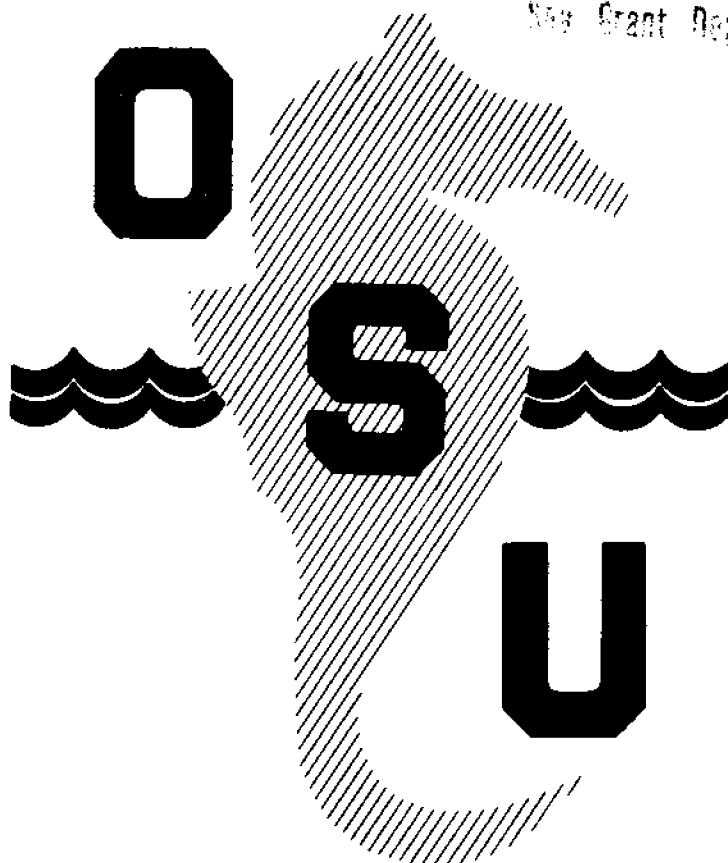


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THE UTILIZATION OF NETARTS BAY
BY JUVENILE CHUM SALMON—1986

by

A.W. Chung and W.G. Pearcy

Oregon State University
ORES-U-86-002

Reference 86-12
October 1986
Field Report

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OREGON STATE UNIVERSITY

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College of Oceanography
Oregon State University
Corvallis, Oregon 97331

FIELD REPORT

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D.R. Caldwell
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ACKNOWLEDGMENTS

This research was supported by the Oregon State University Sea Grant College program, Oregon Aqua-Foods, Inc., and the Northwest and Alaska Fisheries Center. We thank Kevin Hopkins for use of OSU's Whiskey Creek hatchery facilities during our field season; D. Miller (Oregon Department of Fisheries and Wildlife) for the use of a boat; H. Frolander (OSU College of Oceanography) and P. Kalk (CONMAR) for the use of the outboard motors; R. Chitwood and L. Poole (Oregon Aqua-Foods, Inc.) for their advice, the use of the net pens, and rearing the accelerated chum; Superintendent S. Phillips (Swanson Aquiculture Facility) for his invaluable assistance both at the hatchery and in the field; W. McNeil and J. Winton for their timely advice; and R. Brodeur, A. Chapman, J. Chapman, J. Fisher, K. Krefft, L. Mahn and M. Wilson for their help in the field.

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INTRODUCTION

The School of Oceanography, Oregon State University, initiated a study during the spring of 1984 to investigate the utilization of Netarts Bay by juvenile chum salmon. Specific objectives are to determine: 1) the utilization of the estuary by hatchery and wild chum salmon, 2) the residence time of chum salmon in Netarts Bay, and 3) the size at which the fish emigrate from the bay. Preliminary results of our research have been reported for 1984 and 1985 (Wilson and Pearcy 1985a, 1985b). This report summarizes some of the results of the 1986 field season. Most of the observations made in previous years were repeated in 1986, providing data on interannual variations in patterns of estuarine utilization of juvenile chum salmon. Feeding ecology of juvenile chum salmon was also emphasized in 1986.

MATERIALS AND METHODS

Sampling Area

Netarts Bay is located approximately 96 km (60 mi) south of the mouth of the Columbia River and is considered the sixth largest estuary in Oregon with a surface area of 10.1 km (3.9 mi) at MHW (Kreag 1979). About 12% of the Bay is subtidal (Kreag 1979), with extensive eelgrass beds located in many of these areas as well as other lower intertidal areas. Sediments in the bay are composed of fine-to-medium sands and silts (Glanzman *et al.* 1971, Stout 1976). The east side of the lower bay has been extensively rip-rapped. Of the 13 small streams that drain into Netarts Bay, Whiskey Creek is considered the largest, extending approximately 8.0 km (5.0 mi) in length (Stout 1976, Kreag 1979). Glanzman *et al.* (1971) estimated an average annual flow rate for Whiskey Creek of 28.3 liters/sec. (10 cfs). Whiskey Creek is the site of the Oregon State University experimental research hatchery for rearing chum salmon (Lannan 1975). Jackson Creek, which empties into the head of Netarts Bay, is another tributary used for spawning by chum salmon.

Whiskey Creek

A fyke net, 3.2 m long (Figure 1a), was used to sample outmigrating wild chum salmon fry in Whiskey Creek from 28 February to 10 May 1986. The net was situated approximately 35 m upstream from the highway bridge across Whiskey Creek. Steel

fence posts were placed approximately 1.25 m apart across the width of the creek immediately upstream from the fyke net and each wing was secured to a post. The net extended across more than 95% of the width of the stream on 53 of the 72 days sampled.

Flow rates of Whiskey Creek were measured directly with a calibrated T.S.K. flowmeter (readings in revs./minute, 6.26 revs./meter). Stream height was also monitored to the nearest 1.0 cm to provide a relative index of water flow. Water temperature to the nearest 0.1 C and cloud cover were also recorded.

All species captured in the fyke net were identified, counted, and measured. Fork lengths of all species were determined to the nearest 1.0 mm. Occasionally, chum fry were subsampled for age determination. From 28 February through 3 May the fyke net was fished continuously over 24 hours except on four periods of high water flow. We were unable to sample the creek daily after 3 May 1986.

Jackson Creek

A 3.05 m^3 net pen was used to sample outmigrating wild chum fry in Jackson Creek on selected nights from 19 March through 25 April. The net was located downstream of the Jackson Creek culvert adjacent to the Cape Lookout State Park access road. Steel fence posts were placed approximately 3 m apart on either side of the downstream end of the culvert. The net pen was

deployed on its side with the open end facing upstream. The wings of the net were secured to the posts, the lower lip of the net was weighted with chain, and the upper lip was buoyed with styrofoam floats.

Flow rates of Jackson Creek were not measured directly although water depth was monitored to the nearest 1.0 cm to provide a relative index of water flow. Water temperature to the nearest 0.1 °C and cloud cover were also recorded.

All species captured in the net pen were identified, counted, and measured. Fork lengths of all species were determined to the nearest 1.0 mm. Some chum fry were subsampled for age determination. Due to limited personnel, Jackson Creek was sampled on average two nights a week from 19 March through 25 April 1986. During sampling periods the net was removed from the creek between 0800 hr and 1800 hr because few, if any, fry outmigrated from Whiskey Creek between those hours in 1984 and 1985 (Wilson and Pearcy 1985a, 1985b).

Releases of Chum Salmon from the Whiskey Creek Hatchery

An estimated total of 609,725 juvenile chum salmon were released from the OSU Whiskey Creek hatchery into Netarts Bay on the evenings of 28 April and 29 April 1986 (approximately 2200 hr). This number is based on hatchery records of egg survival and daily counts of raceway mortalities.

The hatchery population was afflicted with a bacterial

infection which left most individuals in such a weakened state that any stress, e.g. dip-netting them out of the raceway, resulted in mortalities. While fin-clipping juvenile chum on April 28 we experienced 8.7% immediate mortality and an additional 9.2% mortality after 24 hr. Approximately 4,300 fish did not survive the initial transfer from the raceway to the clipping shed. Daily raceway mortalities at this time were about a 1000 fish a day. As saltwater immersion was the suggested treatment for the infection, we decided to mark less than half of our target goal of 40,000 fish and release the entire population several days earlier than planned. After the release, the entire raceway was drained, scrubbed with formaldehyde, and flushed with fresh water.

Four workers (64 working hours) clipped the right ventral fin from 17,066 fish (mean weight 0.97 g, mean fork length 48 mm) during 28-29 April. A subsample of over a thousand clipped fish from each release (1687 from the 28 April release and 1085 from the April 29 release) were held for 24 hr to estimate clipping mortality and marking efficiency. We estimate that 14,700 marked Whiskey Creek hatchery chum fry (2.3 % of total hatchery releases) were released into Netarts Bay.

Two additional groups of fin-clipped chum fry, totaling 43,570 individuals, were reared off-site at the Oregon-Aqua Foods, Inc. facility in Springfield, Oregon, and were released

from the Whiskey Creek hatchery on 11 May 1986 after acclimation at the hatchery for 10 days. The first group of 21,366 fish, averaged approximately 2.2 g and all had their right ventral and adipose fins removed. The second group of 22,204 fish averaged approximately 6.5 g and all had their left ventral and adipose fins removed. These groups made up 3.3 % and 3.4 % of the total hatchery release, respectively. Therefore, 9.0 % of the total hatchery release of 653,295 chum fry from the Whiskey Creek hatchery in 1986 were marked.

Gear -- Netarts Bay

A 37-m long tapered floating beach seine, constructed by Eastside Net Shop (Seattle), was used to sample fishes in Netarts Bay. The physical dimensions of the net are presented in Figure 1b. The net was set in a semi-circle from the shoreline from a 4.6 m (15') aluminum skiff outfitted with a 18 hp outboard motor.

Surface temperatures were measured to the nearest 0.1° C using a bucket thermometer and surface salinities were determined with a refractometer (American Optical, Model 10419) at the location of each successful beach seine set. Percent cloud cover, wind speed and direction were also recorded. Stage of tide and rough estimates of turbidity were made relative to the depth of water, e.g. if the bottom was visible beneath 2 m of water on station, visibility was recorded as equal to or exceeding 2 m. Substrate and vegetation type were also noted for each beach

seine set.

Sampling Procedure -- Netarts Bay

A total of 11 high tide and 8 low tide stations, some marked with wooden stakes, were repeatedly sampled (Figure 2). Descriptions of most of the specific beach seine stations are presented in Wilson and Percy (1985a). Many of the stations sampled in previous years, especially in the upper bay, were inaccessible because of changes in topography, deposition and erosion. Descriptions of the new sites sampled in 1986 are given in Table 1.

Date, time of day, and performance of the gear were recorded. All stations were usually sampled at least once during a 1-3 day sampling period. All high tide stations could be sampled on tides 6.6 ft or higher (uncorrected tidal height as stated in the 1986 OSU Marine Science Center tide tables). Correction factors for times and elevations of slack low and high tides near the mouth of Netarts Bay are found in Stout (1976). A time lag of 40 and 80 minutes was found for high and low water, respectively, near the mouth. Sampling at high or low tide stations usually commenced at least 30 minutes before slack tide. Stations near the mouth were sampled first and stations farther up the estuary were usually sampled later as the slack high or low tide progressed up the bay. Slack high and low tides in the upper estuary were delayed by as much as 85 to 200 minutes.

respectively, after slack high and low water at the mouth.

At each site all fishes captured were identified and counted. Estimates of large catches were derived from the expansion of subsample totals. Fork lengths of the common species were determined to the nearest 1.0 mm. If substantial numbers of species other than chum salmon were captured, subsamples were preserved for stomach contents and size frequency analyses. Potential fish predators of juvenile chum salmon including coho smolts, rainbow trout and cutthroat trout were occasionally captured and retained for stomach content analysis.

All juvenile chum salmon, or a subsample of 50-100 individuals, were counted and checked for ventral and adipose fin clips. Fish to be returned to the bay were examined, counted, placed in a recovery bucket, and then released. A subsample of 1-100 chum was placed in 10% formalin or 50% ethanol for stomach content analysis and age determination, respectively. Fork lengths of all preserved fish were measured in the laboratory and converted to fresh fork lengths using the relationships determined from measurements of individual fresh and preserved fish (Wilson and Pearcy 1985b for formalin preserved fish and Appendix A for ethanol preserved fish).

Station #1 was sampled for 32 consecutive hours over 3 tidal cycles on four occasions (9-11 April (new moon), 23-24 April (full moon), 8-9 May (new moon), and 21-23 May (full moon)) to determine diel changes in catches and feeding periodicity of chum

salmon. Additionally, all sites were sampled on all four tides on 5-6 May.

Data Analysis

Whiskey Creek -- The sampling season was divided into 24 hr. periods with each period beginning at 1200 hr. As juvenile chum tend to move downstream almost exclusively at night (Wilson and Pearcy 1985a, 1985b), fish found in the net before noon were considered to have entered the net the previous evening. Daily catches were estimated by linear interpolation for those days not sampled. All observed and estimated daily totals of outmigrating chum were summed to provide an estimate of the contribution of wild chum in Whiskey Creek to Netarts Bay.

Netarts Bay -- For the purpose of data analysis the field season was divided into 18 sampling periods in which every beach seine station was usually sampled at least once. Some upper bay stations were not sampled during each period during the end of the field season. The bay was arbitrarily divided into an upper bay and lower bay stations (Figure 2). Mean lengths and numbers of fish caught from different regions of the bay were compared using a t-test and Mann-Whitney test, respectively (Zar 1974). Estimates of growth were compared using an F test for parallelism (Zar 1974).

RESULTS

Whiskey Creek

A total of 15,330 chum salmon fry were estimated to have outmigrated from Whiskey Creek into Netarts Bay between 28 February and 10 May. This outmigration of wild chum salmon fry was approximately 2.3% of the total chum salmon releases from Whiskey Creek hatchery in 1986. As in previous years, the peaks of outmigration did not appear positively associated with the new moon as reported for other outmigrating salmonid fry (Mason 1975). For example, a peak of outmigration occurred shortly after the full moon on 27 March, although large numbers of fish outmigrated just before the new moon on 9 April (Appendix B). Neither stream temperature, which ranged from 8.0 to 12.2 °C (mean 10.0 °C), nor stream velocities (range = 1.9 to 39.3 m/sec; mean 17.4 m/sec) showed any strong correlation with the pulses of outmigrating chum, although the highest peak of outmigration followed the highest peak in water temperature (Appendix B, Figure 3). The first peak of outmigration occurred after a peak in stream flow (water velocities > 15 m/sec) whereas subsequent peaks occurred during the period of lowest flow.

Jackson Creek

Although the data for the outmigration of chum fry from Jackson Creek are incomplete, they provide an index of the relative contribution of chum fry to Netarts Bay. We estimate

that at least as many wild chum fry outmigrate from Jackson Creek as from Whiskey Creek (Figure 3a.). Outmigration appeared to be earlier in Jackson Creek than Whiskey Creek. Peak catches occurred on the evening of 3 April (approximately 2465 fish), five days before the peak in Whiskey Creek (approximately 1780 fish). About 97% of the estimated total number of outmigrating wild chum fry were caught by 10 April in Jackson Creek, in comparison to 17 April for Whiskey Creek.

Netarts Bay

Beach Seine

A total of 388 beach seine sets were made in Netarts Bay from 3 March through 26 June 1986. Appendix C lists the date, time of day, tide stage, water temperature, salinity, and catch for each beach seine set. The water temperature from all stations averaged 12.8°C and ranged from 8.9°C to 26.4°C . All areas of the bay showed a seasonal increase in temperature (Figs. 4a,b). Water temperatures in the upper bay were generally greater than those in the lower bay during the latter portion of the field season (Table 2, Figure 4a,b.). Mean salinity for all sites was 23.4 ppt and ranged from 4 to 35 ppt.

An estimated 18,323 juvenile chum salmon were caught in seine hauls from 13 March to 26 June. Numbers of chum salmon caught at each beach seine station are listed in Appendix C. The average number of chum caught per beach seine set, all sites

combined, ranged from 0 to 280 over the field season (Figure 5). Large standard deviations of the number of fish per set, as well as results from repeated sets, indicate that chum salmon often occurred in schools or aggregations within the bay.

The first noticeable increase in the mean number of chum per beach seine set coincided with the first peak of outmigration of wild fish from Whiskey Creek on 27 March (Figures 3a, 5). Beach seine catches increased to an average of approximately 12 fish per set during the end of April as decreasing numbers of wild chum migrated downstream from Whiskey and Jackson Creeks. The greatest increase in catches immediately followed the first hatchery releases on 28-29 April when mean numbers per set increased to 280 (Figure 5). By 5 May, mean catch per set dropped to less than 50. On 8 May the mean catch per set exceeded 125, suggesting that the distribution of juvenile chum was patchy. Catches did not increase, but declined to less than 60 two days after the second release on 11 May, and then increased to 95 eight days later. By 7 June mean catches dropped to less than 3. The last 3 chum salmon were caught near the mouth of the bay at sites "Opposite #1" and "#1" on 22 June.

Although not statistically significant in most cases (Mann-Whitney U-test, $P > .05$), the following trends in catches of juvenile chum salmon were observed. Prior to 9 April, all catches were made during high tide, and the mean catch per set was

greater at the upper bay than the lower bay stations. After the releases, mean catches in the lower bay were higher than in the upper bay, and catches at low tide were higher than catches at high tide. Catches were again similar between upper and lower bay and high and low tides when the majority of the juvenile chum had apparently emigrated from the bay. Most catches were made in the lower bay at low tide at the end of the season. This suggests a general down-bay movement of fish as a function of time.

Though statistically different in many cases (t-tests, $P < .05$), differences in fork length among chum caught in the upper and lower bay and at high and low tide tended to be small. Fish caught at low tide tended to be slightly larger than those caught at high tide, but there was no consistent trend between samples from the upper and lower bay. Prior to the first release, the mean fork length of chum in the bay increased over time. Mean size decreased apparently due to the large influx of small hatchery fish after the first release (Figure 6.). No significant differences were found in mean size between fish from the upper and lower bay or high and low tide immediately after the release suggesting that the hatchery fish were distributed throughout the bay. Within a week, however, significant differences were found in mean size between chum from the upper and lower bay and high and low tides, though no consistent patterns emerged. After the second release, the mean size of

fish increased due to the influx of large OAF fish, but no significant difference was found with respect to station location or tide, although larger individuals tended to be found in the lower bay.

24-hr studies

Catches at station #1 were significantly higher (Mann-Whitney U-test, $P < .05$) during the early morning hours (0500-0800 hr) and at night (2000-0500 hr) than during the day (0800-1600 hr). The largest catches were made during the early morning hours. Catches in May were higher than in April due to the hatchery releases (Figure 7.).

Catches during the day tended to be larger than catches at night at the same stations during 24-hr sampling of all stations on 5-6 May. Catches were not consistently higher during high or low tidal phases, although significantly larger fish were caught at low tide than at high tide during both day and night (Figure 8.).

Recapture of marked chum salmon

We estimate that a total of 494 fin-clipped juvenile chum salmon were recaptured from 1 May through 12 June in beach seine hauls within Netarts Bay. The majority of these fish were either reared at the Whiskey Creek Hatchery (317 fish, right pelvic clip) or from the 2.2 g OAF release group (144 fish, right pelvic and adipose clip). Eleven fish from the 6.5 g OAF group (left

pelvic and adipose clip) and one fish which had both pelvics and adipose fins clipped were also recaptured in the bay. Twenty-one additional marked fish were caught, but precise identification of the specific tag groups could not be made due to inadequate preservation. The proportion of clipped fish in the catch was nearly 9% on 13 May, two days after the OAF release, but declined to less than 1% in approximately three weeks (Figure 9a.). Tagged Whiskey Creek fish consistently made up about 2% of the catch for the month of May. The 2.2 g OAF group, which was released approximately two weeks later, made up almost 6% of the catch shortly after release then declined to less than 1% at the end of May (Figure 9b.). Few of the 6.5 g OAF group were recaptured suggesting that these large individuals may have rapidly emigrated from the bay (Appendix D.).

Growth was estimated from fork lengths of recaptured fin-clipped fish. The increase in mean lengths after release of both the Whiskey Creek and 2.2 g OAF groups appears to be linear (Figure 10.). No trend for decreasing size later in the spring is obvious due to migration of large individuals from the bay. A straight line was fitted to individual length data by the method of least squares and resulted in the following relationships for the two groups:

$$\text{Whiskey Creek fish: } FL = 0.53 \cdot T + 47.34 \quad (N=121; r^2=0.59)$$

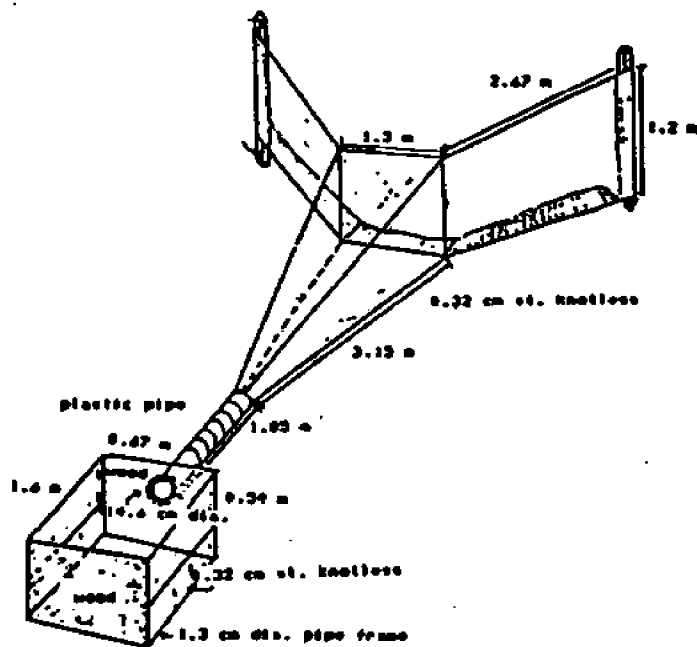
$$2.2 \text{ g OAF fish: } FL = 0.33 \cdot T + 62.41 \quad (N=112; r^2=0.11)$$

where FL represents the fresh fork length in mm and T represents the number of days since hatchery release (April 28 and May 11, respectively). Estimated growth for Whiskey Creek chum salmon was 0.5 mm per day which was significantly greater ($P < 0.01$) than the 0.3 mm per day determined for the 2.2 gram OAF fish. The low r^2 values are probably due to variations in size within release groups. The low growth rate for the OAF group could be due to continuous removal of larger, faster growing individuals from the bay.

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A



B

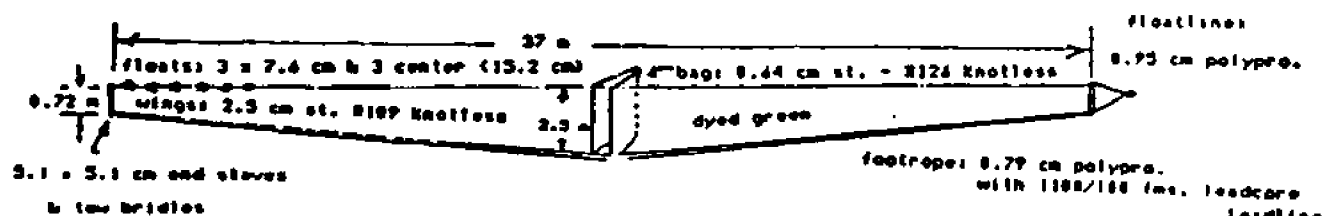


Figure 1. Physical dimensions of the fyke net (A) and beach seine (B).

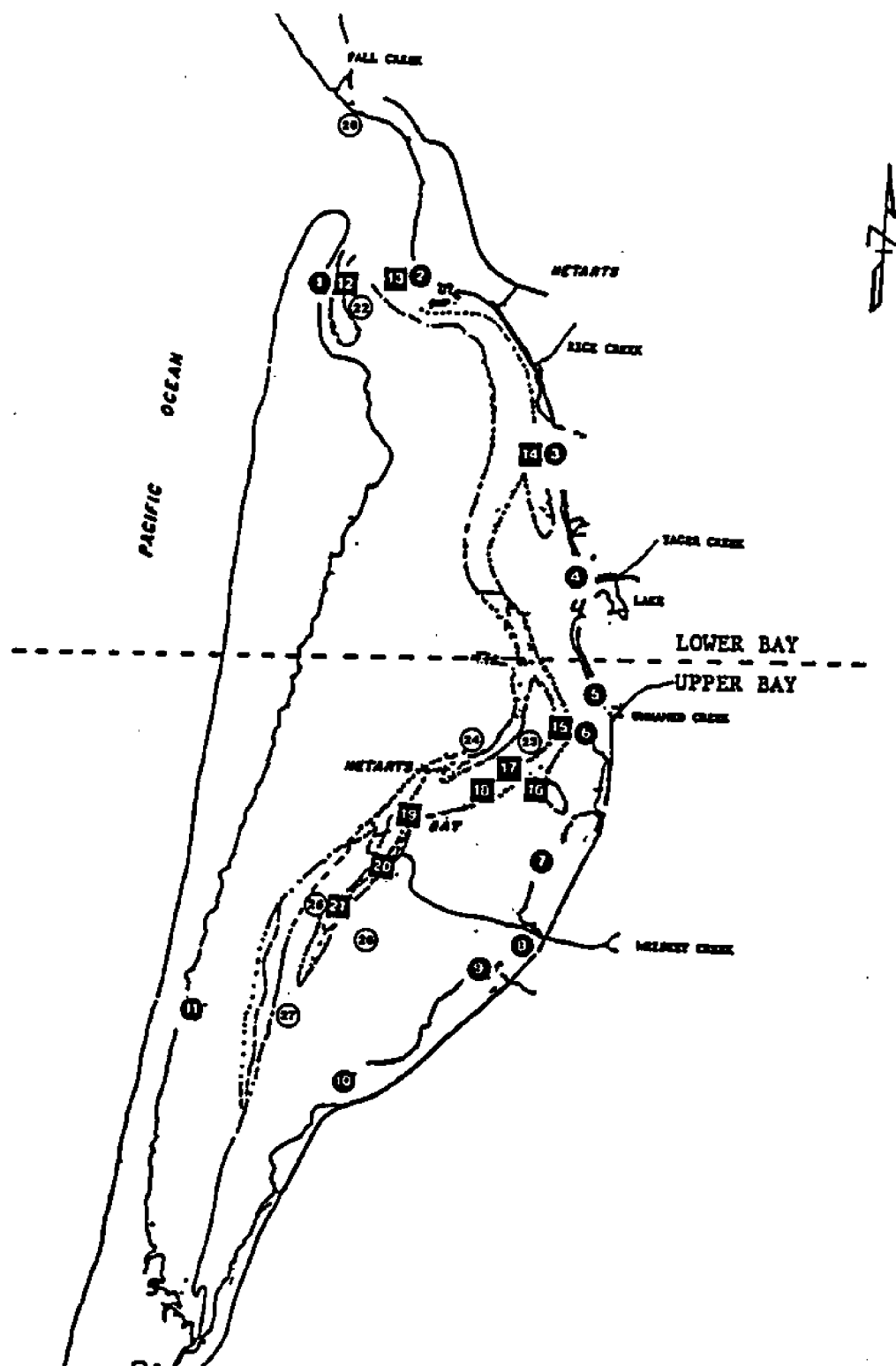


Figure 2. Location of high tide (filled circles), low tide (squares), and new low tide (open circles) beach seine stations.

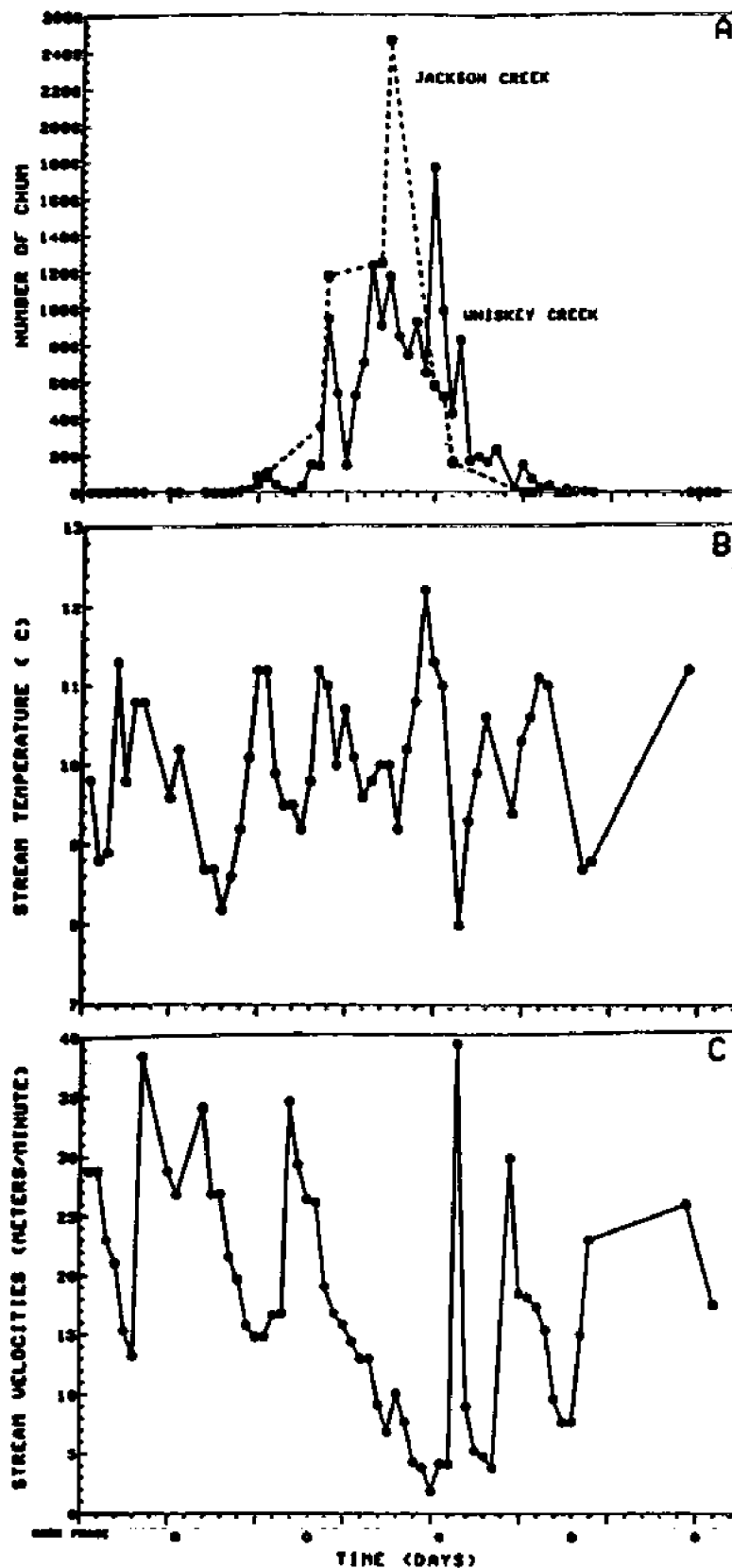


Figure 3. Fyke net catches of chum salmon fry in Whiskey and Jackson Creeks (A), Whiskey Creek stream temperature (B), and Whiskey Creek stream velocities (C).

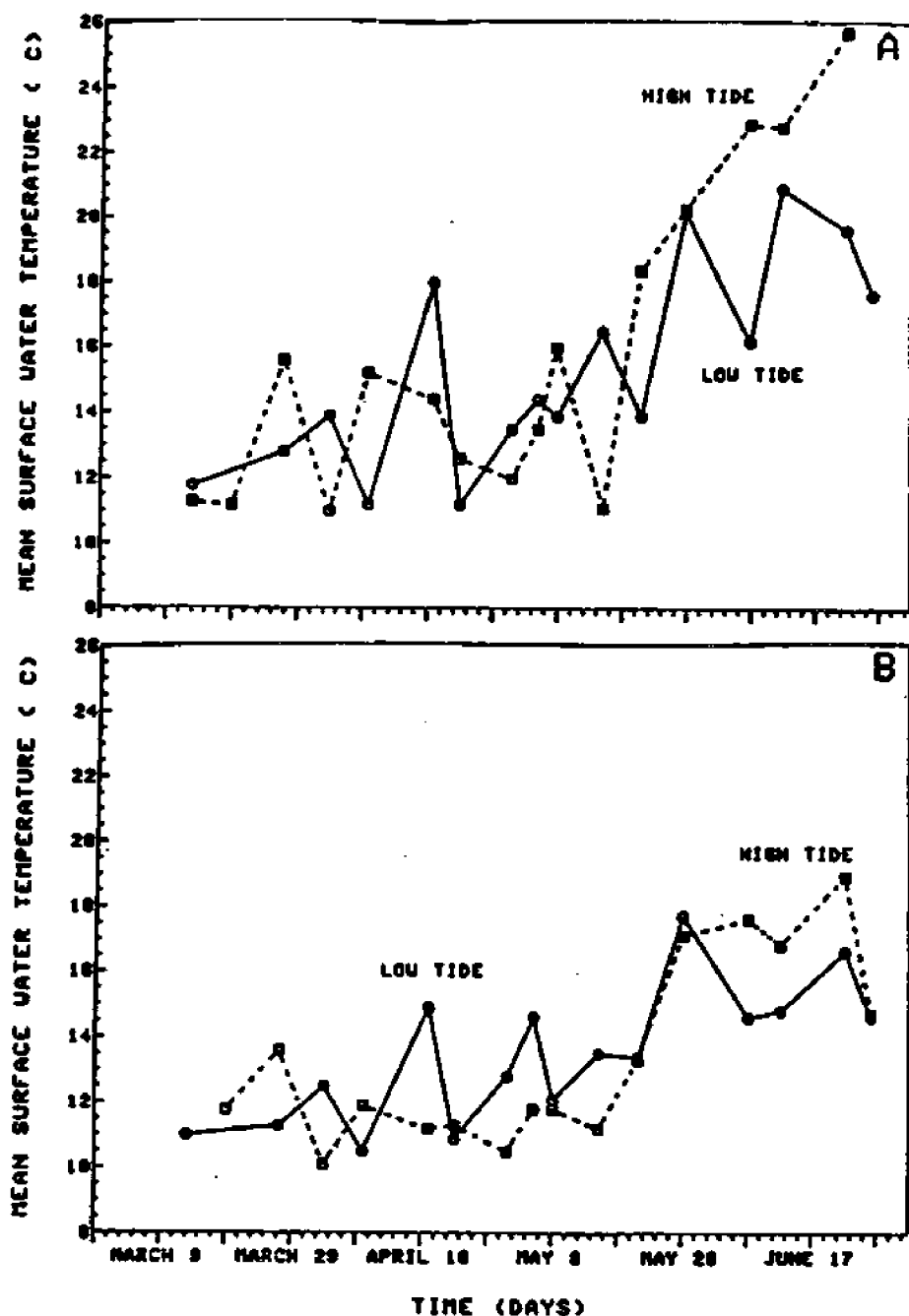


Figure 4. Mean surface water temperatures from upper bay (A) and lower bay (B) beach seine stations at high tide (squares) and low tide (circles).

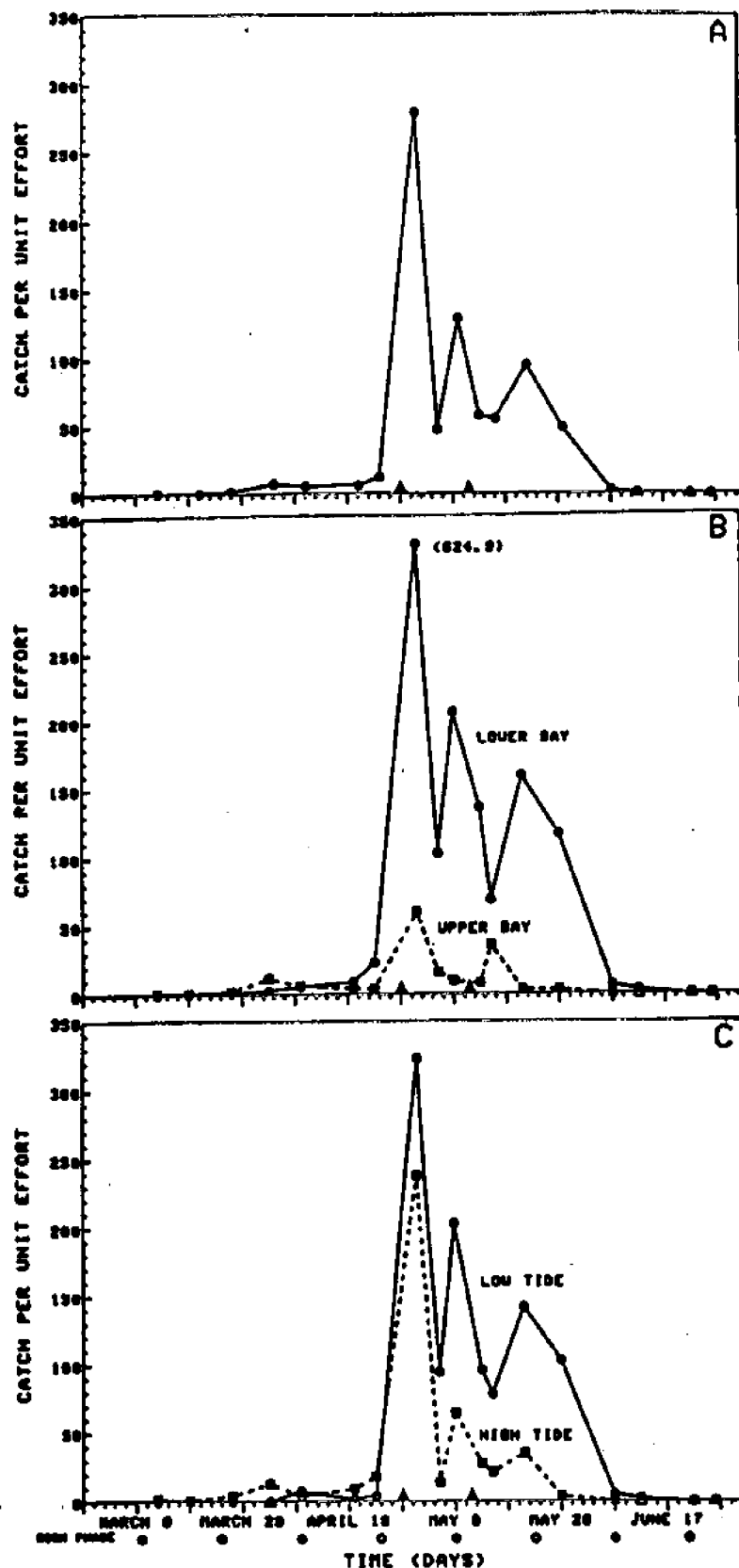


Figure 5. Mean number of chum salmon per beach seine set for the entire bay (A), the upper bay (squares) and the lower bay (circles) (B), and high tide (squares) and low tide (circles) (C). The triangles indicate the release dates for the Whiskey Creek and OAF chum salmon.

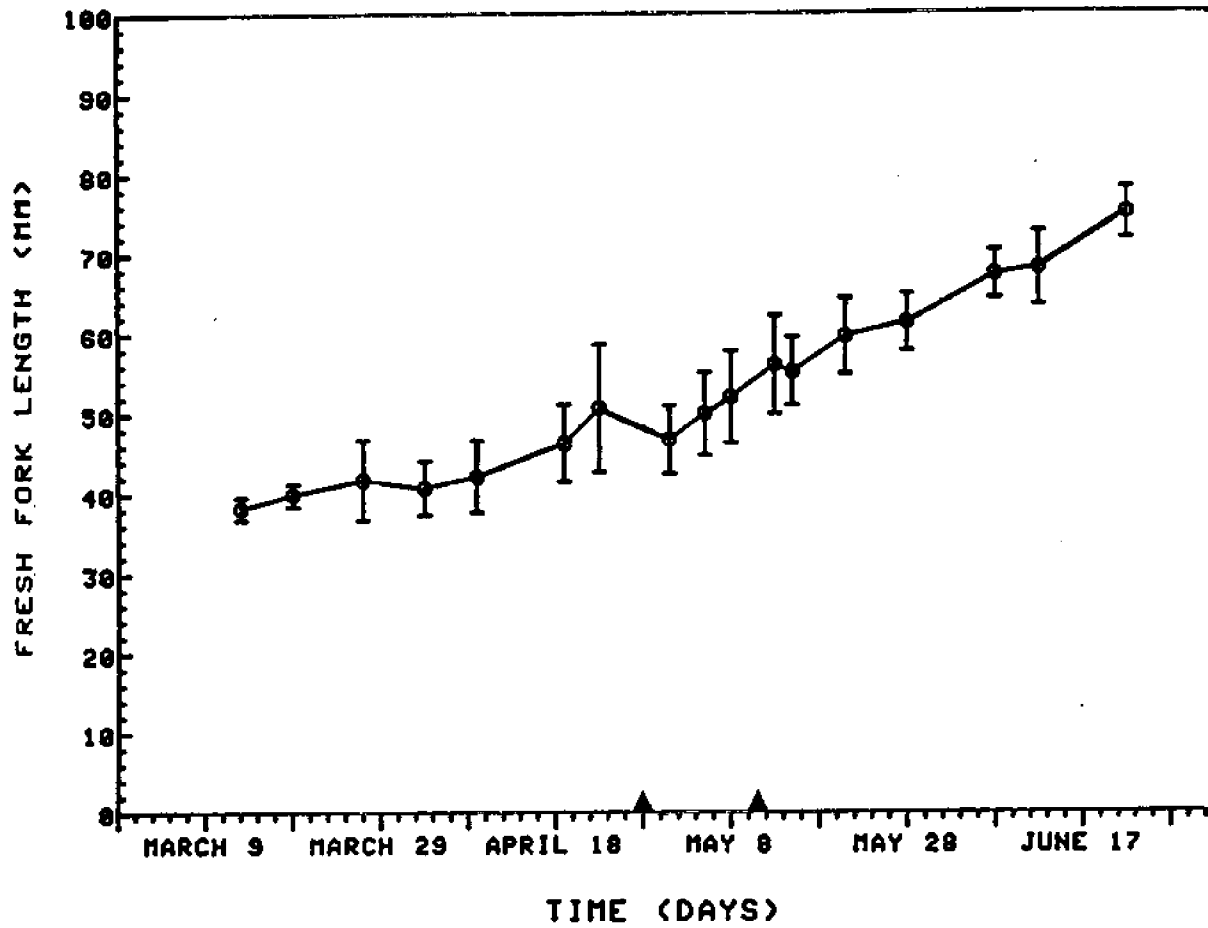


Figure 6. Mean calculated fresh fork lengths and standard deviations of chum salmon from the entire bay.

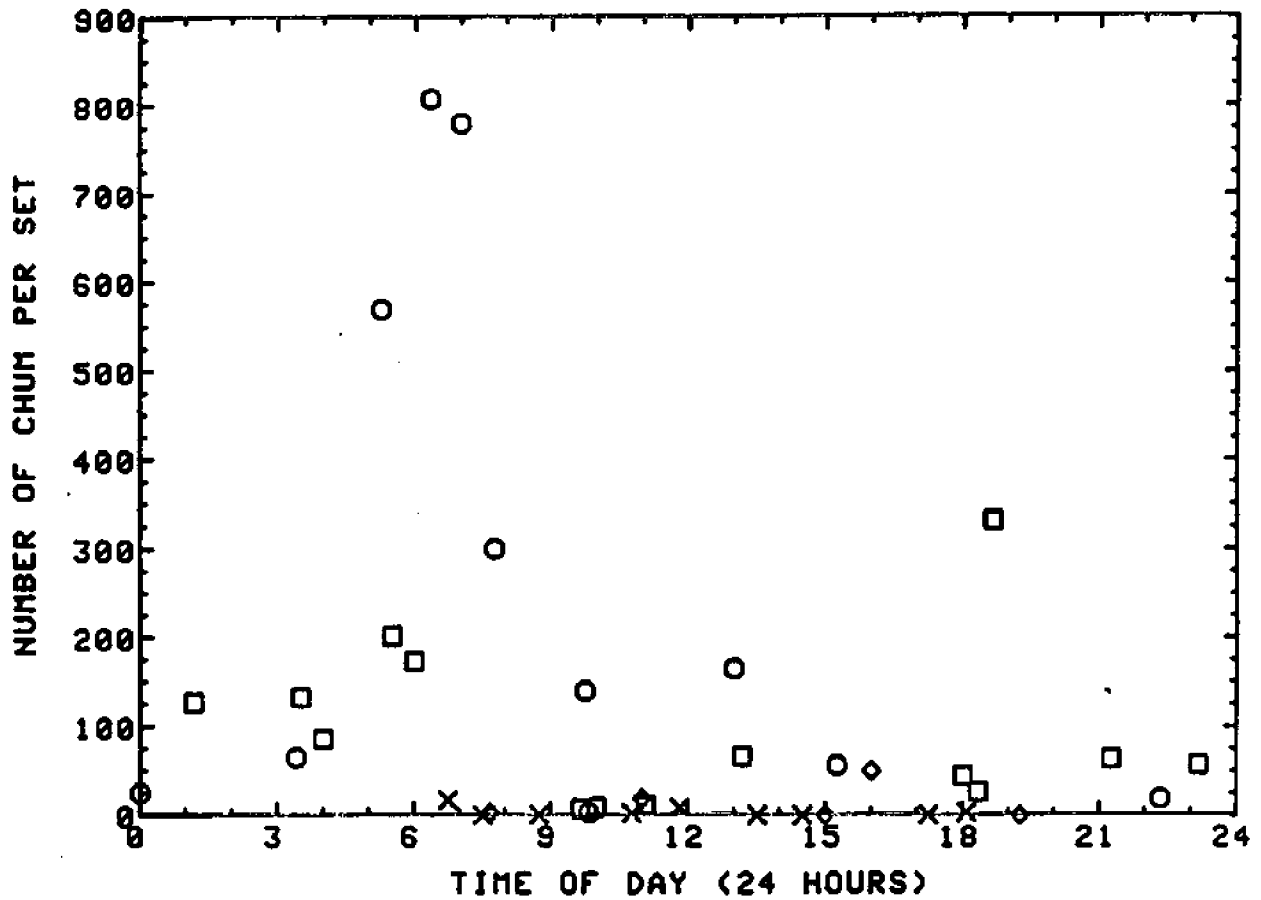


Figure 7. Number of chum salmon per beach seine set during the 24-hr studies at station #1 vs the time at which the set was made: April 9-11 (X's), April 23-24 (diamonds), May 8 (circles), and May 21 (squares).

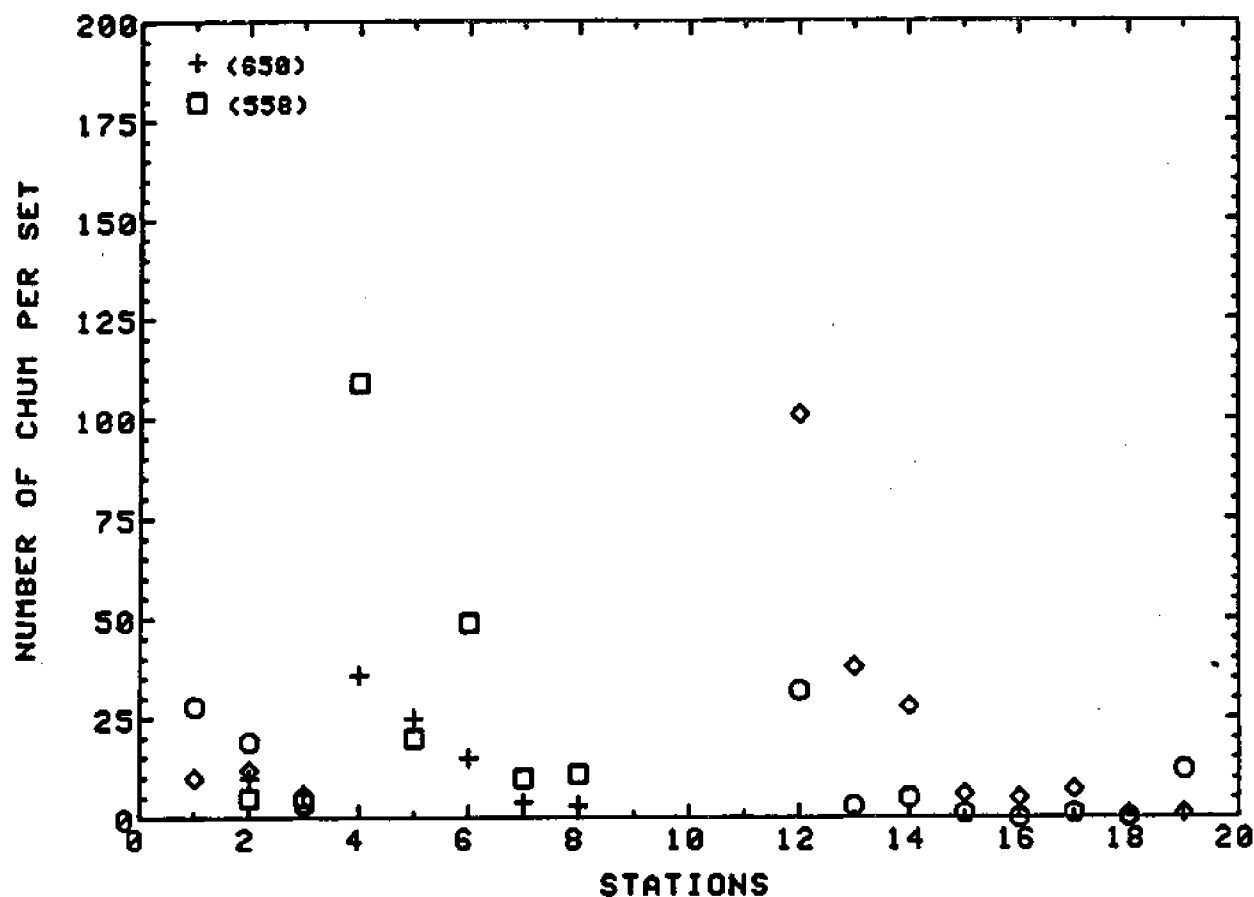


Figure 8. Number of chum salmon per beach seine set during the 5 May 24-hr all-bay sampling: low tide night (crosses), high tide day (diamonds), low tide day (squares), high tide night (circles). Stations: 1 = #1, 2 = #2, 3 = #3, 4 = Willow Bush Channel, 5 = Snag Point, 6 = Little Riverette, 7 = Opposite South 33, 8 = Johnny's Place, 9-11 = no stations, 12 = #4, 13 = No Name Creek, 14 = Willow Bush High, 15 = Mud Paradise, 16 = Whiskey Creek, 17 = South 1, 18 = Picnic Point, and 19 = West South 3.

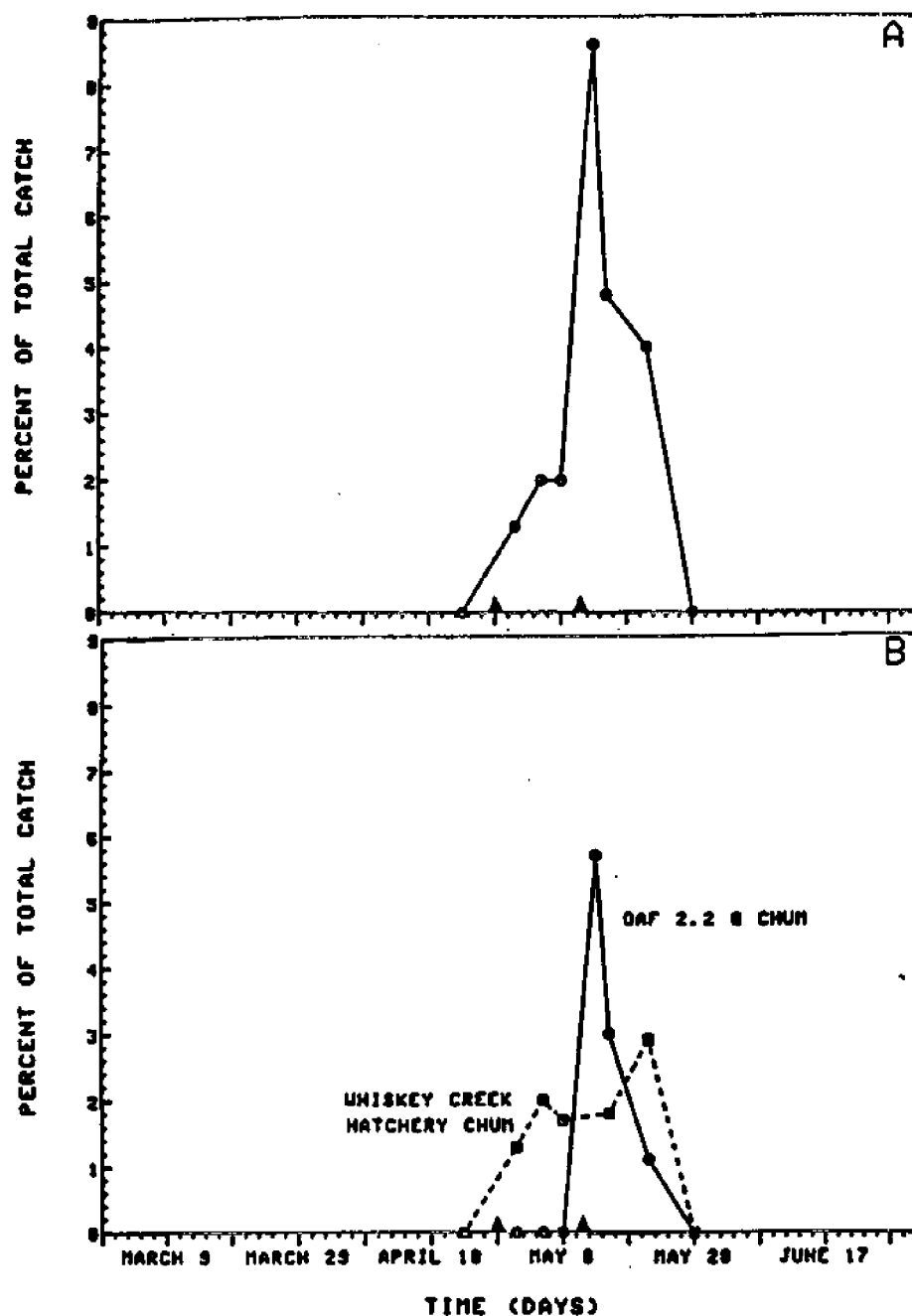


Figure 9. Percent occurrence of all recaptured tagged chum salmon (A), and Whiskey Creek fish (squares) and 2.2 g OAF fish (circles) (B). All points represent ≥ 30 fish.

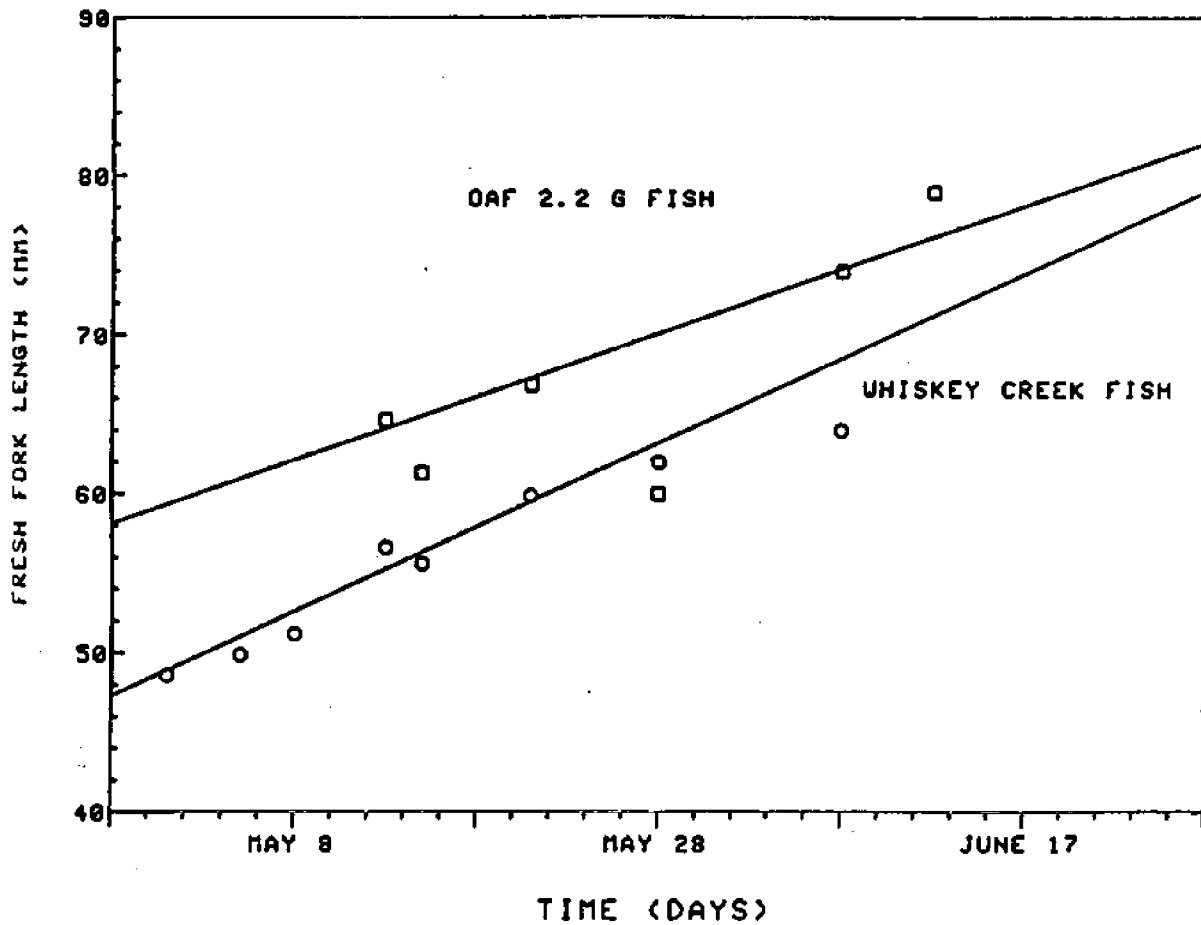


Figure 10. Fitted growth lines and mean calculated fresh fork lengths (mm) for recaptured Whiskey Creek fish (circles) and 2.2 g OAF fish (squares) from all beach seines.

Table 1. Description of new beach seine stations.

STATION	LOCATION	DESCRIPTION/COMMENTS
22 Opposite #1	Due east from #1 on the inner arm of the opposite sand spit.	Firm sand substrate. Several patches of eelgrass (<i>Zostera marina</i>). Basin with steeply sloped sides.
23 Willow Bush Channel	Due west from Willow Bush High on the main low tide channel.	Firm sand substrate. No vegetation. Steeply sloping channel.
24 Little Riverette	Due west of Willow Bush Channel at the mouth of a small rivulet which drained the exposed tidal flat.	Firm sand substrate. No vegetation.
25 Opposite South 33	Due west from South 33 on the new main low tide channel on the north side of a narrow tributary which drained a small lagoon.	Firm sand substrate with many dead bivalve shells. Extensive eelgrass beds.
26 Johnny's Place	Due west of South 1 and east of Opposite South 33 midway a blind slough.	Firm sand substrate. Several patches of eelgrass. Large quantities of decaying, vegetable matter.
27 Zestre Pool	Due east of West South 3 on the western shore of a enormous, shallow lagoon.	Firm sand substrate. Enormous eelgrass bed approximately 1 Km x 0.4 Km. Huge pool drained by single, narrow channel.
28 Byte	Two hundred yards east of the confluence of Fall Creek adjacent to the Happy Camp campground.	Firm sand substrate. Drift algae.

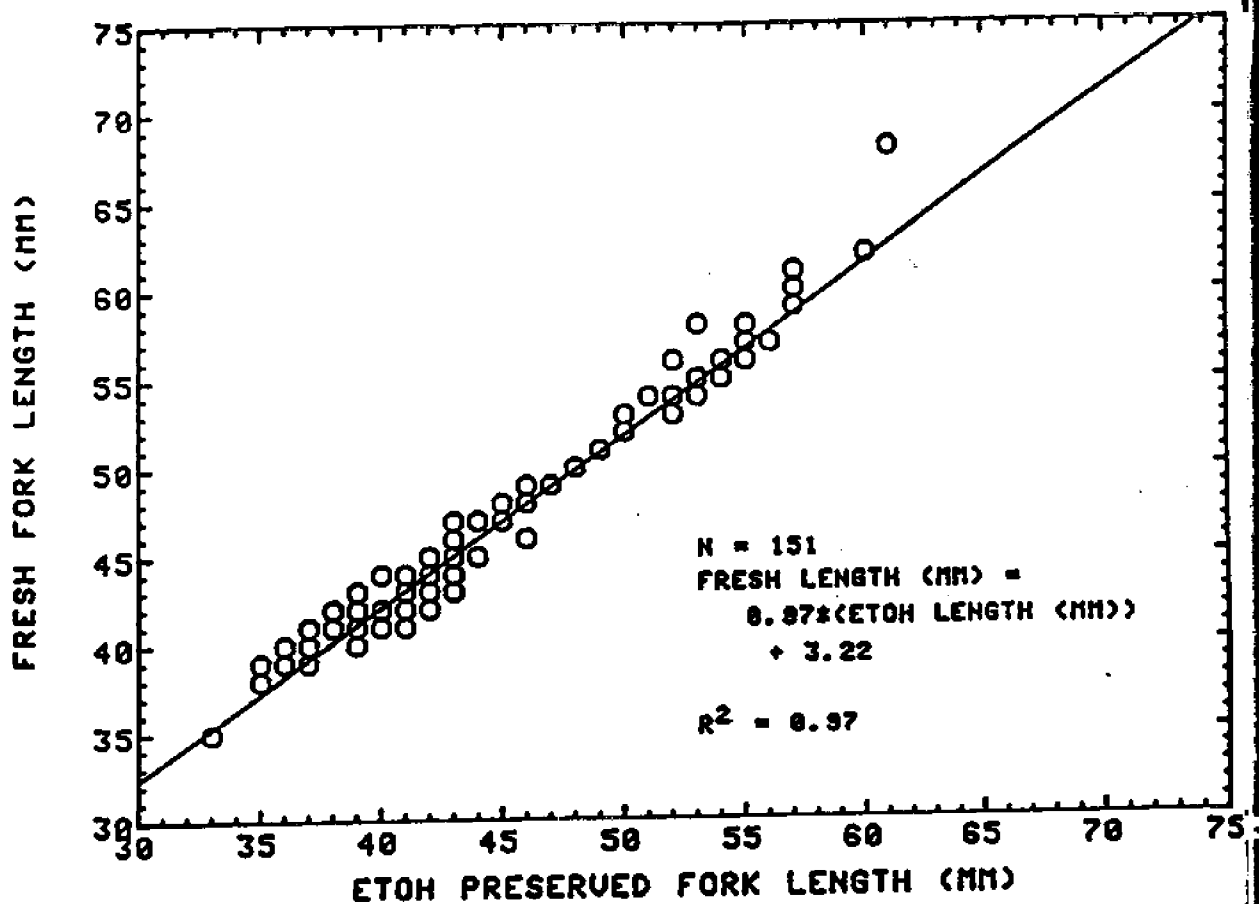
Table 2. Netarts Bay mean surface water temperatures and standard deviations.

Lower Bay

High Tide Sites				Low Tide Sites		
Date	Water Temp.	Std. Dev.	No.	Water Temp.	Std. Dev.	No.
3/13	--	--	0	11.0	0.46	3
3/20-21	11.8	0.25	3	--	--	0
3/27	13.6	0.81	4	11.3	0.21	3
4/3	10.1	0.59	6	12.5	0.38	4
4/9-11	11.9	0.70	6	10.5	0.59	6
4/19-20	11.2	0.42	5	14.9	0.40	3
4/23-24	11.3	1.40	5	10.9	1.57	4
5/1	10.5	0.26	4	12.8	0.06	3
5/5	11.8	0.38	8	14.6	0.99	3
5/8-9	11.8	1.76	3	12.1	0.29	4
5/13	--	--	0	--	--	0
5/15-16	11.2	1.60	10	13.5	1.01	5
5/21-23	13.3	2.23	7	13.4	1.63	11
5/28-29	17.1	1.37	4	17.7	1.42	4
6/7	17.6	1.78	4	14.6	0.25	4
6/12	16.8	3.66	4	14.8	1.44	3
6/22	18.9	2.77	5	16.6	0.78	5
6/26	14.7	2.10	5	14.6	0.52	3

Upper Bay

3/13	11.3	0.23	5	11.8	0.21	2
3/20-21	11.2	0.54	6	--	--	0
3/27	15.6	1.54	7	12.8	0.51	8
4/3	11.0	0.73	7	13.9	0.77	5
4/9-11	15.2	0.70	3	11.2	0.40	7
4/19-20	14.4	1.68	8	18.0	0.53	6
4/23-24	12.6	1.71	7	11.2	1.92	5
5/1	12.0	0.87	6	13.5	0.32	5
5/5	13.5	1.34	14	14.4	0.37	5
5/8-9	16.0	2.15	6	13.9	0.00	2
5/13	--	--	0	--	--	0
5/15-16	11.1	--	1	16.5	0.77	10
5/21-23	18.4	2.10	7	13.9	0.72	7
5/28-29	20.3	1.29	7	20.2	0.40	5
6/7	22.9	1.89	6	16.2	0.37	4
6/12	22.8	0.96	7	20.9	1.27	5
6/22	25.7	0.70	6	19.6	1.49	5
6/26	--	--	0	17.6	2.33	5



Appendix A. The relationship between juvenile chum salmon measured fresh and after preservation in 50% ethanol.

Appendix B. Fyke net catches of chum salmon fry, stream temperatures, stream flow, mean fry fresh fork length (mm) and standard deviations for Whiskey and Jackson Creeks.

WHISKEY CREEK

JACKSON CREEK

DATE	NO. CHUM	STREAM TEMP. (C)	STREAM FLOW (revs/min)	N	\bar{X}	std. dev.	NO. CHUM	STREAM TEMP. (C)	N	\bar{X}	std. dev.
02/28/86	--	9.8	180	---	---	--	--	--	---	---	--
03/01/86	--	8.8	180	---	---	--	--	--	---	---	--
03/02/86	--	8.9	144	---	---	--	--	--	---	---	--
03/03/86	--	11.3	132	---	---	--	--	--	---	---	--
03/04/86	--	9.8	96	---	---	--	--	--	---	---	--
03/05/86	--	10.8	--	---	---	--	--	--	---	---	--
03/06/86	--	10.8	240	---	---	--	--	--	---	---	--
03/09/86	--	9.6	180	---	---	--	--	--	---	---	--
03/10/86	2	10.2	168	2	35.00	--	--	--	---	---	--
03/13/86	1	8.7	213	1	30.00	--	--	--	---	---	--
03/14/86	--	8.7	168	---	---	--	--	--	---	---	--
03/15/86	--	8.2	168	---	---	--	--	--	---	---	--
03/16/86	2	8.6	135	2	35.00	--	--	--	---	---	--
03/17/86	13	9.2	123	13	36.77	1.74	--	--	---	---	--
03/18/86	15	10.1	99	15	37.00	2.56	--	--	---	---	--
03/19/86	50	11.2	93	50	37.50	1.88	90	9.7	12	40.75	1.66
03/20/86	89	11.2	93	54	37.96	1.63	110	9.9	11	41.64	1.43
03/21/86	45	9.9	104	11	37.36	1.12	--	--	---	---	--
03/22/86	12	9.5	105	7	37.43	2.51	--	--	---	---	--
03/23/86	1	9.5	216	1	39.00	--	--	--	---	---	--
03/24/86	40	9.2	183	37	40.03	2.09	--	--	---	---	--
03/25/86	156	9.8	165	102	40.22	1.84	--	--	---	---	--
03/26/86	147	11.2	163	31	39.19	1.74	359	9.7	13	41.00	0.82
03/27/86	951	11.0	119	95	39.65	1.62	1184	10.0	60	40.30	0.97
03/28/86	544	10.0	105	85	40.58	1.26	--	--	---	---	--
03/29/86	152	10.7	99	73	40.37	1.48	--	--	---	---	--
03/30/86	533	10.1	90	---	---	--	--	--	---	---	--
03/31/86	712	9.6	81	112	41.04	1.41	--	--	---	---	--
04/01/86	1241	9.8	81	57	41.12	1.10	--	--	---	---	--
04/02/86	916	10.0	57	47	39.92	1.02	1256	8.9	---	---	--
04/03/86	1180	10.0	43	---	---	--	2465	9.0	61	41.77	1.12
04/04/86	856	9.2	63	49	41.02	1.28	--	--	---	---	--
04/05/86	755	10.2	48	50	41.14	1.05	--	--	---	---	--
04/06/86	933	10.8	27	50	41.42	1.14	--	--	---	---	--
04/07/86	658	12.2	24	---	---	--	--	--	---	---	--
04/08/86	1777	11.3	12	---	---	--	585	9.6	---	---	--
04/09/86	993	11.0	--	---	---	--	526	--	---	---	--
04/10/86	435	--	--	---	---	--	166	--	36	40.86	0.80
04/11/86	833	8.0	246	88	40.99	1.27	--	--	---	---	--
04/12/86	176	9.3	56	50	41.06	1.27	--	--	---	---	--
04/13/86	197	9.9	33	51	42.22	1.21	--	--	---	---	--
04/14/86	170	10.6	30	59	41.88	1.31	--	--	---	---	--

Appendix B. (Continued)

WHISKEY CREEK

JACKSON CREEK

DATE	NO. CHUM	STREAM TEMP. (C)	STREAM FLOW (revs/ min)	N	\bar{X}	std. dev.	NO. CHUM	STREAM TEMP. (C)	N	\bar{X}	std. dev.
04/15/86	238	--	24	---	---	--	--	--	---	---	---
04/17/86	26	9.4	186	26	41.46	1.53	--	--	---	---	---
04/18/86	151	10.3	115	85	40.14	3.77	2	--	2	41.00	1.41
04/19/86	78	10.6	--	---	---	--	3	--	3	40.30	0.58
04/20/86	29	11.1	108	25	41.20	1.38	--	--	---	---	---
04/21/86	41	11.0	96	---	---	--	--	--	---	---	---
04/22/86	7	--	60	7	41.43	1.62	--	--	---	---	---
04/23/86	22	--	48	22	41.68	1.46	1	--	---	---	---
04/24/86	7	--	48	7	40.57	0.98	1	8.3	---	---	---
04/25/86	5	8.7	--	---	---	--	--	--	---	---	---
04/26/86	1	8.8	143	---	---	--	--	--	---	---	---
05/07/86	--	11.2	161	---	---	--	--	--	---	---	---
05/08/86	--	--	--	---	---	--	--	--	---	---	---
05/09/86	--	--	--	---	---	--	--	--	---	---	---
05/10/86	--	--	--	---	---	--	--	--	---	---	---

Appendix C. Netarts Bay environmental and catch data. Tidal stages: L = low, H = high, F = flood, E = ebb, S = slack.

HAUL NO.	STATION	DATE	TIME	TIDE	TEMP (C)	SALINITY (O/00)	NO. CHUM	COMMENTS
1 #1		03/13/86	840	LE	10.5	25.0	--	
2 #2		03/13/86	930	LF	11.3	26.5	--	
3 #3		03/13/86	1000	LF	11.3	25.0	--	
4 Willow Bush Low		03/13/86	1040	LF	11.6	25.5	--	
5 2 Stake Point		03/13/86	1100	LF	11.9	25.5	--	
6 Picnic Point		03/13/86	1500	HF	11.7	13.0	7	
7 South 1		03/13/86	1530	HE	11.2	17.0	--	
8 Mud Paradise		03/13/86	1555	HE	11.3	20.0	1	
9 Willow Bush High		03/13/86	1615	HE	11.3	22.0	1	
10 No Name Creek		03/13/86	1640	HE	11.1	16.0	--	
11 #1		03/20/86	830	HS	11.6	28.0	1	
12 #2		03/20/86	900	HE	11.8	31.0	--	
13 #3		03/20/86	925	HE	12.1	31.0	--	
14 West South 3		03/21/86	820	HF	10.7	20.0	4	
15 Picnic Point		03/21/86	845	HE	10.9	19.0	2	
16 South 1		03/21/86	915	HE	11.5	21.0	--	
17 Whiskey Creek		03/21/86	945	HE	11.8	24.0	--	
18 Willow Bush High		03/21/86	1015	HE	11.6	24.0	--	
19 No Name Creek		03/21/86	1045	HE	10.5	21.0	--	
20 #1		03/27/86	740	LS	11.1	27.0	--	
21 #2		03/27/86	805	LS	11.5	27.0	--	
22 #3		03/27/86	830	LF	11.4	27.0	--	
23 Lucky 13		03/27/86	858	LS	12.2	26.0	--	
24 2 Stake Point		03/27/86	914	LE	12.2	26.0	--	
25 Little Riverette		03/27/86	932	LS	12.4	26.0	--	
26 Snag Point		03/27/86	945	LS	12.8	26.0	--	
27 South 33		03/27/86	955	LS	13.6	25.5	--	
28 South 33 Channel		03/27/86	1010	LF	13.1	27.0	--	
29 Snag Point		03/27/86	1023	LF	13.1	28.0	--	
30 Willow Bush Low		03/27/86	1042	LF	13.1	28.0	--	
31 #1		03/27/86	1322	HS	13.2	31.0	--	
32 #2		03/27/86	1340	HS	14.8	29.0	10	
33 #3		03/27/86	1352	HS	13.0	28.0	--	
34 #4		03/27/86	1411	HS	13.5	24.0	--	
35 No Name Creek		03/27/86	1420	HS	15.5	30.0	2	
36 Willow Bush High		03/27/86	1439	HS	14.5	30.0	1	
37 Mud Paradise		03/27/86	1455	HS	14.0	26.0	3	
38 Whiskey Creek		03/27/86	1513	HS	16.4	27.0	5	
39 South 1		03/27/86	1536	HS	14.9	10.0	20	
40 West South 3		03/27/86	1605	HS	15.0	26.0	3	
41 Picnic Point		03/27/86	1623	HS	18.6	18.0	1	
42 #1		04/03/86	655	HS	9.5	29.0	--	42A
42 #1		04/03/86	706	HS	9.5	29.0	--	42B
43 #2		04/03/86	720	HS	10.0	29.0	19	

Appendix C. (Continued)

HAUL NO.	STATION	DATE	TIME	TIDE	TEMP (C)	SALINITY (0/00)	NO. CHUM	COMMENT
44 #2		04/03/86	735	HF	10.0	29.0	10	
45 #3		04/03/86	749	HS	11.0	29.0	--	
46 #3		04/03/86	805	HS	--	--	--	aborted
47 #4		04/03/86	815	HS	10.5	30.0	--	
48 No Name Creek		04/03/86	835	HS	10.1	30.0	2	
49 Willow Bush High		04/03/86	850	HS	10.5	30.0	2	
50 Mud Paradise		04/03/86	910	HS	10.5	29.0	27	
51 Whiskey Creek		04/03/86	925	HS	10.7	22.0	5	
52 South 1		04/03/86	935	HE	11.7	15.0	73	
53 Picnic Point		04/03/86	955	HE	11.8	14.0	8	
54 West South 3		04/03/86	1015	HE	11.8	28.0	26	
55 #1		04/03/86	1400	LE	12.2	33.0	--	
56 #1		04/03/86	1415	LE	12.2	33.0	--	
57 #2		04/03/86	1440	LE	12.5	30.0	--	
58 #3		04/03/86	1500	LE	13.0	20.0	--	
59 Little Riverette		04/03/86	1533	LE	13.9	27.0	--	
60 Snag Point		04/03/86	1558	LE	14.2	27.0	--	
61 Opp South 33		04/03/86	1614	LE	14.2	26.0	--	
62 Johnnys Place		04/03/86	1630	LE	14.6	26.0	--	
63 Willow Bush Channel		04/03/86	1705	LF	12.6	26.0	--	
64 #1		04/09/86	645	LF	9.9	28.0	17	
65 #1		04/09/86	730	LF	9.9	28.0	--	
66 #2		04/09/86	750	LF	10.4	29.0	36	
67 #3		04/09/86	815	LF	10.7	27.0	--	
68 Willow Bush Channel		04/09/86	830	LS	11.3	28.0	--	
69 Little Riverette		04/09/86	845	LS	10.4	28.0	4	
70 Snag Point		04/09/86	900	LF	11.3	28.0	2	
71 Opp South 33		04/09/86	915	LF	11.0	29.0	37	
72 Johnnys Place		04/09/86	930	LF	11.3	27.0	4	
73 Johnnys Place		04/09/86	950	LF	11.3	27.0	--	
74 Lagoon Opp South 33		04/09/86	1000	LF	11.7	28.0	1	
75 #1		04/09/86	1330	HE	11.1	32.0	--	
76 #2		04/09/86	1345	HE	12.3	30.0	2	
77 #2		04/09/86	1400	HE	12.3	30.0	9	
78 #3		04/09/86	1430	HE	--	--	--	aborted
79 #4		04/09/86	1455	HE	12.7	31.0	6	
80 No Name Creek		04/09/86	1515	HE	14.9	29.0	1	
81 #1		04/10/86	845	LF	10.9	--	1	
82 #1		04/10/86	1150	LF	--	--	8	MID-TIDE
83 #1		04/10/86	1430	HE	10.9	33.0	--	
84 Picnic Point		04/10/86	1515	HS	16.0	28.0	3	
85 South 1		04/10/86	1535	HS	14.7	30.0	13	
86 #3		04/10/86	1610	HE	11.7	32.0	1	
87 #1		04/10/86	1715	LE	11.4	32.0	1	MID-TIDE

Appendix C. (Continued)

HAUL NO.	STATION	DATE	TIME	TIDE	TEMP (C)	SALINITY (0/00)	NO. CHUM	COMMENTS
88 #1		04/10/86	1805	LS	--	--	3	
89 #1		04/11/86	1046	HS	--	--	2	
90 #1		04/19/86	750	HS	11.1	28.0	--	
91 #1		04/19/86	800	HS	11.1	28.0	--	
92 #2		04/19/86	818	HS	10.8	28.0	57	
93 #3		04/19/86	840	HS	11.5	28.0	1	
94 #4		04/19/86	900	HE	11.8	22.0	5	
95 South 1		04/19/86	949	HE	12.8	8.0	20	
96 West South 3		04/19/86	1021	HE	14.8	22.0	1	
97 #2		04/19/86	1414	LE	14.5	30.0	10	
98 #3		04/19/86	1438	LE	15.3	27.0	--	
99 Willow Bush Channel		04/19/86	1515	LE	17.4	27.0	--	
100 Little Riverette		04/19/86	1529	LE	17.4	27.0	--	
101 Snag Point		04/19/86	1550	LE	17.8	26.0	3	
102 Opp South 33		04/19/86	1600	LE	18.5	28.0	4	
103 Johnnys Place		04/19/86	1616	LE	18.4	26.0	--	
104 Opp 2 Stake Point		04/19/86	1655	LF	18.5	25.0	1	
105 #1		04/19/86	1728	LF	15.0	28.0	--	
106 Willow Bush High		04/20/86	852	HF	12.7	28.0	11	
107 No Name Creek		04/20/86	915	HF	13.0	27.0	4	
108 Mud Paradise		04/20/86	935	HF	14.2	27.0	18	
109 Whiskey Creek		04/20/86	958	HF	14.4	6.5	7	
110 Willow Bush High		04/20/86	--	--	--	--	--	aborted
111 Picnic Point		04/20/86	1016	HS	16.2	21.0	--	
112 No Name Creek		04/23/86	1330	HE	16.1	29.0	17	
113 #4		04/23/86	1400	HE	13.1	14.0	135	
114 #3		04/23/86	1420	HE	11.8	32.0	2	
115 #1		04/23/86	1500	HE	11.9	32.0	--	
116 #2		04/23/86	1745	LF	11.9	30.0	--	
117 Little Riverette		04/23/86	1830	LE	13.2	27.0	2	
118 Willow Bush Channel		04/23/86	1840	LE	13.3	27.0	13	
119 #1		04/23/86	1915	LF	12.4	28.0	--	
120 #1		04/24/86	740	LE	8.9	30.0	3	
121 #1		04/24/86	1100	HF	10.5	31.0	19	MID-TIDE
122 Willow Bush High		04/24/86	1305	HF	11.5	28.0	5	
123 Mud Paradise		04/24/86	1320	HE	10.9	29.0	3	
124 Whiskey Creek		04/24/86	1340	HE	12.1	28.0	--	
125 South 1		04/24/86	1400	HE	11.8	24.0	1	
126 Picnic Point		04/24/86	1430	HE	13.1	23.0	1	
127 West South 3		04/24/86	1450	HE	12.6	26.0	7	
128 #2		04/24/86	1540	HE	9.8	30.0	1	
129 #1		04/24/86	1600	HE	10.0	28.0	50	
130 Snag Point		04/24/86	1900	LE	9.0	18.0	--	
131 Opp South 33		04/24/86	1920	LE	10.3	26.0	1	

Appendix C. (Continued)

HAUL NO.	STATION	DATE	TIME	TIDE	TEMP (C)	SALINITY (O/00)	NO. CHUM	COMMENTS
132	Johnnys Place	04/24/86	1938	LE	10.4	26.0	--	
133	#1	05/01/86	620	HF	10.1	26.0	130	
134	#2	05/01/86	720	HS	10.5	26.0	22	
135	#3	05/01/86	750	HS	10.6	27.0	1544	
136	#4	05/01/86	820	HS	10.7	23.0	236	
137	No Name Creek	05/01/86	855	HE	11.0	23.0	2	
138	Willow Bush High	05/01/86	910	HE	11.2	26.0	552	
139	Mud Paradise	05/01/86	930	HE	11.5	26.0	33	
140	South 1	05/01/86	955	HE	12.1	22.0	13	
141	Picnic Point	05/01/86	1010	HE	13.2	24.0	3	
142	West South 3	05/01/86	1035	HE	12.7	22.0	23	
143	#1	05/01/86	1320	LE	12.8	25.0	2579	
144	#2	05/01/86	1416	LE	12.7	27.0	--	
145	#3	05/01/86	1445	LS	12.8	25.0	40	
146	Willow Bush Channel	05/01/86	1515	LF	13.1	26.0	1	
147	Little Riverette	05/01/86	1530	LF	13.9	24.0	8	
148	Snag Point	05/01/86	1545	LS	13.5	25.0	1	
149	Opp South 33	05/01/86	1550	LF	13.2	23.0	24	
150	Johnnys Place	05/01/86	1615	LF	13.6	24.0	5	
151	#1	05/05/86	415	LE	--	--	650	MID-T
152	#2	05/05/86	430	LE	--	--	10	
153	#3	05/05/86	445	LE	--	--	6	
154	Willow Bush Channel	05/05/86	530	LE	--	--	36	
155	Snag Point	05/05/86	600	LE	--	--	25	
156	Little Riverette	05/05/86	615	LE	--	--	15	
157	Opp South 33	05/05/86	640	LE	--	--	4	
158	Johnnys Place	05/05/86	700	LE	--	--	3	
159	#1	05/05/86	1115	HF	11.6	26.0	10	
160	#2	05/05/86	1136	HF	12.0	25.0	12	
161	#3	05/05/86	1145	HS	11.5	26.0	2	
162	#4	05/05/86	1200	HS	12.5	22.0	101	
163	No Name Creek	05/05/86	1230	HF	13.4	22.0	38	
164	Willow Bush High	05/05/86	1245	HE	13.6	24.0	28	
165	Mud Paradise	05/05/86	1315	HE	14.4	20.0	6	
166	Whiskey Creek	05/05/86	1330	HE	14.6	16.0	5	
167	South 1	05/05/86	1340	HE	14.6	18.0	7	
168	Picnic Point	05/05/86	1400	HE	15.6	15.0	--	
169	West South 3	05/05/86	1430	HE	15.3	22.0	1	
170	#1	05/05/86	1700	LE	15.3	28.0	558	
171	#2	05/05/86	1715	LE	13.5	26.0	5	
172	#3	05/05/86	1745	LS	15.1	18.0	4	
173	Willow Bush Channel	05/05/86	1800	LS	14.6	24.0	109	
174	Snag Point	05/05/86	1830	LF	14.9	24.0	20	
175	Little Riverette	05/05/86	1850	LF	14.3	24.0	49	

Appendix C. (Continued)

HAUL NO.	STATION	DATE	TIME	TIDE	TEMP (C)	SALINITY (0/00)	NO. CHUM	COMMENTS
176	Opp South 33	05/05/86	1900	LF	14.1	24.0	10	
177	Johnnys Place	05/05/86	1915	LF	14.0	23.0	11	
178	#1	05/05/86	2245	HF	11.4	27.0	28	
179	#2	05/05/86	2300	HF	11.4	26.0	19	
180	#3	05/05/86	2330	HF	11.8	28.0	5	
181	#4	05/05/86	2357	HS	12.0	27.0	32	
182	No Name Creek	05/06/86	25	HS	12.4	27.0	3	
183	Willow Bush High	05/06/86	45	HE	12.4	27.0	5	
184	Mud Paradise	05/06/86	115	HE	12.1	27.0	1	
185	Whiskey Creek	05/06/86	125	HE	12.7	8.0	--	
186	South 1	05/06/86	150	HE	13.5	12.0	1	
187	Picnic Point	05/06/86	210	HE	13.5	22.0	--	
188	West South 3	05/06/86	245	HE	10.8	22.0	10	
189	#1	05/08/86	620	LE	11.9	28.0	808	
190	#2	05/08/86	650	LE	12.5	27.0	7	
191	#3	05/08/86	715	LE	12.2	25.0	--	
192	#1	05/08/86	745	LS	11.9	28.0	300	
193	Willow Bush Channel	05/08/86	815	LE	13.9	24.0	9	
194	Little Riverette	05/08/86	830	LE	13.9	24.0	33	
195	Snag Point	05/08/86	845	LE	--	24.0	5	
196	Opp South 33	05/08/86	900	LE	--	--	56	
197	Johnnys Place	05/08/86	915	LS	--	--	6	
198	#1	05/08/86	945	LF	--	--	140	
199	#1	05/08/86	1300	HF	--	30.0	165	
200	#2	05/08/86	1330	HF	--	28.0	25	
201	#3	05/08/86	1345	HF	13.5	33.0	14	
202	#4	05/08/86	1400	HF	--	--	35	
203	No Name Creek	05/08/86	1430	HF	16.0	28.0	1	
204	Willow Bush High	05/08/86	1500	HF	19.0	24.0	--	
205	#1	05/08/86	1515	HE	12.0	30.0	56	
206	South 1	05/08/86	1600	HE	16.5	5.0	2	
207	West South 3	05/08/86	1615	HE	17.0	25.0	2	
208	#1	05/08/86	2220	HF	--	--	19	
209	#1	05/09/86	0000	HS	--	--	25	
210	#1	05/09/86	325	HE	10.0	32.0	65	
211	#1	05/09/86	515	HE	--	--	570	
212	#1	05/09/86	700	LE	--	--	780	
213	#1	05/09/86	950	LE	--	--	3	
214	#1	05/09/86	1210	LF	--	--	500	
215	Mud Paradise	05/09/86	1600	HE	14.4	--	--	
216	Whiskey Creek	05/09/86	1615	HE	12.8	4.0	--	
217	#1	05/13/86	900	LE	--	26.0	618	
218	#2	05/13/86	1025	LE	--	25.0	66	
219	Little Riverette	05/13/86	1110	LE	--	26.0	6	

Appendix C. (Continued)

HAUL NO.	STATION	DATE	TIME	TIDE	TEMP (C)	SALINITY (0/00)	NO. CHUM	COMMENT
220	Willow Bush Channel	05/13/86	1125	LE	--	24.0	9	
221	Snag Point	05/13/86	1145	LE	--	24.0	--	
222	Opp South 33	05/13/86	1200	LE	--	26.0	65	
223	Johnnys Place	05/13/86	1225	LS	--	24.0	4	
224 #3		05/13/86	1305	LF	--	18.0	2	224A
224 #1		05/13/86	1550	HS	--	25.0	182	224B
225 #2		05/13/86	1625	HF	--	24.0	3	
226 #3		05/13/86	1442	HF	--	23.0	5	
227 #4		05/13/86	1700	HF	--	17.0	80	
228	No Name Creek	05/13/86	1740	HF	--	20.0	--	
229	Willow Bush High	05/13/86	1800	HS	--	--	--	
230	Mud Paradise	05/13/86	1820	HF	--	22.0	8	
231	Whiskey Creek	05/13/86	1840	HF	--	8.0	--	
232	South 1	05/13/86	1900	HF	--	4.0	--	
233	West South 3	05/13/86	1919	HS	--	24.0	3	
234 #1		05/15/86	1048	LS	12.5	28.0	449	
235 #2		05/15/86	1149	LS	13.4	26.0	--	
236	Willow Bush Channel	05/15/86	1215	LE	15.2	23.0	2	
237	Little Riverette	05/15/86	1228	LE	15.5	23.0	55	
238	Snag Point	05/15/86	1251	LE	16.2	22.0	21	
239	Opp South 33	05/15/86	1309	LE	16.8	23.0	57	
240	Johnnys Place	05/15/86	1325	LS	17.3	22.0	10	
241 #3		05/15/86	1422	LS	16.0	21.0	--	
242 #1		05/15/86	1800	HS	11.6	32.0	124	
243 #1		05/15/86	1821	HS	11.6	32.0	44	
244 #2		05/15/86	1838	HS	12.0	28.0	6	
245 #2		05/15/86	1851	HF	12.0	29.0	7	
246 #3		05/15/86	1903	HS	13.2	27.0	10	
247 #4		05/15/86	1958	HS	13.7	18.0	27	
248 #1		05/16/86	610	HS	9.4	28.0	6	
249 #1		05/16/86	625	HS	9.3	28.0	6	
250 #2		05/16/86	639	HS	9.4	28.0	7	
251 #3		05/16/86	655	HS	10.2	28.0	1	
252	South 1	05/16/86	740	HE	11.1	18.0	2	
253 #1		05/16/86	1145	LS	12.8	30.0	410	
254 #2		05/16/86	1234	LS	13.5	28.0	9	
255	Willow Bush Channel	05/16/86	1300	LE	16.1	24.0	21	
256	Little Riverette	05/16/86	1313	LE	16.1	24.0	65	
257	Snag Point	05/16/86	1331	LE	16.6	22.0	37	
258	Opp South 33	05/16/86	1349	LS	17.2	24.0	107	
259	Johnnys Place	05/16/86	1406	LE	17.5	22.0	25	
260 #3		05/16/86	1440	LS	15.1	24.0	--	
261 #1		05/21/86	1800	LS	15.4	22.0	44	
262 #1		05/21/86	1820	LS	15.4	22.0	26	

Appendix C. (Continued)

HAUL NO.	STATION	DATE	TIME	TIDE	TEMP (C)	SALINITY (0/00)	NO. CHUM	COMMENTS
263 #1		05/21/86	1840	LS	15.4	22.0	331	
264 #1		05/22/86	400	LE	11.3	21.0	86	
265 #1		05/22/86	600	LE	10.7	20.0	174	
266 Willow Bush Channel		05/22/86	715	LE	13.9	20.0	5	
267 Little Riverette		05/22/86	730	LE	13.3	21.0	25	
268 Snag Point		05/22/86	800	LE	14.4	21.0	1	
269 Opp South 33		05/22/86	815	LE	14.5	22.0	8	
270 Johnnys Place		05/22/86	830	LS	14.9	--	3	
271 Zostra Pool		05/22/86	845	LS	13.0	22.0	--	
272 Zostra Pool		05/22/86	915	LF	13.3	22.0	--	
273 #1		05/22/86	940	LF	13.0	23.0	7	
274 #1		05/22/86	1000	LF	12.3	26.0	8	MID-TIDE
275 #1		05/22/86	1105	LF	13.1	27.0	11	MID-TIDE
276 #1		05/22/86	1310	HE	13.0	29.0	66	
277 No Name Creek		05/22/86	1350	HE	17.6	22.0	--	
278 Willow Bush High		05/22/86	1400	HE	17.8	--	1	
279 Mud Paradise		05/22/86	1410	HE	18.2	22.0	--	
280 Whiskey Creek		05/22/86	1420	HE	15.8	6.0	--	
281 South 1		05/22/86	1430	HE	16.9	12.0	--	
282 Picnic Point		05/22/86	1445	HE	21.1	18.0	--	
283 West South 3		05/22/86	1500	HE	21.4	22.0	--	
284 #4		05/22/86	1530	HE	17.2	--	82	
285 #3		05/22/86	1600	HE	14.6	26.0	3	
286 #2		05/22/86	1630	HE	13.9	26.0	4	
287 #2		05/22/86	1840	LE	14.3	26.0	2	
288 #3		05/22/86	1900	LE	13.9	24.0	1	
289 #1		05/22/86	2115	HF	12.9	25.0	64	
290 #1		05/22/86	2310	HF	11.3	25.0	57	
291 #1		05/23/86	110	HE	10.4	27.0	127	
292 #1		05/23/86	330	HE	--	--	133	
293 #1		05/23/86	530	LE	--	--	202	
294 Opp #1		05/23/86	840	LF	12.9	25.0	1760	
295 #1		05/28/86	1725	HF	16.0	28.0	33	
296 #2		05/28/86	1745	HF	17.5	27.0	1	
297 #3		05/28/86	1800	HS	16.1	27.0	4	
298 #4		05/28/86	1810	HS	18.9	25.0	--	
299 No Name Creek		05/28/86	1830	HS	20.2	24.0	--	
300 Willow Bush High		05/28/86	1845	HS	20.1	26.0	--	
301 Mud Paradise		05/28/86	1855	HS	20.1	26.0	1	
302 Whiskey Creek		05/28/86	1910	HS	19.6	22.0	--	
303 South 1		05/28/86	1920	HS	18.4	12.0	--	
304 Picnic Point		05/28/86	1940	HS	22.2	23.0	--	
305 West South 3		05/28/86	1955	HS	21.8	25.0	--	
306 Opp #1		05/29/86	1045	LS	16.5	30.0	35	

Appendix C. (Continued)

HAUL NO.	STATION	DATE	TIME	TIDE	TEMP (C)	SALINITY (0/00)	NO. CHUM	COMME
307 #1		05/29/86	1100	LE	16.9	30.0	857	
308 #2		05/29/86	1220	LE	17.6	28.0	--	
309 Little Riverette		05/29/86	1250	LE	19.9	27.0	8	
310 Willow Bush Channel		05/29/86	1305	LS	20.0	27.0	6	
311 Snag Point		05/29/86	1325	LS	19.8	26.0	4	
312 Opp South 33		05/29/86	1344	LE	20.5	27.0	21	
313 Johnnys Place		05/29/86	1357	LE	20.7	25.0	--	
314 #3		05/29/86	1447	LE	19.7	27.0	--	
315 Opp #1		06/07/86	657	LE	14.5	28.0	2	
316 #1		06/07/86	720	LE	14.5	28.0	72	
317 #2		06/07/86	807	LS	14.5	28.0	--	
318 Willow Bush Channel		06/07/86	828	LE	15.8	28.0	--	
319 Little Riverette		06/07/86	842	LE	16.1	29.0	2	
320 Snag Point		06/07/86	900	LE	--	--	--	
321 Opp South 33		06/07/86	913	LE	16.2	28.0	--	
322 Johnnys Place		06/07/86	927	LS	16.7	29.0	--	
323 #3		06/07/86	1020	LF	15.0	26.0	--	
324 #1		06/07/86	1320	HF	15.4	32.0	4	
325 #2		06/07/86	1340	HF	19.1	28.0	--	
326 #3		06/07/86	1355	HF	16.9	30.0	--	
327 #4		06/07/86	1408	HF	19.0	28.0	--	
328 No Name Creek		06/07/86	1435	HF	21.4	28.0	--	
329 Mud Paradise		06/07/86	1455	HS	20.4	30.0	1	
330 Whiskey Creek		06/07/86	1514	HS	23.0	26.0	--	
331 South 1		06/07/86	1530	HS	22.8	18.0	--	
332 Picnic Point		06/07/86	1555	HE	25.8	25.0	--	
333 West South 3		06/07/86	1614	HE	23.9	29.0	--	
334 #1		06/12/86	1030	LE	14.0	33.0	22	
335 Opp #1		06/12/86	1112	LS	14.0	33.0	--	
336 #2		06/12/86	1129	LS	16.5	35.0	--	
337 Willow Bush Channel		06/12/86	1152	LE	19.3	32.0	--	
338 Little Riverette		06/12/86	1204	LS	20.1	31.0	--	
339 Snag Point		06/12/86	1218	LS	20.9	31.0	--	
340 Opp South 33		06/12/86	1232	LS	21.5	32.0	--	
341 Johnnys Place		06/12/86	1249	LS	22.6	34.0	--	
342 #1		06/12/86	1636	HF	12.7	34.0	--	
343 #2		06/12/86	1650	HS	17.5	33.0	--	
344 #3		06/12/86	1708	HS	15.5	32.0	--	
345 #4		06/12/86	1720	HS	21.4	24.0	--	
346 No Name Creek		06/12/86	1740	HS	23.6	30.0	--	
347 Willow Bush High		06/12/86	1800	HS	23.0	30.0	--	
348 Mud Paradise		06/12/86	1818	HS	21.5	32.0	--	
349 Whiskey Creek		06/12/86	1833	HS	23.4	12.0	--	
350 South 1		06/12/86	1850	HS	22.4	21.0	--	

Appendix C. (Continued)

HAUL NO.	STATION	DATE	TIME	TIDE	TEMP (C)	SALINITY (O/00)	NO. CHUM	COMMENTS
351	Picnic Point	06/12/86	1910	HS	23.5	26.0	--	
352	West South 3	06/12/86	1930	HS	21.3	30.0	--	
353	#1	06/22/86	741	LS	15.8	27.0	--	
354	Opp #1	06/22/86	810	LS	17.3	28.0	1	
355	Byte	06/22/86	840	LF	17.0	28.0	--	
356	#2	06/22/86	900	LF	17.2	28.0	--	
357	Willow Bush Channel	06/22/86	920	LE	17.8	28.0	--	
358	Little Riverette	06/22/86	930	LE	19.2	29.0	--	
359	Snag Point	06/22/86	945	LE	19.1	28.0	--	
360	Opp South 33	06/22/86	1000	LE	20.2	29.0	--	
361	Johnnys Place	06/22/86	1015	LS	21.8	28.0	--	
362	Opp #1	06/22/86	1115	LF	15.7	31.0	1	
363	#1	06/22/86	1354	HF	16.5	32.0	1	
364	#1	06/22/86	1422	HF	17.0	32.0	--	
365	#2	06/22/86	1432	HF	18.8	30.0	--	
366	#3	06/22/86	1448	HF	18.5	30.0	--	
367	#4	06/22/86	1457	HF	23.5	26.0	--	
368	No Name Creek	06/22/86	1519	HF	25.8	28.0	--	
369	Willow Bush High	06/22/86	1532	HF	25.5	28.0	--	
370	Mud Paradise	06/22/86	1553	HS	26.5	30.0	--	
371	Whiskey Ceek	06/22/86	1600	HS	25.5	26.0	--	
372	South 1	06/22/86	1612	HF	24.6	11.0	--	
373	West South 3	06/22/86	1640	HE	26.4	28.0	--	
374	#1	06/26/86	1115	LS	14.0	32.0	--	
375	Opp #1	06/26/86	1125	LS	14.9	33.0	--	
376	#2	06/26/86	1200	LF	14.9	32.0	--	
377	Willow Bush Channel	06/26/86	1225	LE	17.7	31.0	--	
378	Little Riverette	06/26/86	1240	LE	18.4	31.0	--	
379	Snag Point	06/26/86	1250	LE	18.8	31.0	--	
380	Opp South 33	06/26/86	1310	LE	19.5	30.0	--	
381	Johnnys Place	06/26/86	1320	LE	19.4	31.0	--	
382	#1	06/26/86	1700	HF	13.6	35.0	--	
383	#1	06/26/86	1715	HF	13.3	34.0	--	
384	#2	06/26/86	1730	HF	14.3	32.0	--	
385	#4	06/26/86	1750	HF	18.4	31.0	--	
386	#3	06/26/86	1830	HF	13.9	33.0	--	

Appendix D. Number of chum salmon caught at each beach seine station. TOTAL = number of fish subsampled from the catch; R = number of Right pelvic fin-clipped fish (Whiskey Creek); R/A = number of Right pelvic/Adipose fin-clipped fish (OAF 2.2 g); L/A = number of Left pelvic/Adipose fin-clipped fish (OAF 6.5 g); B/A = number of Both pelvics/Adipose fin-clipped fish (OAF); UNID. = number of Unidentifiable fin-clipped fish; ADJ. TOTAL = Subsample expanded to represent total fish caught.

HAUL NO.	STATION	DATE	TOTAL	R	R/A	L/A	B/A	UNID.	ADJ. TOTAL
1 #1		03/13/86	---	--	--	-	-	-	0
2 #2		03/13/86	---	--	--	-	-	-	0
3 #3		03/13/86	---	--	--	-	-	-	0
4 Willow Bush Low		03/13/86	---	--	--	-	-	-	0
5 2 Stake Point		03/13/86	---	--	--	-	-	-	0
6 Picnic Point		03/13/86	7	--	--	-	-	-	7
7 South 1		03/13/86	---	--	--	-	-	-	0
8 Mud Paradise		03/13/86	1	--	--	-	-	-	1
9 Willow Bush High		03/13/86	1	--	--	-	-	-	1
10 No Name Creek		03/13/86	---	--	--	-	-	-	0
11 #1		03/20/86	1	--	--	-	-	-	1
12 #2		03/20/86	---	--	--	-	-	-	0
13 #3		03/20/86	---	--	--	-	-	-	0
14 West South 3		03/21/86	4	--	--	-	-	-	4
15 Picnic Point		03/21/86	2	--	--	-	-	-	2
16 South 1		03/21/86	---	--	--	-	-	-	0
17 Whiskey Creek		03/21/86	---	--	--	-	-	-	0
18 Willow Bush High		03/21/86	---	--	--	-	-	-	0
19 No Name Creek		03/21/86	---	--	--	-	-	-	0
20 #1		03/27/86	---	--	--	-	-	-	0
21 #2		03/27/86	---	--	--	-	-	-	0
22 #3		03/27/86	---	--	--	-	-	-	0
23 Lucky 13		03/27/86	---	--	--	-	-	-	0
24 2 Stake Point		03/27/86	---	--	--	-	-	-	0
25 Little Riverette		03/27/86	---	--	--	-	-	-	0
26 Snag Point		03/27/86	---	--	--	-	-	-	0
27 South 33		03/27/86	---	--	--	-	-	-	0
28 South 33 Channel		03/27/86	---	--	--	-	-	-	0
29 Snag Point		03/27/86	---	--	--	-	-	-	0
30 Willow Bush Low		03/27/86	---	--	--	-	-	-	0
31 #1		03/27/86	---	--	--	-	-	-	0
32 #2		03/27/86	10	--	--	-	-	-	10
33 #3		03/27/86	---	--	--	-	-	-	0
34 #4		03/27/86	---	--	--	-	-	-	0
35 No Name Creek		03/27/86	2	--	--	-	-	-	2
36 Willow Bush High		03/27/86	1	--	--	-	-	-	1
37 Mud Paradise		03/27/86	3	--	--	-	-	-	3
38 Whiskey Creek		03/27/86	5	--	--	-	-	-	5
39 South 1		03/27/86	20	--	--	-	-	-	20
40 West South 3		03/27/86	3	--	--	-	-	-	3
41 Picnic Point		03/27/86	1	--	--	-	-	-	1
42 #1		04/03/86	---	--	--	-	-	-	0
42 #1		04/03/86	---	--	--	-	-	-	0
43 #2		04/03/86	19	--	--	-	-	-	19

Appendix D. (Continued)

HAUL NO.	STATION	DATE	TOTAL	R	R/A	L/A	B/A	UNID.	ADJ. TOTAL
44 #2		04/03/86	10	--	--	-	-	-	10
45 #3		04/03/86	---	--	--	-	-	-	0
43 #3		04/03/86	---	--	--	-	-	-	0
47 #4		04/03/86	---	--	--	-	-	-	0
48 No Name Creek		04/03/86	2	--	--	-	-	-	2
49 Willow Bush High		04/03/86	2	--	--	-	-	-	2
50 Mud Paradise		04/03/86	27	--	--	-	-	-	27
51 Whiskey Creek		04/03/86	5	--	--	-	-	-	5
52 South 1		04/03/86	73	--	--	-	-	-	73
53 Picnic Point		04/03/86	8	--	--	-	-	-	8
54 West South 3		04/03/86	26	--	--	-	-	-	26
55 #1		04/03/86	---	--	--	-	-	-	0
56 #1		04/03/86	---	--	--	-	-	-	0
57 #2		04/03/86	---	--	--	-	-	-	0
58 #3		04/03/86	---	--	--	-	-	-	0
59 Little Riverette		04/03/86	---	--	--	-	-	-	0
60 Snag Point		04/03/86	---	--	--	-	-	-	0
61 Opp South 33		04/03/86	---	--	--	-	-	-	0
62 Johnnys Place		04/03/86	---	--	--	-	-	-	0
63 Willow Bush Channel		04/03/86	---	--	--	-	-	-	0
64 #1		04/09/86	17	--	--	-	-	-	17
65 #1		04/09/86	---	--	--	-	-	-	0
66 #2		04/09/86	36	--	--	-	-	-	36
67 #3		04/09/86	---	--	--	-	-	-	0
68 Willow Bush Channel		04/09/86	---	--	--	-	-	-	0
69 Little Riverette		04/09/86	4	--	--	-	-	-	4
70 Snag Point		04/09/86	2	--	--	-	-	-	2
71 Opp South 33		04/09/86	37	--	--	-	-	-	37
72 Johnnys Place		04/09/86	4	--	--	-	-	-	4
73 Johnnys Place		04/09/86	---	--	--	-	-	-	0
74 Lagoon Opp South 33		04/09/86	1	--	--	-	-	-	1
75 #1		04/09/86	---	--	--	-	-	-	0
76 #2		04/09/86	2	--	--	-	-	-	2
77 #2		04/09/86	9	--	--	-	-	-	9
78 #3		04/09/86	---	--	--	-	-	-	0
79 #4		04/09/86	6	--	--	-	-	-	6
80 No Name Creek		04/09/86	1	--	--	-	-	-	1
81 #1		04/10/86	1	--	--	-	-	-	1
82 #1		04/10/86	8	--	--	-	-	-	8
83 #1		04/10/86	---	--	--	-	-	-	0
84 Picnic Point		04/10/86	3	--	--	-	-	-	3
85 South 1		04/10/86	13	--	--	-	-	-	13
86 #3		04/10/86	1	--	--	-	-	-	1
87 #1		04/10/86	1	--	--	-	-	-	1

Appendix D. (Continued)

HAUL NO.	STATION	DATE	TOTAL	R	R/A	L/A	B/A	UNID.	ADJ. TOTAL
88 #1		04/10/86	3	--	--	-	-	-	3
89 #1		04/11/86	2	--	--	-	-	-	2
90 #1		04/19/86	---	--	--	-	-	-	0
91 #1		04/19/86	---	--	--	-	-	-	0
92 #2		04/19/86	57	--	--	-	-	-	57
93 #3		04/19/86	1	--	--	-	-	-	1
94 #4		04/19/86	5	--	--	-	-	-	5
95 South 1		04/19/86	20	--	--	-	-	-	20
96 West South 3		04/19/86	1	--	--	-	-	-	1
97 #2		04/19/86	10	--	--	-	-	-	10
98 #3		04/19/86	---	--	--	-	-	-	0
99 Willow Bush Channel		04/19/86	---	--	--	-	-	-	0
100 Little Riverette		04/19/86	---	--	--	-	-	-	0
101 Snag Point		04/19/86	3	--	--	-	-	-	3
102 Opp South 33		04/19/86	4	--	--	-	-	-	4
103 Johnnys Place		04/19/86	---	--	--	-	-	-	0
104 Opp 2 Stake Point		04/19/86	1	--	--	-	-	-	1
105 #1		04/19/86	---	--	--	-	-	-	0
106 Willow Bush High		04/20/86	11	--	--	-	-	-	11
107 No Name Creek		04/20/86	4	--	--	-	-	-	4
108 Mud Paradise		04/20/86	18	--	--	-	-	-	18
109 Whiskey Creek		04/20/86	7	--	--	-	-	-	7
110 Willow Bush High		04/20/86	---	--	--	-	-	-	0
111 Picnic Point		04/20/86	---	--	--	-	-	-	0
112 No Name Creek		04/23/86	17	--	--	-	-	-	17
113 #4		04/23/86	135	--	--	-	-	-	135
114 #3		04/23/86	2	--	--	-	-	-	2
115 #1		04/23/86	---	--	--	-	-	-	0
116 #2		04/23/86	---	--	--	-	-	-	0
117 Little Riverette		04/23/86	2	--	--	-	-	-	2
118 Willow Bush Channel		04/23/86	13	--	--	-	-	-	13
119 #1		04/23/86	---	--	--	-	-	-	0
120 #1		04/24/86	3	--	--	-	-	-	3
121 #1		04/23/86	19	--	--	-	-	-	19
122 Willow Bush High		04/24/86	5	--	--	-	-	-	5
123 Mud Paradise		04/24/86	3	--	--	-	-	-	3
124 Whiskey Creek		04/24/86	---	--	--	-	-	-	0
125 South 1		04/24/86	1	--	--	-	-	-	1
126 Picnic Point		04/24/86	1	--	--	-	-	-	1
127 West South 3		04/24/86	7	--	--	-	-	-	7
128 #2		04/24/86	1	--	--	-	-	-	1
129 #1		04/24/86	50	--	--	-	-	-	50
130 Snag Point		04/24/86	---	--	--	-	-	-	0
131 Opp South 33		04/24/86	1	--	--	-	-	-	1

Appendix D. (Continued)

HAUL NO.	STATION	DATE	TOTAL	R	R/A	L/A	B/A	UNID.	ADJ. TOTAL
132	Johnnys Place	04/24/86	---	--	--	-	-	-	0
133 #1		05/01/86	110	1	--	-	-	-	130
134 #2		05/01/86	22	--	--	-	-	-	22
135 #3		05/01/86	193	4	--	-	-	-	1544
136 #4		05/01/86	59	--	--	-	-	-	236
137 No Name Creek		05/01/86	2	--	--	-	-	-	2
138 Willow Bush High		05/01/86	138	5	--	-	-	-	552
139 Mud Paradise		05/01/86	33	--	--	-	-	-	33
140 South 1		05/01/86	13	1	--	-	-	-	13
141 Picnic Point		05/01/86	3	--	--	-	-	-	3
142 West South 3		05/01/86	23	1	--	-	-	-	23
143 #1		05/01/86	496	1	--	-	-	-	2579
144 #2		05/01/86	---	--	--	-	-	-	0
145 #3		05/01/86	40	2	--	-	-	-	40
146 Willow Bush Channel		05/01/86	1	--	--	-	-	-	1
147 Little Riverette		05/01/86	8	--	--	-	-	-	8
148 Snag Point		05/01/86	1	--	--	-	-	-	1
149 Opp South 33		05/01/86	24	2	--	-	-	-	24
150 Johnnys Place		05/01/86	5	--	--	-	-	-	5
151 #1		05/05/86	65	1	--	-	-	-	650
152 #2		05/05/86	10	--	--	-	-	-	10
153 #3		05/05/86	6	--	--	-	-	-	6
154 Willow Bush Channel		05/05/86	36	3	--	-	-	-	36
155 Snag Point		05/05/86	25	1	--	-	-	-	25
156 Little Riverette		05/05/86	15	2	--	-	-	-	15
157 Opp South 33		05/05/86	4	--	--	-	-	-	4
158 Johnnys Place		05/05/86	3	--	--	-	-	-	3
159 #1		05/05/86	10	--	--	-	-	-	10
160 #2		05/05/86	12	--	--	-	-	-	12
161 #3		05/05/86	2	--	--	-	-	-	2
162 #4		05/05/86	101	5	--	-	-	-	101
163 No Name Creek		05/05/86	38	--	--	-	-	-	38
164 Willow Bush High		05/05/86	28	1	--	-	-	-	28
165 Mud Paradise		05/05/86	6	--	--	-	-	-	6
166 Whiskey Creek		05/05/86	5	--	--	-	-	-	5
167 South 1		05/05/86	7	1	--	-	-	-	7
168 Picnic Point		05/05/86	---	--	--	-	-	-	0
169 West South 3		05/05/86	1	--	--	-	-	-	1
170 #1		05/05/86	124	1	--	-	-	-	558
171 #2		05/05/86	5	--	--	-	-	-	5
172 #3		05/05/86	4	--	--	-	-	-	4
173 Willow Bush Channel		05/05/86	109	5	--	-	-	-	109
174 Snag Point		05/05/86	20	--	--	-	-	-	20
175 Little Riverette		05/05/86	49	--	--	-	-	-	49

Appendix D. (Continued)

HAUL NO.	STATION	DATE	TOTAL	R	R/A	L/A	B/A	UNID.	ADJ. TOTAL
176	Opp South 33	05/05/86	10	1	--	-	-	-	10
177	Johnnys Place	05/05/86	11	--	--	-	-	-	11
178	#1	05/05/86	28	--	--	-	-	-	28
179	#2	05/05/86	19	--	--	-	-	-	19
180	#3	05/05/86	5	--	--	-	-	-	5
181	#4	05/05/86	32	1	--	-	-	-	32
182	No Name Creek	05/05/86	3	--	--	-	-	-	3
183	Willow Bush High	05/05/86	5	--	--	-	-	-	5
184	Mud Paradise	05/05/86	1	--	--	-	-	-	1
185	Whiskey Creek	05/06/86	---	--	--	-	-	-	0
186	South 1	05/06/86	1	1	--	-	-	-	1
187	Picnic Point	05/06/86	---	--	--	-	-	-	0
188	West South 3	05/06/86	10	--	--	-	-	-	10
189	#1	05/08/86	202	3	--	-	-	-	808
190	#2	05/08/86	7	--	--	-	-	-	7
191	#3	05/08/86	---	--	--	-	-	-	0
192	#1	05/08/86	300	--	--	-	-	-	300
193	Willow Bush Channel	05/08/86	9	--	--	-	-	-	9
194	Little Riverette	05/08/86	33	--	--	-	-	-	33
195	Snag Point	05/08/86	5	--	--	-	-	-	5
196	Opp South 33	05/08/86	56	--	--	-	-	-	56
197	Johnnys Place	05/08/86	6	1	--	-	-	-	6
198	#1	05/08/86	50	1	--	-	-	-	140
199	#1	05/08/86	62	4	--	-	-	-	165
200	#2	05/08/86	25	--	--	-	-	-	25
201	#3	05/08/86	14	--	--	-	-	-	14
202	#4	05/08/86	35	--	--	-	-	-	35
203	No Name Creek	05/08/86	1	--	--	-	-	-	1
204	Willow Bush High	05/08/86	---	--	--	-	-	-	0
205	#1	05/08/86	56	--	--	-	-	-	56
206	South 1	05/08/86	2	--	--	-	-	-	2
207	West South 3	05/08/86	2	--	--	-	-	-	2
208	#1	05/08/86	19	--	--	-	-	-	19
209	#1	05/09/86	25	--	--	-	-	-	25
210	#1	05/09/86	65	--	--	-	-	-	65
211	#1	05/09/86	60	--	--	1	-	-	570
212	#1	05/09/86	23	1	--	-	-	-	780
213	#1	05/09/86	3	--	--	-	-	-	3
214	#1	05/09/86	28	--	--	-	-	-	500
215	Mud Paradise	05/09/86	---	--	--	-	-	-	0
216	Whiskey Creek	05/09/86	---	--	--	-	-	-	0
217	#1	05/13/86	89	2	2	-	-	-	618
218	#2	05/13/86	66	1	18	-	1	-	66
219	Little Riverette	05/13/86	6	--	--	-	-	-	6

Appendix D. (Continued)

HAUL NO.	STATION	DATE	TOTAL	R	R/A	L/A	B/A	UNID.	ADJ. TOTAL
220	Willow Bush Channel	05/13/86	9	2	--	-	-	-	9
221	Snag Point	05/13/86	---	--	--	-	-	-	0
222	Opp South 33	05/13/86	65	4	7	-	-	-	65
223	Johnnys Place	05/13/86	4	--	--	-	-	-	4
224	#3	05/13/86	2	1	--	-	-	-	2
224	#1	05/13/86	182	4	17	-	-	-	182
225	#2	05/13/86	3	--	--	-	-	-	3
226	#3	05/13/86	5	--	--	-	-	-	5
227	#4	05/13/86	80	1	3	1	-	-	80
228	No Name Creek	05/13/86	---	--	--	-	-	-	0
229	Willow Bush High	05/13/86	---	--	--	-	-	-	0
230	Mud Paradise	05/13/86	8	2	1	-	-	-	8
231	Whiskey Creek	05/13/86	---	--	--	-	-	-	0
232	South 1	05/13/86	---	--	--	-	-	-	0
233	West South 3	05/13/86	3	--	--	-	-	-	3
234	#1	05/15/86	449	--	1	-	-	-	449
235	#2	05/15/86	---	--	--	-	-	-	0
236	Willow Bush Channel	05/15/86	2	--	--	-	-	-	2
237	Little Riverette	05/15/86	55	1	6	-	-	-	55
238	Snag Point	05/15/86	21	1	--	-	-	-	21
239	Opp South 33	05/15/86	57	--	--	-	-	-	57
240	Johnnys Place	05/15/86	10	3	--	-	-	-	10
241	#3	05/15/86	---	--	--	-	-	-	0
242	#1	05/15/86	124	1	6	-	-	-	124
243	#1	05/15/86	44	1	--	-	-	-	44
244	#2	05/15/86	6	1	--	-	-	-	6
245	#2	05/15/86	7	--	2	-	-	-	7
246	#3	05/15/86	10	--	1	-	-	-	10
247	#4	05/15/86	27	2	1	-	-	-	27
248	#1	05/16/86	6	--	1	-	-	-	6
249	#1	05/16/86	6	--	1	-	-	-	6
250	#2	05/16/86	7	--	1	-	-	-	7
251	#3	05/16/86	2	--	--	-	-	-	2
253	#1	05/16/86	410	2	9	-	-	-	410
254	#2	05/16/86	9	--	--	-	-	-	9
255	Willow Bush Channel	05/16/86	21	2	--	-	-	-	21
256	Little Riverette	05/16/86	65	1	4	-	-	-	65
257	Snag Point	05/16/86	37	1	--	-	-	-	37
258	Opp South 33	05/16/86	107	3	--	-	-	-	107
259	Johnnys Place	05/16/86	25	1	--	-	-	-	25
260	#3	05/16/86	---	--	--	-	-	-	0
261	#1	05/21/86	44	1	--	-	-	-	44
262	#1	05/21/86	26	1	--	-	-	-	26

Appendix D. (Continued)

HAUL NO.	STATION	DATE	TOTAL	R	R/A	L/A	B/A	UNID.	ADJ. TOTAL
263 #1		05/21/86	331	3	5	-	-	-	331
264 #1		05/22/86	86	2	3	-	-	-	86
265 #1		05/22/86	174	3	1	-	-	-	174
266 Willow Bush Channel		05/22/86	5	1	1	-	-	-	5
267 Little Riverette		05/22/86	25	1	1	-	-	-	25
268 Snag Point		05/22/86	1	--	--	-	-	-	1
269 Opp South 33		05/22/86	8	--	--	-	-	-	8
270 Johnnys Place		05/22/86	3	--	--	-	-	-	3
271 Zostra Pool		05/22/86	---	--	--	-	-	-	0
272 Zostra Pool		05/22/86	---	--	--	-	-	-	0
273 #1		05/22/86	7	--	1	-	-	-	7
274 #1		05/22/86	8	--	--	-	-	-	8
275 #1		05/22/86	11	2	--	-	-	-	11
276 #1		05/22/86	66	1	--	-	-	-	66
277 No Name Creek		05/22/86	---	--	--	-	-	-	0
278 Willow Bush High		05/22/86	1	--	--	-	-	-	1
279 Mud Paradise		05/22/86	---	--	--	-	-	-	0
280 Whiskey Creek		05/22/86	---	--	--	-	-	-	0
281 South 1		05/22/86	---	--	--	-	-	-	0
282 Picnic Point		05/22/86	---	--	--	-	-	-	0
283 West South 3		05/22/86	---	--	--	-	-	-	0
284 #4		05/22/86	82	--	--	-	-	-	82
285 #3		05/22/86	3	--	--	-	-	-	3
286 #2		05/22/86	4	--	--	-	-	-	4
287 #2		05/22/86	2	--	--	-	-	-	2
288 #3		05/22/86	1	--	--	-	-	-	1
289 #1		05/22/86	64	2	1	-	-	-	64
290 #1		05/22/86	57	--	1	-	-	-	57
291 #1		05/23/86	127	3	6	-	-	-	127
292 #1		05/23/86	133	2	10	-	-	-	133
293 #1		05/23/86	202	5	2	-	-	-	202
294 Opp #1		05/23/86	108	4	--	-	-	-	1760
296 #2		05/28/86	1	--	--	-	-	-	1
297 #3		05/28/86	4	--	--	-	-	-	4
298 #4		05/28/86	---	--	--	-	-	-	0
299 No Name Creek		05/28/86	---	--	--	-	-	-	0
300 Willow Bush High		05/28/86	---	--	--	-	-	-	0
301 Mud Paradise		05/28/86	1	--	--	-	-	-	1
302 Whiskey Creek		05/28/86	---	--	--	-	-	-	0
303 South 1		05/28/86	---	--	--	-	-	-	0
304 Picnic Point		05/28/86	---	--	--	-	-	-	0
305 West South 3		05/28/86	---	--	--	-	-	-	0
306 Opp #1		05/29/86	35	1	--	-	-	-	35

Appendix D. (Continued)

HAUL NO.	STATION	DATE	TOTAL	R	R/A	L/A	B/A	UNID.	ADJ. TOTAL
307 #1		05/29/86	245	--	--	-	-	6	857
308 #2		05/29/86	---	--	--	-	-	-	0
309 Little Riverette		05/29/86	8	1	1	-	-	-	8
310 Willow Bush Channel		05/29/86	6	--	--	-	-	-	6
311 Snag Point		05/29/86	4	--	--	-	-	-	4
312 Opp South 33		05/29/86	21	2	1	-	-	-	21
313 Johnnys Place		05/29/86	---	--	--	-	-	-	0
314 #3		05/29/86	---	--	--	-	-	-	0
315 Opp #1		06/07/86	2	--	--	-	-	-	2
316 #1		06/07/86	72	1	1	-	-	-	72
317 #2		06/07/86	---	--	--	-	-	-	0
318 Willow Bush Channel		06/07/86	---	--	--	-	-	-	0
319 Little Riverette		06/07/86	2	--	--	-	-	-	2
320 Snag Point		06/07/86	---	--	--	-	-	-	0
321 Opp South 33		06/07/86	---	--	--	-	-	-	0
322 Johnnys Place		06/07/86	---	--	--	-	-	-	0
323 #3		06/07/86	---	--	--	-	-	-	0
324 #1		06/07/86	4	--	--	-	-	-	4
325 #2		06/07/86	---	--	--	-	-	-	0
326 #3		06/07/86	---	--	--	-	-	-	0
327 #4		06/07/86	---	--	--	-	-	-	0
328 No Name Creek		06/07/86	---	--	--	-	-	-	0
329 Mud Paradise		06/07/86	1	--	--	-	-	-	1
330 Whiskey Creek		06/07/86	---	--	--	-	-	-	0
331 South 1		06/07/86	---	--	--	-	-	-	0
332 Picnic Point		06/07/86	---	--	--	-	-	-	0
333 West South 3		06/07/86	---	--	--	-	-	-	0
334 #1		06/12/86	22	--	1	-	-	-	22
335 Opp #1		06/12/86	---	--	--	-	-	-	0
336 #2		06/12/86	---	--	--	-	-	-	0
337 Willow Bush Channel		06/12/86	---	--	--	-	-	-	0
338 Little Riverette		06/12/86	---	--	--	-	-	-	0
339 Snag Point		06/12/86	---	--	--	-	-	-	0
340 Opp South 33		06/12/86	---	--	--	-	-	-	0
341 Johnnys Place		06/12/86	---	--	--	-	-	-	0
342 #1		06/12/86	---	--	--	-	-	-	0
343 #2		06/12/86	---	--	--	-	-	-	0
344 #3		06/12/86	---	--	--	-	-	-	0
345 #4		06/12/86	---	--	--	-	-	-	0
346 No Name Creek		06/12/86	---	--	--	-	-	-	0
347 Willow Bush High		06/12/86	---	--	--	-	-	-	0
348 Mud Paradise		06/12/86	---	--	--	-	-	-	0
349 Whiskey Creek		06/12/86	---	--	--	-	-	-	0
350 South 1		06/12/86	---	--	--	-	-	-	0

Appendix D. (Continued)

HAUL NO.	STATION	DATE	TOTAL	R	R/A	L/A	B/A	UNID.	ADJ. TOTAL
351	Picnic Point	06/12/86	---	--	--	-	-	-	0
352	West South 3	06/12/86	---	--	--	-	-	-	0
353	#1	06/22/86	---	--	--	-	-	-	0
354	Opp #1	06/22/86	1	--	--	-	-	-	1
355	Byte	06/22/86	---	--	--	-	-	-	0
356	#2	06/22/86	---	--	--	-	-	-	0
357	Willow Bush Channel	06/22/86	---	--	--	-	-	-	0
358	Little Riverette	06/22/86	---	--	--	-	-	-	0
359	Snag Point	06/22/86	---	--	--	-	-	-	0
360	Opp South 33	06/22/86	---	--	--	-	-	-	0
361	Johnnys Place	06/22/86	---	--	--	-	-	-	0
362	Opp #1	06/22/86	1	--	--	-	-	-	1
363	#1	06/22/86	1	--	--	-	-	-	1
364	#1	06/22/86	---	--	--	-	-	-	0
365	#2	06/22/86	---	--	--	-	-	-	0
366	#3	06/22/86	---	--	--	-	-	-	0
367	#4	06/22/86	---	--	--	-	-	-	0
368	No Name Creek	06/22/86	---	--	--	-	-	-	0
369	Willow Bush High	06/22/86	---	--	--	-	-	-	0
370	Mud Paradise	06/22/86	---	--	--	-	-	-	0
371	Whiskey Ceek	06/22/86	---	--	--	-	-	-	0
372	South 1	06/22/86	---	--	--	-	-	-	0
373	West South 3	06/22/86	---	--	--	-	-	-	0
374	#1	06/26/86	---	--	--	-	-	-	0
375	Opp #1	06/26/86	---	--	--	-	-	-	0
376	#2	06/26/86	---	--	--	-	-	-	0
377	Willow Bush Channel	06/26/86	---	--	--	-	-	-	0
378	Little Riverette	06/26/86	---	--	--	-	-	-	0
379	Snag Point	06/26/86	---	--	--	-	-	-	0
380	Opp South 33	06/26/86	---	--	--	-	-	-	0
381	Johnnys Place	06/26/86	---	--	--	-	-	-	0
382	#1	06/26/86	---	--	--	-	-	-	0
383	#1	06/26/86	---	--	--	-	-	-	0
384	#2	06/26/86	---	--	--	-	-	-	0
385	#4	06/26/86	---	--	--	-	-	-	0
386	#3	06/26/86	---	--	--	-	-	-	0