21	17:20
01/25/00	428	n/a	12.0	12.4	11.6	30.0	40.0	35.0	24.30	25.20	24.75	39.9	2.0	761.5	19	07:20	17:21
01/26/00	351	n/a	11.6	11.9	11.4	40.0	40.0	40.0	25.50	18.50	22.00	0.5	0.0	765.3	20	07:19	17:22
01/27/00	299	n/a	11.1	11.6	10.6	120.0	100.0	110.0	9.39	6.83	8.11	0.0	0.0	766.5	21	07:18	17:23
01/28/00	291	n/a	10.6	11.0	9.9	120.0	170.0	145.0	5.28	4.29	4.79	0.0	0.0	764.5	22	07:17	17:24
01/29/00	456	n/a	10.7	11.5	9.9	130.0	130.0	130.0	6.85	6.96	6.91	0.0	0.0	761.7	23	07:16	17:26
01/30/00	530	n/a	10.9	11.2	10.6	180.0	120.0	150.0	6.56	8.08	7.32	0.0	4.8	760.5	24	07:15	17:27
01/31/00	532	n/a	10.8	11.1	10.5	130.0	130.0	130.0	6.71	6.30	6.51	6.4	0.0	767.4	25	07:14	17:28
02/01/00	795	n/a	11.2	11.6	10.9	60.0	60.0	60.0	11.50	13.00	12.25	0.0	0.0	769.2	26	07:13	17:32
02/02/00	866	n/a	11.2	11.6	11.1	60.0	60.0	60.0	11.40	12.7	12.0	0.0	0.0	765.1	27	07:12	17:33
02/03/00	916	n/a	11.2	11.4	10.9	60.0	70.0	65.0	11.60	11.90	11.75	0.0	7.9	760.1	28	07:11	17:34
02/04/00	942	n/a	11.0	11.4	10.9	60.0	70.0	65.0	9.90	13.90	11.90	17.0	0.3	761.9	29	07:10	17:35
02/05/00	936	n/a	11.0	11.3	10.8	60.0	90.0	75.0	12.30	10.90	11.60	0.0	0.5	763.1	0	07:09	17:37
02/06/00	934	n/a	11.0	11.4	10.8	60.0	150.0	105.0	10.30	9.38	9.84	0.0	0.3	766.3	1	07:08	17:38
02/07/00	936	n/a	10.9	11.1	10.8	80.0	90.0	85.0	9.33	10.00	9.67	0.0	0.5	766.6	2	07:07	17:39
02/08/00	941	n/a	11.2	11.6	10.9	110.0	90.0	100.0	9.06	8.54	8.80	0.0	0.0	763.7	3	07:06	17:34
02/09/00	938	n/a	11.1	11.3	10.9	80.0	100.0	90.0	9.55	9.60	9.58	0.0	2.8	760.2	4	07:04	17:35
02/10/00	969	n/a	11.0	11.1	10.7	90.0	70.0	80.0	9.5	22.90	16.2	4.3	13.7	757.4	5	07:03	17:36
02/11/00	982	n/a	10.6	10.7	10.5	90.0	70.0	80.0	13.00	13.90	13.45	25.7	31.0	758.4	6	07:02	17:38
02/12/00	1,120	n/a	10.9	11.4	10.6	60.0	40.0	50.0	18.10	45.10	31.60	37.9	1.5	758.2	7	07:01	17:39
02/13/00	1,100	n/a	11.2	11.4	11.1	50.0	70.0	60.0	13.90	14.20	14.05	10.9	22.6	756.3	8	06:59	17:40
02/14/00	1,130	n/a	12.0	12.6	11.5	50.0	50.0	50.0	16.80	16.75	16.78	10.7	1.5	760.0	9	06:58	17:41
02/15/00	1,040	n/a	11.8	12.1	11.6	60.0	100.0	80.0	13.3	8.43	10.9	15.2	0.0	764.3	10	06:57	17:43
02/16/00	1,670	n/a	11.5	11.9	11.3	40.0	50.0	45.0	27.00	26.40	26.70	3.8	12.7	760.3	11	06:55	17:44
02/17/00	1,850	n/a	11.4	11.6	11.1	50.0	70.0	60.0	17.20	14.30	15.75	6.9	0.0	763.8	12	06:54	17:46
02/18/00	1,870	n/a	11.3	11.7	10.8	50.0	80.0	65.0	12.20	12.10	12.15	0.0	0.0	764.6	13	06:52	17:47
02/19/00	1,870	n/a	11.3	11.5	10.8	60.0	90.0	75.0	10.30	8.76	9.53	0.0	0.0	761.1	14	06:51	17:48
02/20/00	1,890	n/a	11.5	11.6	11.1	80.0	80.0	80.0	9.59	10.40	10.00	0.0	12.7	751.5	15	06:49	17:49
02/21/00	1,920	n/a	11.8	12.3	11.4	60.0	80.0	70.0	12.30	9.48	10.89	9.7	0.5	756.7	16	06:48	17:51
02/22/00	1,940	n/a	11.4	12.1	11.1	90.0	80.0	85.0	6.93	8.77	8.85	0.0	23.9	761.7	17	06:46	17:52
02/23/00	2,100	n/a	11.3	11.8	10.9	50.0	70.0	60.0	17.60	14.40	16.00	32.5	7.1	759.4	18	06:45	17:53
02/24/00	1,990	n/a	10.9	11.2	10.6	70.0	90.0	80.0	10.00	9.04	9.52	0.0	0.0	761.6	19	06:43	17:54
02/25/00	1,950	n/a	11.2	11.5	10.8	90.0	90.0	90.0	8.78	8.76	8.77	0.0	0.0	764.9	20	06:42	17:55
02/26/00	1,940	n/a	11.3	11.6	10.9	90.0	90.0	90.0	8.80	8.61	8.71	0.0	7.4	762.3	21	06:41	17:57
02/27/00	2,020	n/a	11.7	12.0	11.4	80.0	90.0	85.0	11.80	9.80	10.80	17.8	13.0	757.3	22	06:40	17:58
02/28/00	2,010	n/a	11.2	11.5	11.0	80.0	90.0	85.0	10.60	10.30	10.45	6.1	0.0	763.3	23	06:38	17:59
02/29/00	1,980	n/a	11.0	11.4	10.7	80.0	90.0	85.0	9.72	9.19	9.46	3.6	8.4	762.8	24	06:37	18:00
03/01/00	1,970	n/a	11.1	11.5	10.6	70.0	100.0	85.0	7.83	8.40	8.12	0.8	0.0	765.0	25	06:34	18:02

APPENDIX E: Daily environmental conditions at Woodbridge Dam: December 1999 -- July 2000

Date	River Flow	Canal Flow	Water Temp (C)			Secchi Depth (cm)			Turbidity (NTUs)			Rainfall (mm)		Baropress	Moon Age		
	(cfs)	(cfs)	Avg	Max	Min	AM	PM	Avg	AM	PM	Avg	Camanche	Woodbridge	(mm Hg)	(days)	Sunrise	Sunset
03/02/00	2,230	n/a	10.8	11.3	10.5	80.0	80.0	80.0	11.10	9.93	10.52	0.5	1.5	764.2	26	06:32	18:03
03/03/00	2,300	n/a	10.8	11.2	10.2	90.0	90.0	90.0	8.85	10.20	9.53	1.5	0.0	760.4	27	06:31	18:04
03/04/00	2,300	n/a	11.0	11.3	10.4	80.0	100.0	90.0	7.97	9.65	8.81	0.0	0.5	755.6	28	06:29	18:05
03/05/00	2,330	n/a	10.9	11.5	10.5	90.0	100.0	95.0	9.31	8.62	8.97	10.2	8.1	747.7	29	06:27	18:06
03/06/00	2,320	n/a	11.0	11.6	10.5	100.0	90.0	95.0	7.78	8.78	8.28	0.5	0.0	755.1	0	06:26	18:08
03/07/00	2,320	n/a	10.6	11.1	10.4	100.0	90.0	95.0	8.08	7.99	8.04	0.0	6.9	759.2	1	06:24	18:09
03/08/00	2,330	n/a	10.9	11.4	10.4	100.0	110.0	105.0	7.72	8.01	7.87	5.6	6.1	760.6	2	06:22	18:10
03/09/00	2,320	n/a	11.1	11.4	10.5	110.0	110.0	110.0	9.47	7.54	8.51	3.8	0.5	766.1	3	06:21	18:11
03/10/00	2,320	n/a	11.1	11.4	10.5	110.0	110.0	110.0	8.06	7.59	7.83	0.5	0.3	768.9	4	06:19	18:12
03/11/00	2,190	n/a	11.2	11.5	10.8	110.0	110.0	110.0	6.48	7.19	6.84	0.0	0.0	768.0	5	06:23	18:13
03/12/00	2,020	n/a	11.0	11.5	10.4	110.0	120.0	115.0	6.54	6.66	6.60	0.0	0.0	763.5	6	06:22	18:15
03/13/00	1,860	n/a	11.3	11.7	10.7	120.0	140.0	130.0	6.42	6.28	6.35	0.0	0.0	763.5	7	06:20	18:16
03/14/00	1,690	n/a	11.5	11.9	11.1	120.0	110.0	115.0	6.59	6.87	6.73	0.0	0.0	762.7	8	06:18	18:17
03/15/00	1,540	n/a	11.3	11.6	10.8	150.0	130.0	140.0	5.65	6.00	5.83	0.0	0.0	760.0	9	06:16	18:18
03/16/00	1,630	n/a	11.5	12.0	11.0	120.0	130.0	125.0	5.88	6.12	6.00	0.0	0.0	762.4	10	06:14	18:19
03/17/00	1,630	n/a	11.3	11.8	10.8	120.0	140.0	130.0	5.35	5.35	5.35	0.0	0.0	766.3	11	06:12	18:20
03/18/00	1,620	n/a	11.4	12.0	10.7	120.0	140.0	130.0	5.39	4.95	5.17	0.0	0.0	765.1	12	06:10	18:22
03/19/00	1,610	n/a	11.8	12.1	11.4	170.0	170.0	170.0	5.64	4.92	5.28	0.0	0.0	761.2	13	06:09	18:15
03/20/00	1,610	n/a	11.0	11.4	10.4	150.0	160.0	155.0	4.77	4.70	4.74	0.0	0.0	758.6	14	06:07	18:16
03/21/00	1,600	n/a	11.1	11.8	10.3	140.0	160.0	150.0	5.09	4.24	4.67	0.0	0.0	759.1	15	06:05	18:17
03/22/00	1,450	n/a	12.1	12.8	11.5	160.0	200.0	180.0	4.10	4.12	4.11	0.0	0.0	761.0	16	06:03	18:18
03/23/00	1,290	n/a	12.3	12.4	12.1	160.0	160.0	160.0	6.15	4.85	5.50	0.0	0.0	761.2	17	06:02	18:19
03/24/00	1,240	n/a	12.1	12.5	11.8	160.0	170.0	165.0	5.90	3.96	4.93	0.0	0.0	759.2	18	06:01	18:20
03/25/00	1,230	n/a	12.1	12.5	11.8	170.0	180.0	175.0	4.32	4.11	4.22	0.0	0.0	762.0	19	05:59	18:22
03/26/00	1,230	n/a	12.0	12.5	11.6	150.0	160.0	155.0	4.76	5.30	5.03	0.0	0.0	763.8	20	05:57	18:23
03/27/00	1,220	n/a	11.9	12.2	11.6	180.0	210.0	195.0	4.05	3.72	3.89	0.0	0.0	760.8	21	05:56	18:24
03/28/00	935	n/a	11.8	12.3	11.4	180.0	180.0	180.0	4.90	4.36	4.63	0.0	0.0	758.7	22	05:54	18:25
03/29/00	924	n/a	12.1	12.8	11.6	230.0	190.0	210.0	3.19	3.25	3.22	0.0	0.0	760.8	23	05:52	18:26
03/30/00	839	n/a	12.8	14.2	12.0	250.0	240.0	245.0	2.63	2.18	2.41	0.0	0.0	762.0	24	05:51	18:27
03/31/00	763	n/a	13.0	13.9	12.1	250	310	280	3.20	2.77	2.99	0.0	0.0	762.3	25	05:55	18:28
04/01/00	770	n/a	13.2	14.2	12.2	220	280	250	2.56	3.03	2.80	0.0	0.0	760.3	26	05:53	18:31
04/02/00	761	n/a	13.9	14.9	12.8	300	250	275	2.37	2.90	2.64	0.0	0.0	759.7	27	06:51	19:33
04/03/00	761	n/a	14.1	15.0	13.2	270	300	285	2.50	2.54	2.52	0.0	0.0	761.8	28	06:50	19:34
04/04/00	619	26	14.1	15.1	13.3	270	280	275	2.62	2.50	2.56	0.0	0.0	763.2	29	06:48	19:29
04/05/00	515	54	14.1	14.9	13.3	280	290	285	2.66	2.67	2.67	0.0	0.0	760.5	0	06:46	19:30
04/06/00	447	57	13.7	14.4	13.0	240	300	270	2.60	2.62	2.61	0.0	0.0	762.1	1	06:45	19:31
04/07/00	428	92	13.7	14.7	13.0	320	320	320	2.74	2.41	2.58	0.0	0.0	762.6	2	06:43	19:32
04/08/00	449	102	14.0	14.6	13.4	280	290	285	2.83	2.67	2.75	0.0	0.0	762.6	3	06:41	19:33
04/09/00	443	102	14.2	14.7	13.6	300	320	310	2.48	2.85	2.67	0.0	0.0	762.3	4	06:40	19:35
04/10/00	432	103	14.1	14.7	13.6	330	340	335	2.25	2.20	2.23	0.0	0.0	760.6	5	06:38	19:36
04/11/00	426	110	14.8	15.5	14.0	350	370	360	2.54	2.31	2.43	0.0	0.0	760.9	6	06:36	19:37
04/12/00	413	127	14.9	15.5	14.5	290	260	275	2.31	2.54	2.43	0.0	1.0	760.9	7	06:35	19:38
04/13/00	414	129	14.6	14.8	14.3	350	220	285	2.38	2.55	2.47	3.8	3.8	760.3	8	06:33	19:39
04/14/00	353	126	14.2	14.5	13.9	300	290	295	2.63	2.57	2.60	2.0	0.0	758.3	9	06:31	19:40
04/15/00	285	126	14.1	14.7	13.9	310	320	315	2.50	2.37	2.44	0.0	0.0	756.2	10	06:30	19:41
04/16/00	269	116	14.1	14.7	13.7	240	270	255	2.50	2.49	2.50	0.0	0.3	756.1	11	06:28	19:42

APPENDIX E: Daily environmental conditions at Woodbridge Dam: December 1999 -- July 2000

	River Flow	Canal Flow	Water Temp (C)			Secchi Depth (cm)			Turbidity (NTUs)			Rainfall (mm)		Baropress	Moon Age		
Date	(cfs)	(cfs)	Avg	Max	Min	AM	PM	Avg	AM	PM	Avg	Camanche	Woodbridge	(mm Hg)	(days)	Sunrise	Sunset
04/17/00	327	107	13.6	14.0	13.3	210	280	245	2.98	2.73	2.86	10.2	25.4	756.1	12	06:27	19:44
04/18/00	280	104	13.7	14.8	12.9	60	110	85	13.90	7.38	10.64	20.6	0.0	758.9	13	06:25	19:45
04/19/00	267	106	14.0	14.8	13.1	190	250	220	4.49	3.28	3.89	0.0	0.0	764.0	14	06:23	19:46
04/20/00	274	103	14.9	16.0	13.9	250	300	275	3.16	2.50	2.83	0.0	0.0	761.3	15	06:22	19:47
04/21/00	270	105	15.5	16.6	14.6	300	290	295	2.41	2.87	2.64	0.0	0.0	758.1	16	06:20	19:48
04/22/00	263	105	15.6	16.2	15.2	260	290	275	2.37	2.67	2.52	0.0	0.0	762.2	17	06:19	19:49
04/23/00	261	103	15.0	15.7	14.5	280	250	265	3.16	3.19	3.18	0.0	0.0	764.2	18	06:17	19:50
04/24/00	258	104	14.8	15.8	13.9	310	300	305	2.74	2.80	2.77	0.0	0.0	762.9	19	06:16	19:51
04/25/00	258	103	15.6	16.6	14.6	290	260	275	2.43	2.63	2.53	0.0	0.0	763.2	20	06:14	19:53
04/26/00	262	99	16.1	17.1	15.2	320	290	305	2.63	2.68	2.66	0.0	0.0	760.6	21	06:13	19:54
04/27/00	260	96	16.3	17.0	15.7	300	260	280	2.44	2.50	2.47	0.0	0.0	759.9	22	06:11	19:55
04/28/00	247	101	15.8	16.5	15.1	300	270	285	3.00	2.93	2.97	0.0	0.0	763.0	23	06:10	19:56
04/29/00	247	103	15.4	16.3	14.6	290	310	300	2.54	2.73	2.64	0.0	0.0	763.3	24	06:09	19:57
04/30/00	249	101	15.8	16.6	14.8	250	280	265	2.72	2.91	2.82	0.0	0.0	762.3	25	06:07	19:58
05/01/00	323	110	16.2	17.4	15.4	260	320	290	2.44	2.80	2.62	0.0	0.0	760.4	26	06:06	19:59
05/02/00	420	131	16.2	16.8	15.8	310	280	295	2.48	3.74	3.11	0.0	0.0	759.3	27	06:05	20:00
05/03/00	422	148	15.7	16.2	15.3	280	290	285	2.48	3.02	2.75	0.0	0.0	758.8	28	06:10	20:01
05/04/00	442	154	17.5	19.7	15.4	280	280	280	2.29	2.30	2.30	0.0	0.0	758.1	29	06:09	20:03
05/05/00	435	157	15.3	16.0	14.8	300	300	300	2.31	2.43	2.37	0.0	0.0	758.6	0	06:08	20:04
05/06/00	434	159	14.4	15.3	14.1	300	270	285	2.27	2.35	2.31	0.0	7.1	760.5	1	06:06	20:05
05/07/00	465	158	13.4	14.0	13.1	270	280	275	2.95	2.45	2.70	6.6	6.4	761.2	2	06:05	20:06
05/08/00	464	156	13.7	14.3	13.2	250	270	260	2.52	2.48	2.50	10.2	1.0	761.3	3	06:04	20:07
05/09/00	458	153	14.2	14.8	13.8	200	290	245	2.45	2.47	2.46	0.0	0.0	761.1	4	06:03	20:08
05/10/00	460	147	14.4	14.8	14.0	280	280	280	2.42	2.01	2.22	0.0	0.0	760.6	5	06:02	20:09
05/11/00	462	144	14.2	14.6	13.5	300	300	300	2.20	2.32	2.26	0.0	0.0	764.2	6	06:01	20:10
05/12/00	458	142	14.3	15.1	13.6	300	300	300	2.23	2.20	2.22	0.0	0.0	762.8	7	06:00	20:11
05/13/00	450	142	14.5	15.0	13.9	300	290	295	2.14	2.22	2.18	0.0	0.0	758.9	8	05:58	20:12
05/14/00	456	140	14.5	14.8	14.1	300	280	290	2.50	2.42	2.46	0.0	1.5	758.1	9	05:57	20:08
05/15/00	466	142	14.2	14.7	13.8	280	270	275	2.46	2.19	2.33	11.4	4.3	757.7	0	05:56	20:09
05/16/00	469	144	13.9	14.2	13.7	280	280	280	2.72	2.26	2.49	0.0	0.0	760.2	11	05:55	20:10
05/17/00	465	143	14.1	14.8	13.5	270	280	275	2.24	2.32	2.28	0.0	0.0	761.6	12	05:55	20:11
05/18/00	458	140	15.2	16.3	14.4	300	300	300	2.49	2.31	2.40	0.0	0.0	761.1	13	05:54	20:12
05/19/00	450	137	16.2	17.2	15.4	280	290	285	2.14	2.43	2.29	0.0	0.0	760.6	14	05:53	20:13
05/20/00	484	137	16.8	17.6	16.0	300	290	295	2.04	2.49	2.27	0.0	0.0	758.5	15	05:52	20:14
05/21/00	478	135	17.0	18.0	16.2	310	300	305	2.27	2.04	2.16	0.0	0.0	757.7	16	05:51	20:15
05/22/00	486	133	17.3	18.1	16.5	300	300	300	2.36	2.90	2.63	0.0	0.0	756.3	17	05:50	20:16
05/23/00	480	139	17.1	17.8	16.4	300	300	300	2.32	2.51	2.42	0.0	0.0	756.5	18	05:49	20:17
05/24/00	489	148	17.0	17.7	16.3	300	300	300	2.56	2.33	2.45	0.0	0.0	754.7	19	05:49	20:18
05/25/00	490	150	16.3	17.3	15.7	300	310	305	2.61	2.51	2.56	0.0	0.0	755.5	20	05:48	20:19
05/26/00	496	157	15.7	16.5	14.9	300	300	300	2.40	2.46	2.43	0.0	0.0	757.8	21	05:47	20:20
05/27/00	496	161	15.9	16.7	15.1	310	290	300	2.44	2.42	2.43	0.0	0.0	759.1	22	05:47	20:21
05/28/00	494	162	16.0	16.8	15.1	300	290	295	2.35	3.12	2.74	0.0	0.0	759.0	23	05:46	20:22
05/29/00	492	165	15.8	16.5	15.0	300	300	300	2.74	2.65	2.70	0.0	0.0	757.7	24	05:45	20:22
05/30/00	483	174	15.4	16.2	14.6	290	300	295	2.51	2.26	2.39	0.0	0.0	757.6	25	05:45	20:23
05/31/00	495	177	15.3	16.1	14.5	300	300	300	1.97	2.04	2.01	0.0	0.0	757.7	26	05:44	20:24
06/01/00	499	176	15.3	16.3	14.6	320	310	315	2.42	2.76	2.59	0.0	0.0	756.5	27	05:44	20:25

APPENDIX E: Daily environmental conditions at Woodbridge Dam: December 1999 – July 2000

Date	River Flow	Canal Flow	Water Temp (C)			Secchi Depth (cm)			Turbidity (NTUs)			Rainfall (mm)		Baropress	Moon Age		
	(cfs)	(cfs)	Avg	Max	Min	AM	PM	Avg	AM	PM	Avg	Camanche	Woodbridge	(mm Hg)	(days)	Sunrise	Sunset
06/02/00	488	179	15.5	16.5	14.7	340	310	325	2.37	2.19	2.28	0.0	0.0	759.9	28	05:43	20:26
06/03/00	483	180	15.6	16.5	14.8	310	310	310	2.84	2.25	2.55	0.0	0.0	760.8	29	05:43	20:26
06/04/00	493	177	15.7	16.5	14.9	290	300	295	2.96	2.58	2.77	0.0	0.0	759.5	0	05:43	20:27
06/05/00	500	179	15.3	16.4	14.8	310	320	315	2.41	2.24	2.33	0.0	0.0	760.9	1	05:42	20:27
06/06/00*	500	160	16.0	16.7	15.3	320	300	310	2.21	2.69	2.45	0.0	0.0	759.3	2	05:42	20:28
06/07/00*	498	185	16.0	16.4	15.6	300	300	300	2.17	4.36	3.27	0.0	0.0	757.9	3	05:42	20:29
06/08/00*	487	195	15.6	16.1	15.0	290	280	285	3.10	2.46	2.78	1.0	1.0	757.6	4	05:42	20:30
06/09/00*	487	201	15.4	16.1	14.7	330	300	315	2.69	2.19	2.44	1.3	0.0	759.6	5	05:41	20:30
06/10/00*	484	202	15.6	16.4	14.7	330	300	315	2.04	2.36	2.20	0.0	0.0	759.3	6	05:41	20:31
06/11/00*	476	204	15.7	16.4	15.0	310	300	305	2.23	2.54	2.39	0.0	0.0	759.8	7	05:41	20:31
06/12/00*	502	199	16.1	17.2	15.0	310	300	305	2.34	2.37	2.36	0.0	0.0	760.2	8	05:41	20:32
06/13/00*	459	202	16.5	16.9	16.1	320	310	315	2.20	2.26	2.23	0.0	0.0	756.9	9	05:41	20:32
06/14/00*	449	210	17.4	18.1	16.7	340	300	320	2.29	2.24	2.27	0.0	0.0	756.2	10	05:41	20:33
06/15/00*	432	222	17.6	18.3	16.9	320	300	310	2.07	n/a	2.07	0.0	0.0	754.0	11	05:41	20:33
06/16/00*	424	229	17.5	18.1	16.9	320	310	315	2.43	2.52	2.48	0.0	0.0	750.4	12	05:41	20:33
06/17/00*	420	227	17.2	17.8	16.7	290	320	305	2.19	2.86	2.53	0.0	0.0	752.0	13	05:41	20:34
06/18/00*	424	228	16.7	17.2	16.1	300	290	295	2.57	3.00	2.79	0.0	0.0	756.2	14	05:41	20:34
06/19/00*	446	229	16.4	16.9	15.8	310	310	310	2.28	2.20	2.24	0.0	0.0	756.5	15	05:41	20:34
06/20/00*	431	229	16.7	17.2	16.1	320	300	310	2.34	2.49	2.42	0.0	0.0	755.7	16	05:41	20:34
06/21/00*	425	231	17.1	17.8	16.4	300	290	295	2.15	2.53	2.34	0.0	0.0	755.3	17	05:41	20:35
06/22/00*	429	227	16.9	17.5	16.4	300	300	300	2.77	2.65	2.71	0.0	0.0	754.4	18	05:42	20:35
06/23/00*	440	225	16.8	17.5	16.1	310	290	300	2.30	2.35	2.33	0.0	0.0	756.7	19	05:42	20:35
06/24/00*	426	220	16.8	17.5	16.1	300	290	295	2.70	2.52	2.61	0.0	0.0	758.9	20	05:42	20:35
06/25/00*	424	222	16.7	17.2	16.1	290	280	285	2.41	2.60	2.51	0.0	0.0	758.6	21	05:43	20:35
06/26/00*	425	224	16.7	17.2	16.1	280	310	295	2.67	2.61	2.64	0.0	0.0	756.7	22	05:43	20:35
06/27/00*	433	227	17.2	18.1	16.4	290	300	295	2.19	2.27	2.23	0.0	0.0	755.7	23	05:43	20:35
06/28/00*	430	230	17.1	17.5	16.7	280	290	285	2.28	2.59	2.44	0.0	0.0	756.5	24	05:43	20:35
06/29/00*	416	235	17.2	18.1	16.4	300	280	290	2.18	1.98	2.08	0.0	0.0	756.2	25	05:44	20:35
06/30/00*	417	240	16.9	17.8	16.1	290	290	290	2.11	2.44	2.28	0.0	0.0	756.5	26	05:45	20:35
07/01/00*	419	238	16.8	17.5	16.1	310	300	305	2.50	2.17	2.34	0.0	0.0	757.7	27	05:45	20:35
07/02/00*	410	234	16.1	16.7	15.6	300	260	280	2.53	2.51	2.52	0.0	0.0	757.7	28	05:46	20:35
07/03/00*	328	227	16.1	16.7	15.6	290	300	295	2.67	2.63	2.65	0.0	0.0	758.5	29	05:46	20:34
07/04/00*	331	227	16.5	17.2	15.8	300	300	300	2.33	2.18	2.26	0.0	0.0	758.3	0	05:47	20:34
07/05/00*	353	223	16.8	17.5	16.1	280	300	290	2.66	2.65	2.66	0.0	0.0	758.3	1	05:48	20:34
07/06/00*	360	211	16.7	17.2	16.1	310	290	300	2.13	2.35	2.24	0.0	0.0	758.2	2	05:48	20:33
07/07/00*	361	213	16.7	17.2	16.1	290	300	295	2.10	2.39	2.25	0.0	0.0	758.6	3	05:49	20:33
07/08/00*	344	216	16.7	17.2	16.1	310	300	305	2.34	2.13	2.24	0.0	0.0	758.9	4	05:50	20:33
07/09/00*	338	215	16.8	17.5	16.1	310	310	310	2.11	2.55	2.33	0.0	0.0	757.2	5	05:50	20:32
07/10/00*	328	223	17.4	18.1	16.7	320	320	320	2.35	2.1	2.23	0.0	0.0	757.1	6	05:51	20:32
07/11/00*	327	223	17.2	17.8	16.7	320	310	315	1.99	2.23	2.11	0.0	0.0	757.7	7	05:52	20:31
07/12/00*	325	230	17.4	17.8	16.9	320	300	310	2.07	2.26	2.17	0.0	0.0	759.1	8	05:53	20:31
07/13/00*	317	238	17.2	17.8	16.7	300	300	300	2.51	2.09	2.30	0.0	0.0	761.6	9	05:53	20:30
07/14/00*	319	248	17.1	17.8	16.4	310	310	310	2.28	2.66	2.47	0.0	0.0	760.9	10	05:54	20:30
07/15/00*	308	249	17.1	17.5	16.7	310	300	305	2.25	2.16	2.21	0.0	0.0	759.2	11	05:55	20:29
07/16/00*	308	254	17.1	17.5	16.7	300	300	300	2.25	1.84	2.05	0.0	0.0	758.8	12	05:56	20:28
07/17/00*	313	250	16.8	17.2	16.4	300	300	300	2.13	2.22	2.18	0.0	0.0	761.5	13	05:57	20:28

APPENDIX E: Daily environmental conditions at Woodbridge Dam: December 1999 – July 2000

Date	River Flow (cfs)	Canal Flow (cfs)	Water Temp (C)			Secchi Depth (cm)			Turbidity (NTUs)			Rainfall (mm)		Baropress (mm Hg)	Moon Age (days)		
			Avg	Max	Min	AM	PM	Avg	AM	PM	Avg	Camanche	Woodbridge			Sunrise	Sunset
07/16/00*	282	247	16.8	17.5	16.1	300	300	300	2.27	2.25	2.26	0.0	0.0	762.1	14	05:58	20:27
07/19/00*	276	247	17.2	17.8	16.7	300	280	290	2.23	2.7	2.47	0.0	0.0	760.1	15	05:58	20:26
07/20/00*	276	247	17.6	18.1	17.2	280	280	280	2.8	2.4	2.60	0.0	0.0	757.6	16	05:59	20:25
07/21/00*	275	247	17.9	18.3	17.5	290	280	285	2.28	2.49	2.39	0.0	0.0	757.3	17	06:00	20:24
07/22/00*	269	245	18.1	18.5	17.8	280	280	280	2.35	2.41	2.38	0.0	0.0	759.1	18	06:01	20:24
07/23/00*	262	241	18.1	18.5	17.8	290	280	285	2.16	2.93	2.55	0.0	0.0	759.5	19	06:02	20:23
07/24/00*	266	244	18.1	18.3	17.8	270	270	270	2.62	2.33	2.48	0.0	0.0	758.2	20	06:03	20:22
07/25/00*	268	250	18.2	18.6	17.8	270	270	270	2.54	2.44	2.49	0.0	0.0	756.4	21	06:04	20:26
07/26/00*	260	253	18.3	18.8	17.9	280	290	285	2.44	3.15	2.80	0.0	0.0	757.2	22	06:05	20:25
07/27/00*	172	253	18.3	18.5	17.9	250	290	270	2.3	3.02	2.66	0.0	0.0	758.5	23	06:06	20:24
07/28/00*	156	257	18.5	19.0	17.9	270	260	265	2.43	2.62	2.53	0.0	0.0	758.2	24	06:07	20:23
07/29/00*	152	253	n/a	n/a	n/a	300	290	295	2.64	2.51	2.58	0.0	0.0	756.7	25	06:08	20:22
07/30/00*	150	253	n/a	n/a	n/a	270	270	270	2.55	2.96	2.76	0.0	0.0	756.2	26	06:09	20:21
07/31/00*	157	253	n/a	n/a	n/a	270	n/a	270	2.61	n/a	2.61	0.0	0.0	755.9	27	06:10	20:19

Mokelumne River flow data from U.S.G.S. gaging station #11325500 at Woodbridge, CA. (operated by EBMUD) - Expressed in commonly used English units of water flow (cfs)
Water temperatures were recorded hourly with a Ryan TM2000 submersible thermograph installed in pool #15 of the high-stage fishway or pool #6a of low-stage fishway.
Average temperature on these dates (*) are computed from a morning and an afternoon "grab sample" hand held thermometer measurements.
Secchi depth measured twice daily in pool #9a of low-stage fishway or from screw trap platform located about mid-channel below Woodbridge Dam.
Rainfall measured by National Weather Service station at Camanche Reservoir N., San Joaquin Co., CA and by EBMUD approximately 0.5 miles downstream from WIDD.
Baropressure measured (mm Hg) at 15 minute intervals and average daily value computed from a Campbell Scientific Instruments meteorological datalogger (w/Vaisala PTA 427A pressure transducer) deployed near Woodbridge, CA.
Lunar and solar data compiled from tables in the Old Farmer's Almanac, 1999 and 2000 western editions, Yankee Publishing, Dublin, NH.

Appendix F. Delta outflow (in cfs): December 1999 -- July 2000.

December 1999

Date	Sacramento River At Freeport	Sacramento Treatment Plant	San Joaquin River Near Vernalis	Tracy Pump	Contra Costa Pump	Clifton Court Forebay Inflow	Byron-Bethany Irrigation District	Delta Outflow Index
1	14,903	208	1,972	4,175	99	5,345	0	6,933
2	15,898	209	2,001	4093	106	5,815	0	7,590
3	17,144	211	1,893	4,042	72	5,606	0	9,041
4	19,055	212	1,862	4,017	60	5,559	0	10,930
5	18,790	213	1,836	4,024	56	5,536	0	10,610
6	18,186	214	1,828	4,016	63	6,677	0	7,698
7	17,676	216	1,832	4,023	44	6,671	0	7,153
8	17,379	217	1,808	4,027	38	6,678	0	6,794
9	17,080	217	1,791	4,022	38	6,672	0	6,484
10	16,753	217	1,790	1,739	25	3,291	0	12,933
11	17,018	217	1,788	828	37	3,290	0	14,102
12	17,755	217	1,796	828	38	3,298	0	14,848
13	17,907	217	1,776	678	39	791	0	17,623
14	17,786	217	1,748	714	40	792	0	17,443
15	17,780	217	1,726	716	40	794	0	16,261
16	17,788	217	1,707	708	40	797	0	16,266
17	17,512	217	1,727	711	40	800	0	16,001
18	17,113	217	1,742	713	40	787	0	15,666
19	16,659	217	1,743	713	34	796	0	15,202
20	16,358	217	1,748	715	27	1,291	0	14,422
21	15,953	217	1,705	716	0	2,300	0	13,035
22	15,464	217	1,688	714	1	3,294	0	11,549
23	15,424	217	1,669	715	2	4,293	0	10,545
24	15,324	217	1,630	3,274	0	2,999	0	9,151
25	15,326	217	1,639	3,945	3	2,999	0	8,534
26	15,290	217	1,644	3,925	1	3,989	0	7,534
27	15,256	217	1,659	3,918	27	3,996	0	7,538
28	15,415	217	1,649	4,012	40	4,501	0	7,073
29	15,249	217	1,618	4,024	40	5,300	0	6,132
30	14,948	217	1,600	4,024	21	5,347	0	5,832
31	14,729	217	1,599	4,093	1	6,822	0	4,148
AVERAGE	16,610	216	1,749	2,544	36	3,778	0	10,809

Appendix F. Delta outflow (in cfs): December 1999 -- July 2000.

January 2000

Date	Sacramento River At Freeport	Sacramento Treatment Plant	San Joaquin River Near Vernalis	Tracy Pump	Contra Costa Pump	Clifton Court Forebay Inflow	Byron-Bethany Irrigation District	Delta Outflow Index
1	14,393	217	1,581	4,131	1	6,676	0	4,010
2	14,637	218	1,581	4,056	2	6,673	0	4,354
3	14,627	220	1,581	4,120	74	6,307	0	4,638
4	14,687	221	1,631	4,091	160	6,670	0	4,369
5	14,448	223	1,635	4,121	230	6,602	0	4,165
6	14,345	224	1,674	4,099	252	6,309	0	4,428
7	14,307	226	1,678	4,094	246	6,656	0	4,099
8	14,118	227	1,656	4,089	249	6,154	0	4,379
9	14,059	227	1,641	4,100	249	6,500	0	3,998
10	13,927	227	1,666	4,114	249	6,387	12	4,048
11	13,760	227	1,658	4,113	269	6,480	33	3,773
12	13,690	227	1,620	4,106	291	5,725	5	6,960
13	14,851	227	1,715	4,093	239	5,584	0	8,449
14	14,796	227	1,731	4,074	219	5,153	7	8,978
15	16,073	227	1,715	4,067	280	5,686	5	9,609
16	16,207	227	1,793	4,084	279	5,762	8	10,226
17	16,303	227	1,818	1,846	251	6,011	0	10,584
18	19,775	227	1,861	921	102	5,991	24	16,165
19	24,004	227	1,956	907	101	6,494	0	23,678
20	25,140	227	2,069	789	100	6,493	0	25,579
21	23,762	227	2,036	732	98	6,494	16	24,162
22	24,527	227	2,060	730	100	6,493	0	24,207
23	27,622	227	2,108	728	93	6,297	10	26,676
24	26,252	227	2,211	728	83	7,226	7	28,467
25	29,970	227	2,509	2,264	90	7,472	8	45,191
26	43,629	227	2,984	4,012	87	6,488	0	59,878
27	50,545	227	3,385	4,022	87	6,320	0	62,703
28	48,925	227	3,446	4,026	107	6,503	0	59,673
29	46,469	227	3,056	4,011	145	7,592	0	48,136
30	44,504	227	3,018	4,040	140	7,493	0	36,735
31	42,421	227	2,777	4,030	140	7,391	0	35,696
AVERAGE	23,451	226	2,060	3,205	162	6,454	4	19,942

Appendix F. Delta outflow (in cfs): December 1999 -- July 2000.

February 2000

Date	Sacramento River At Freeport	Sacramento Treatment Plant	San Joaquin River Near Vernalis	Tracy Pump	Contra Costa Pump	Clifton Court Forebay Inflow	Byron-Bethany Irrigation District	Delta Outflow Index
1	43,778	227	2,659	4,075	145	7,499	0	37,247
2	44,761	229	2,642	4,087	183	7,492	0	38,322
3	44,479	230	2,582	4,107	246	7,493	0	37,727
4	43,798	232	2,423	4,100	279	7,281	0	38,317
5	43,439	233	2,346	4,104	280	7,400	0	37,020
6	41,943	235	2,269	4,101	277	7,393	0	35,090
7	40,197	236	2,251	4,089	248	7,174	0	33,671
8	38,759	238	2,214	4,080	201	6,671	0	32,613
9	38,006	238	2,154	4,110	218	6,316	0	30,648
10	36,333	238	2,111	4,121	261	7,011	0	29,314
11	34,581	238	2,096	4,127	299	6,976	0	31,159
12	37,092	238	2,113	4,142	275	6,642	0	40,511
13	45,662	238	2,295	4,064	264	7,227	0	53,892
14	57,111	238	3,329	4,047	260	7,698	0	72,909
15	75,712	238	4,849	4,040	125	7,913	0	128,815
16	87,670	238	7,143	4,028	72	8,806	0	174,445
17	87,518	238	7,578	4,112	70	9,059	0	173,984
18	86,997	238	8,324	4,146	72	9,229	0	174,749
19	82,943	238	11,168	4,146	78	8,705	0	159,245
20	78,683	238	12,132	4,145	81	8,165	0	144,196
21	75,620	238	12,248	4,131	75	9,486	0	133,259
22	74,013	238	12,212	4,133	33	9,182	0	124,876
23	72,319	238	12,063	4,085	4	8,058	0	123,917
24	74,535	238	12,387	4,081	1	5,998	0	148,524
25	75,712	238	13,433	4,141	1	5,811	0	158,647
26	75,515	238	13,761	4,136	4	5,669	0	156,035
27	75,286	238	13,152	4,151	1	5,987	0	154,129
28	77,209	238	12,994	4,142	1	5,995	0	162,842
29	81,724	238	13,894	4,151	4	5,998	0	181,776
AVERAGE	61,083	236	6,925	4,108	140	7,391	0	98,203

Appendix F. Delta outflow (in cfs): December 1999 -- July 2000.

March 2000

Date	Sacramento River At Freeport	Sacramento Treatment Plant	San Joaquin River Near Vernalis	Tracy Pump	Contra Costa Pump	Clifton Court Forebay Inflow	Byron-Bethany Irrigation District	Delta Outflow Index
1	81,907	236	14,957	4,153	1	5,995	0	183,144
2	81,100	234	14,700	4,112	2	6,550	0	180,232
3	79,225	232	14,849	4,071	3	7,962	0	170,628
4	76,982	231	14,802	4,080	1	8,718	0	159,908
5	74,739	229	14,709	4,047	1	8,901	0	150,668
6	74,788	227	15,514	4,070	4	7,854	0	153,170
7	74,492	225	16,481	4,063	1	8,119	0	157,167
8	73,341	225	16,995	4,047	33	8,539	0	157,269
9	73,544	225	16,799	4,038	63	4,028	0	167,773
10	74,231	225	16,606	3,715	60	3,936	0	167,675
11	73,821	225	16,564	3,588	60	2,861	0	163,685
12	73,119	225	16,208	3,587	71	5,009	0	154,545
13	72,407	225	15,829	3,587	61	5,299	0	145,291
14	71,614	225	15,524	3,588	59	3,201	0	136,658
15	70,322	225	14,883	3,602	78	2,678	0	122,921
16	68,407	225	14,027	3,600	175	3,090	16	103,754
17	66,345	225	13,329	3,593	287	3,205	16	87,472
18	64,721	225	12,938	3,578	300	5,422	0	73,583
19	61,943	225	12,373	3,573	293	6,679	0	66,586
20	57,976	225	11,185	3,579	209	6,640	36	61,536
21	53,767	225	11,241	3,567	283	4,807	10	59,022
22	49,082	225	10,810	3,571	301	5,878	24	52,525
23	45,411	225	9,399	3,572	300	4,707	42	48,150
24	42,599	225	8,718	2,305	305	4,270	24	46,153
25	39,760	225	8,355	1,782	300	4,381	25	43,350
26	37,539	225	8,082	1,777	313	4,529	0	40,656
27	34,938	225	7,883	1,774	297	5,793	18	36,526
28	32,855	225	7,525	2,307	286	5,198	25	34,135
29	31,348	225	7,131	2,525	297	5,546	28	31,506
30	29,685	225	6,795	2,390	308	6,674	25	28,165
31	28,326	225	6,581	2,946	258	5,716	22	26,847
AVERAGE	60,333	226	12,638	3,380	161	5,554	10	103,571

Appendix F. Delta outflow (in cfs): December 1999 -- July 2000.

April 2000

Date	Sacramento River At Freeport	Sacramento Treatment Plant	San Joaquin River Near Vernalis	Tracy Pump	Contra Costa Pump	Clifton Court Forebay Inflow	Byron-Bethany Irrigation District	Delta Outflow Index
1	27,095	222	6,345	3,467	317	5,712	23	24,653
2	25,822	218	6,145	3,360	304	6,065	25	22,903
3	24,963	215	5,745	3,483	327	5,600	29	22,000
4	24,298	211	5,406	3,418	316	6,125	40	20,454
5	23,521	208	5,181	3,478	327	3,432	29	21,926
6	23,201	204	4,944	3,479	334	4,203	63	20,593
7	22,840	201	4,738	4,006	346	4,098	42	19,639
8	22,473	201	4,603	4,218	361	4,876	40	18,372
9	21,782	201	4,598	4,229	366	5,047	0	17,438
10	22,354	201	4,522	4,222	369	4,712	97	18,305
11	22,879	201	4,306	4,233	380	4,780	47	18,458
12	24,160	201	4,144	4,217	377	5,224	65	19,215
13	25,560	201	4,115	4,230	374	5,031	84	20,771
14	27,177	201	4,252	2,863	381	2,995	73	26,413
15	27,808	201	4,645	1,016	358	1,299	48	31,250
16	28,286	201	5,332	1,017	249	1,300	5	32,208
17	28,854	201	5,512	977	220	1,300	187	33,091
18	29,924	201	5,834	1,488	129	740	71	41,801
19	30,715	201	6,371	1,112	120	1,191	47	42,442
20	32,045	201	6,635	873	121	1,492	43	43,484
21	34,246	201	6,232	876	111	1,490	77	45,178
22	33,340	201	6,251	905	108	1,492	76	43,955
23	31,538	201	6,280	926	101	1,488	50	35,380
24	30,185	201	6,273	886	113	1,874	47	33,560
25	28,656	201	6,257	263	129	1,979	39	32,680
26	27,693	201	6,066	0	143	2,239	63	31,300
27	26,615	201	5,943	362	151	1,851	113	30,162
28	25,004	201	5,841	871	152	1,242	101	28,558
29	24,234	201	5,670	869	151	1,241	101	27,645
30	24,325	201	5,787	868	157	1,328	101	27,756
AVERAGE	26,726	203	5,466	2,207	246	3,048	61	28,386

Appendix F. Delta outflow (in cfs): December 1999 -- July 2000.

May 2000

Date	Sacramento River At Freeport	Sacramento Treatment Plant	San Joaquin River Near Vernalis	Tracy Pump	Contra Costa Pump	Clifton Court Forebay Inflow	Byron-Bethany Irrigation District	Delta Outflow Index
1	24,929	200	5,811	869	146	1,312	99	28,402
2	25,192	200	5,792	867	142	1,187	157	28,932
3	25,591	199	5,695	872	114	1,327	74	29,042
4	25,571	199	5,561	870	142	798	95	29,656
5	25,935	198	5,516	866	151	1,306	101	29,590
6	26,432	198	5,688	865	161	1,330	101	30,256
7	26,436	197	5,655	863	159	1,327	111	32,078
8	26,878	197	5,755	863	59	1,326	30	34,310
9	27,455	197	6,061	867	3	1,317	35	35,845
10	26,976	197	6,012	858	2	1,326	71	35,321
11	26,137	197	5,898	860	3	1,444	60	33,788
12	24,406	197	5,891	858	3	1,442	51	30,046
13	21,502	197	5,815	859	3	1,447	50	25,245
14	18,188	197	5,701	860	3	1,488	50	21,623
15	16,040	197	5,647	861	1	1,498	65	19,456
16	15,280	197	5,284	865	3	1,495	77	18,871
17	16,458	197	4,956	862	4	1,491	94	20,039
18	18,252	197	4,696	855	6	1,991	95	20,556
19	19,706	197	4,418	862	4	1,744	94	21,741
20	19,674	197	4,184	861	4	1,999	101	21,259
21	18,248	197	4,164	862	4	2,500	40	19,138
22	16,949	197	4,349	861	3	2,994	101	17,531
23	16,917	197	4,233	861	122	3,245	115	17,014
24	17,108	197	4,051	865	193	3,803	95	16,324
25	16,813	197	4,107	1,790	195	(77)	98	19,053
26	17,170	197	4,033	2,781	206	0	119	18,336
27	16,912	197	4,019	2,780	207	0	113	18,026
28	16,842	197	3,862	2,788	206	0	101	17,685
29	16,275	197	3,768	2,766	207	5,000	101	11,964
30	15,954	197	3,629	2,764	207	3,234	83	13,169
31	16,158	197	3,490	2,765	204	3,800	160	12,667
AVERAGE	20,722	197	4,959	1,263	92	1,713	88	23,451

Appendix F. Delta outflow (in cfs): December 1999 -- July 2000.

June 2000

Date	Sacramento River At Freeport	Sacramento Treatment Plant	San Joaquin River Near Vernalis	Tracy Pump	Contra Costa Pump	Clifton Court Forebay Inflow	Byron-Bethany Irrigation District	Delta Outflow Index
1	16,057	196	3,403	1,517	333	6,000	62	11,209
2	15,707	196	3,361	1,000	401	5,999	167	11,255
3	15,566	195	3,318	999	351	5,999	151	11,040
4	15,408	195	3,376	1,000	395	5,991	126	10,896
5	14,807	194	3,471	1,488	388	5,991	142	9,797
6	15,146	194	3,455	1,654	395	5,490	122	10,369
7	15,450	193	3,359	1,652	395	5,443	156	10,622
8	14,951	193	3,204	1,646	368	5,301	156	10,065
9	15,090	193	3,259	2,280	386	4,788	131	10,325
10	15,137	193	3,407	2,528	397	4,268	131	10,694
11	16,249	193	3,398	2,525	401	4,398	131	11,511
12	16,821	193	3,564	2,527	395	4,586	95	11,958
13	16,972	193	3,655	2,532	342	5,167	169	11,698
14	16,908	193	3,515	2,529	275	4,676	137	11,684
15	16,304	193	3,339	2,536	230	4,993	158	10,578
16	15,937	193	3,150	3,782	312	3,994	155	9,709
17	16,264	193	2,918	4,197	390	3,499	126	9,760
18	16,220	193	2,748	4,167	394	2,996	76	9,972
19	15,760	193	2,720	4,173	365	3,000	91	9,474
20	15,304	193	2,711	4,197	328	2,968	125	9,074
21	14,455	193	2,600	4,204	332	2,492	93	8,444
22	13,727	193	2,473	4,284	337	2,491	75	7,413
23	13,375	193	2,347	4,269	345	2,999	88	6,489
24	14,415	193	2,268	4,209	342	3,191	101	7,313
25	15,871	193	2,291	4,235	338	2,046	101	9,883
26	17,120	193	2,361	4,234	339	4,719	116	8,551
27	17,671	193	2,332	4,220	290	3,997	87	9,741
28	17,869	193	2,317	4,251	280	3,993	88	9,890
29	18,507	193	2,200	4,277	337	4,491	113	9,490
30	18,621	193	2,108	4,225	325	5,498	91	8,523
AVERAGE	15,923	193	2,954	3,045	350	4,382	119	9,914

Appendix F. Delta outflow (in cfs): December 1999 -- July 2000.

July 2000

Date	Sacramento River At Freeport	Sacramento Treatment Plant	San Joaquin River Near Vernalis	Tracy Pump	Contra Costa Pump	Clifton Court Forebay Inflow	Byron-Bethany Irrigation District	Delta Outflow Index
1	19,268	194	2,100	4,250	327	6,680	98	7,951
2	19,924	195	2,129	4,219	297	6,549	96	8,809
3	20,083	196	2,118	4,238	307	5,697	140	9,758
4	20,055	196	2,218	4,349	326	6,342	96	8,976
5	20,007	197	2,146	4,268	315	6,027	89	9,158
6	20,239	198	2,168	4,295	328	4,104	163	11,389
7	20,786	199	2,134	4,328	238	6,672	152	9,338
8	20,743	199	2,159	4,330	219	6,463	151	9,522
9	20,902	199	2,170	4,345	219	6,672	151	9,482
10	20,779	199	2,223	4,335	272	6,674	87	9,292
11	20,826	199	2,153	4,325	346	6,665	153	9,231
12	20,569	199	2,049	4,324	350	7,179	103	8,289
13	19,624	199	2,070	4,344	356	7,180	76	7,311
14	19,834	199	2,085	4,318	326	7,134	77	7,617
15	20,395	199	2,132	4,301	259	7,171	101	8,264
16	20,283	199	2,155	4,288	238	7,179	76	8,175
17	20,376	199	2,192	4,276	235	7,177	59	8,338
18	20,571	199	2,158	4,347	239	7,174	88	8,515
19	20,588	199	1,790	4,320	232	6,610	102	8,716
20	20,651	199	1,712	4,336	235	5,272	106	10,054
21	20,697	199	1,558	4,341	235	5,000	102	10,188
22	20,526	199	1,519	4,357	241	4,991	101	9,976
23	21,159	199	1,737	4,360	239	4,997	96	10,812
24	21,754	199	1,781	4,353	240	4,992	72	11,436
25	22,051	199	1,822	4,301	259	4,994	73	11,870
26	21,974	199	1,765	4,336	251	4,993	72	11,719
27	21,865	199	1,718	4,332	242	5,000	68	11,574
28	21,811	199	1,762	4,346	239	4,995	56	11,495
29	21,609	199	1,631	4,350	235	5,000	31	11,113
30	21,669	199	1,736	4,345	239	5,006	76	11,289
31	21,509	199	1,769	4,317	245	815	97	15,465
AVERAGE	20,746	198	1,963	4,319	269	5,852	97	9,843