Exxon Valdez Oil Spill
State/Federal Natural Resource Damage Assessment Final Report

Injury to Salmon Eggs and Preemergent Fry in Prince William Sound

Fish/Shellfish Study Number 2
Final Report

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April 1994

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Study History: This study was conducted beginning March 1989 and continued through February 1991. The project sampled pink salmon embryos and preemergent fry in oil contaminated and unimpacted streams to determine if the *Exxon Valdez* oil spill had an impact on incubating pink salmon.

Abstract: Pink salmon embryo mortality was elevated in oil contaminated streams during the falls of 1989, 1990, and 1991. Increased embryo mortality was detected in the lower intertidal zones in 1989 while elevated mortalities were observed at the highest intertidal zone in 1990. These findings were consistent with how stream oiling was expected to take place: all intertidal zones were contaminated in 1989 with the remaining oil being deposited in the highest intertidal zone in 1990. Embryo mortality was significantly higher in all zones for the oil contaminated streams in 1991. No difference in embryo to preemergent fry survival was detected for the 1989, 1990, or 1991 brood years.

Key Words: Eggs, embryo mortality, *Onchorhynchus gorbuscha*, overwinter survival, pink salmon, preemergent fry, Prince William Sound.

Citation:

Sharr, S., B.G. Bue, S.D. Moffitt, A.K. Craig, and D.G. Evans. 1994. Injury to salmon eggs and preemergent fry in Prince William Sound, *Exxon Valdez* Oil Spill State/Federal Natural Resource Damage Assessment Final Report (Fish/Shellfish Study Number 2), Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division, Cordova, Alaska.

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EXECUTIVE SUMMARY

This study is part of an integrated group of Natural Resource Damage Assessment Fish/Shellfish Studies (NRDA F/S Studies 1, 2, 3, and 4) conducted to quantify damage to pink and chum salmon (*Oncorhynchus gorbuscha* and *O. keta*) as a result of the *Exxon Valdez* oil spill. It was designed to ascertain whether embryo mortality or embryo to preemergent fry survival in intertidal and upstream areas of Prince William Sound was affected by the spill.

The oil spill occurred coincident with the 1989 preemergent fry sampling program conducted annually by the Alaska Department of Fish and Game; thus, many streams were sampled for pink salmon fry densities prior to or immediately after contamination by oil. Some of these streams were sampled again approximately two weeks after oiling. No change in fry density or increase in numbers of dead fry was detected.

Pink salmon embryo mortality was elevated in oil contaminated streams during the falls of 1989, 1990, and 1991 ($p=0.004$, $p=0.023$, and $p=0.003$, respectively). Increased embryo mortality was detected in the lower intertidal zones in 1989 while elevated mortalities were observed at the highest intertidal zone in 1990 (average embryo mortalities; 1989 control 0.104, 1989 oil contaminated 0.174, 1990 control 0.195, 1990 oil contaminated 0.295). These findings are consistent with how stream oiling was expected to take place: all intertidal zones were contaminated in 1989 with the remaining oil persisting mainly in the highest intertidal zone in 1990. Embryo mortality was significantly higher in all zones for the oil contaminated streams in 1991 (average embryo mortalities; control 0.221, oil contaminated 0.433). This finding is unexplained.

No difference in embryo to preemergent fry survival was detected for the 1989, 1990, or 1991 brood years. We feel these results were due to a deficient sampling design rather than the lack of a true effect or statistical power. Embryo to preemergent fry survival was estimated as the ratio of preemergent fry density, sampled in the spring, to embryo density, sampled in the fall. Stream characteristics, primarily flow and channel location varied greatly between the fall and spring sampling; consequently, the population sampled in the spring may not have been the same population sampled in the fall.

Hydrocarbon analysis of mussel (*Mytilus sp.*) tissue and mixed-function oxidase (MFO) analysis of preemergent fry generally agreed with visual observations of stream oilings. Histopathological analysis failed to detect lesions in preemergent fry although results from other studies indicate the fry were collected too early in their life cycle to have developed lesions. There was evidence that fry from oil contaminated streams experienced more collection trauma than fry from unimpacted streams.

Determination of loss in adult salmon production as a result of increasing embryo mortality in oil contaminated streams cannot be made until data from NRDA F/S Studies 1, 2, 3, 4, and 28 are synthesized.

INTRODUCTION

Wild salmon play a major role in the Prince William Sound ecosystem while also contributing to the region's commercial fisheries. Migrating salmon fry are an important spring food source for various mammals, birds, and fishes. Marine mammals, fish and birds prey on the ocean life stages of Pacific salmon while terrestrial mammals and birds, such as bears, river otters, eagles, and gulls depend on salmon for a large portion of their summer diet. Salmon also provide a pathway for transferring nutrients from marine ecosystems to near-shore and terrestrial ecosystems. Total returns of wild pink *Oncorhynchus gorbuscha* and chum salmon *O. keta* to Prince William Sound have ranged from 1.8 to 21.0 million and from 0.4 to 1.5 million since 1978.

Up to 75% of spawning pink and chum salmon in Prince William Sound use intertidal areas (Helle et al. 1964). These areas are highly susceptible to contamination from marine oil spills. Moles et al. (1987) and Rice et al. (1975) found that pink salmon embryos and preemergent fry were adversely affected by exposure to crude oil and that the affect was most acute in intertidal environments. The March 24, 1989 spill from the *Exxon Valdez* occurred just prior to the spring migration of salmon fry and contaminated many intertidal spawning areas in central and southwest Prince William Sound.

This study evaluated 1) the immediate effects of oiling on preemergent pink salmon numbers in the spring of 1989, 2) the effect of intertidal oiling on pink salmon embryo mortality, and 3) the effect of intertidal oiling on pink salmon embryo to preemergent fry survival. Samples were also collected for histopathological and mixed-function oxidase analysis to determine if there was a biological response to oil exposure. Both the histopathological evaluation of tissues for lesions (Hinton and Laurén 1990) and the evaluation for mixed-function oxidase activity (Jimenez and Stegeman 1990; Spies et al. 1982) have been used in past studies to indicate exposure to toxicants such as oil. This study concentrated on the southwestern portions of Prince William Sound; although, streams from Montague Island and the eastern Sound were sampled to provide a sound-wide perspective (Figure 1; see Appendix B for stream names).

Field observation data were used for these evaluations; and as such, the interpretation of study results is not perfect. The estimation of the effects of intertidal oiling on pink salmon embryo mortality and embryo to preemergent fry survival was limited by the lack of experimental control over which streams were treated with oil; thus, the effect of stream location cannot be completely accounted for. Additionally, it was difficult in some cases to determine whether the stream was actually impacted by oil much less determine the true intensity of oiling. These dilemmas are common for impact assessment work based on observational data. We addressed these problems in the project design by including a large number of streams in the study as well as attempting to use unaffected streams in close proximity to oil contaminated streams.

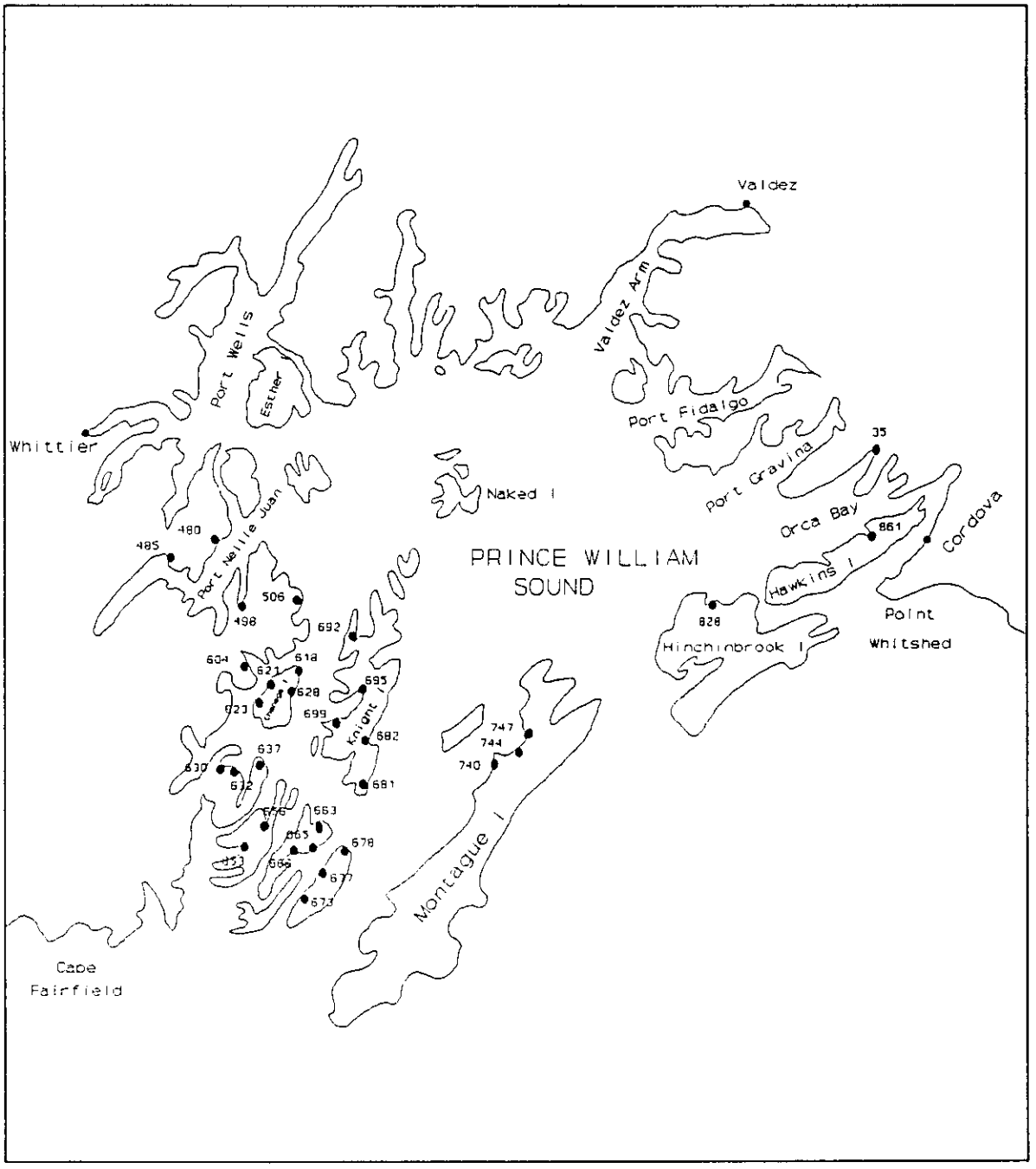

Figure 1. Streams examined by the 1989, 1990, and 1991 pink salmon embryo and 1989, 1990, 1991, and 1992 pink salmon preemergent fry surveys.

OBJECTIVES

1. Estimate the density by tide zone of preemergent fry in 48 streams and embryos in 31 streams using numbers of live and dead embryos and fry.

2. Estimate embryo mortality and overwinter survival of pink salmon embryos in both oil contaminated and unoiled streams.

3. Document hydrocarbon contamination of preemergent fry and mussels (*Mytilus sp.*) using tissue hydrocarbon, presence of induced mixed-function oxidase (MFO) activity, and histopathological analysis.

4. Assess any loss in adult production from changes in overwinter survival using the results of NRDA F/S Studies 1, 2, 3, and 4.

5. Identify potential alternative methods and strategies for restoration of lost use, populations, or habitat where injury is identified.

METHODS

Historic Data

Pink salmon preemergent fry have been sampled annually since 1960 while pink salmon embryos were sampled from 1960 through 1974 and from 1976 through 1978. These data were located in the Alaska Department of Fish and Game, Division of Commercial Fisheries data archives in Cordova, edited to standardize stream locations and sampling techniques, and finally entered into a common database. The data were then summarized and examined for pre- and post-oil spill differences.

Sample Sites

Spring of 1989 Sampling

The annual preemergent pink salmon fry density survey conducted by the Alaska Department of Fish and Game, Division of Commercial Fisheries, was underway at the time of the *Exxon Valdez* spill; consequently, many streams were sampled for preemergent fry density prior to or immediately after oiling. An additional session of sampling was initiated approximately

two weeks after the spill. The second survey allowed for the resampling of some streams examined during the first sampling session so information on the immediate effect of oiling could be obtained. Additional oil contaminated streams were also examined for use in oil impact assessment work.

Thirty nine streams throughout Prince William Sound were sampled during the first preemergent fry survey. Twenty five of these have been historically sampled to provide data for forecasting future adult pink salmon returns. These streams were selected for the following reasons:

1. They contribute a large proportion of the wild return of pink and chum salmon to Prince William Sound.
2. They have significant spawning populations in both odd and even years.
3. They are representative of the spatial distribution of spawning escapement in Prince William Sound.
4. They are accessible for sampling in most years.

The additional 14 streams were surveyed to assess their potential as embryo and preemergent fry study streams. A second round of sampling occurred approximately two weeks after the oil spill and concentrated on the central and southwest areas of Prince William Sound. During the second event 14 streams were resampled (representing both oil impacted and non-oiled areas) and an additional 17 streams in oil impact areas were surveyed to evaluate their suitability as embryo and preemergent fry study streams.

Embryo Sampling

Embryo deposition sampling was completed on 31 streams from September 27, 1989 to October 15, 1989 (Figure 2; see Appendix A for stream names). The streams were selected using the following criteria:

1. Adult salmon returns were expected to be large enough to ensure that embryos and preemergent fry could be found.
2. Embryo and fry sampling had been done in past years.
3. Streams that had low to no oil impact, i.e., controls, were selected near high oil impact streams as well as in other parts of Prince William Sound to help account for variability in embryo and fry survival due to different environmental conditions.

Embryo sampling was completed on the same 31 streams from September 24, 1990 to October 18, 1990 and from September 23, 1991 to October 12, 1991. These streams were also sampled for preemergent fry (by this study) and adult escapement (by NRDA F/S Study 1, Injury to salmon spawning areas in Prince William Sound).

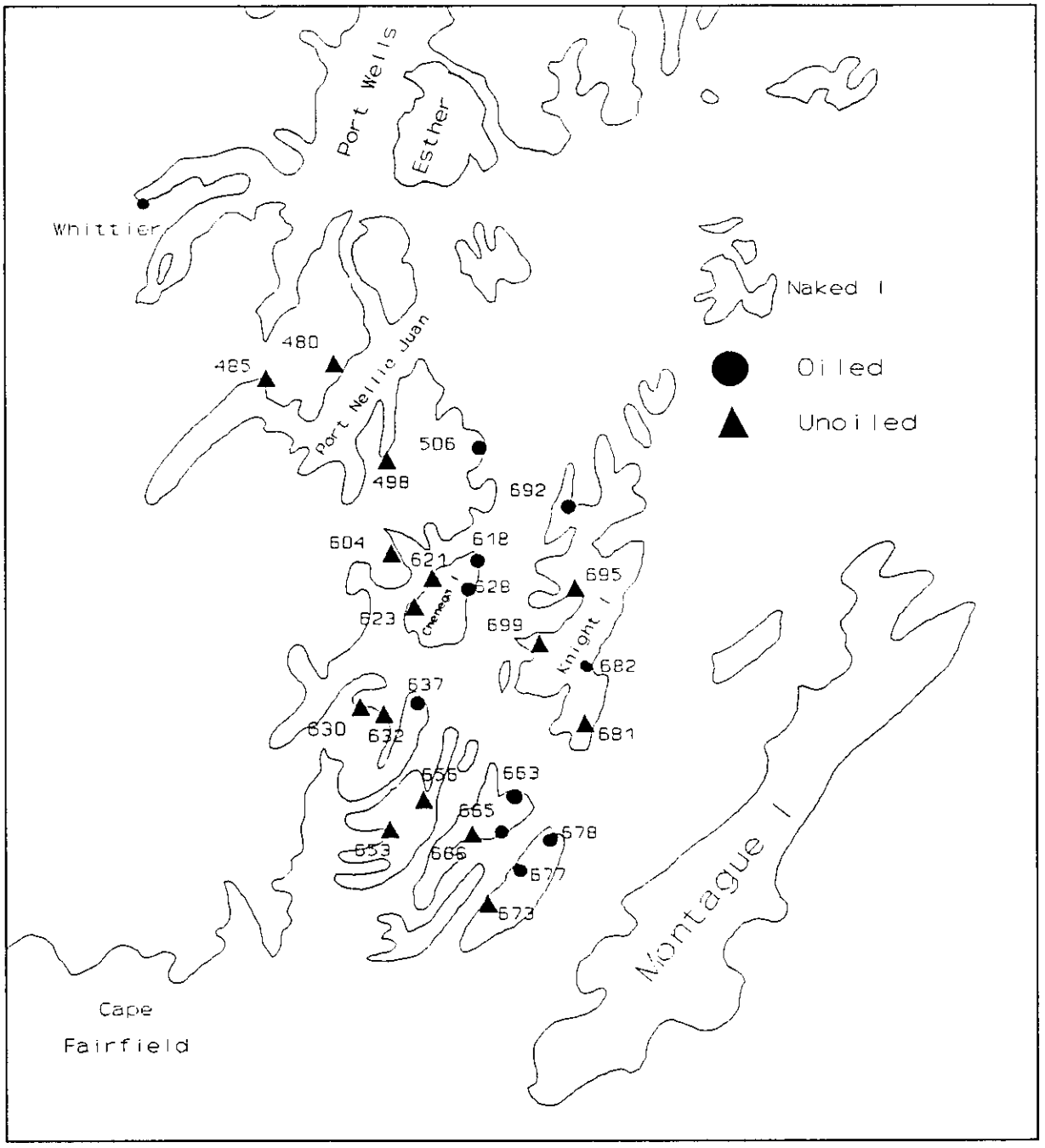

Figure 2. Streams included in the 1989, 1990, 1991, and 1992 embryo mortality and embryo to preemergent fry survival analysis along with their oiling designations.

Preemergent Fry Sampling

In 1990, 1991, and 1992, 48 streams were sampled for preemergent fry. These included 25 streams historically sampled to forecast adult pink salmon returns as well as 23 additional streams from the oil impact area. The 31 streams sampled for pink salmon embryos were included. Sampling began on March 15, 1990 and was completed on May 5, 1990. Most streams (41) were sampled before April 15, but snow and bay ice delayed sampling on seven. In 1991, sampling began on March 15 and was completed by May 17. Most streams (37) were sampled before April 15, but snow and ice delayed sampling on 11. In 1992 sampling started on March 13 and was completed by May 4. Most streams (46) were sampled before April 10, but snow and bay ice delayed sampling on two.

Sample Design

The methods used for both embryo and preemergent fry sampling were similar to those described by Pirtle and McCurdy (1977). Sampling was stratified by tide zone to control for divergence in embryo mortality or overwinter survival due to salinity, temperature, predation, oiling, or a combination of these factors. Four zones, three intertidal and one above the mean high tide line were sampled, whenever possible, for each stream: 1.8 - 2.4 m, 2.4 - 3.0 m, 3.0 - 3.7 m above mean low water, and upstream of mean high tide (3.7 m). Zone boundaries were established by elevation above mean low water using appropriate tide tables, a surveyor's level, and stadia rod and staked prior to sampling. No sampling was done below the 1.8 - 2.4 m zone as survival was expected to be low (Helle et al. 1964). Upstream sample areas were often within the reach of extreme high tides (3.7 - 4.6 m) since ice and snow often limit the extent of upstream sampling.

Separate linear transects were established for each zone on the embryo and preemergent fry surveys. Although most transects were 30.5 m long, some were shorter due to steep stream gradients. Transects were placed in riffle areas where spawning was observed during escapement surveys conducted for NRDA F/S Study 1. Transects ran diagonally across the river: fry survey transects started downstream against the right bank and moved upstream to the left bank while embryo survey transects started downstream against the left bank and moved upstream to the right bank. This placement of embryo and fry transects reduced sampling overlap and the influence of fall embryo sampling on spring fry abundance. A map was drawn for each stream indicating the tide zones and transect locations in relation to major landmarks. Each embryo transect was marked with surveyor's flagging and photographed to assure that embryo and fry transects would be in the same immediate area.

Fourteen circular samples, each 0.186 m^2, were systematically collected along each transect. The number of samples was a compromise between reducing variance and the practicality of conducting the study. Fewer samples were completed on narrow stream channels to avoid excessive sampling of the stream. Streams that split into two or more channels within a zone were sampled either by allocating samples among channels based on spawner distribution

observed during NRDA F/S Study 1 or, where spawner distribution was unknown, by an equal allocation of samples between channels.

The following data were collected for each tide zone transect during both embryo and fry sampling:

1. The sample date.
2. The sample tide zone.
3. The start and stop time for the tide zone transect.
4. Numbers and condition (live or dead) of fry and embryos by species for each dig.
5. An estimate of the overall percent yolk sac absorption for fry in each dig.

Pink salmon embryos were separated from chum and coho (*O. kisutch*) salmon embryos by their smaller size. Chum salmon embryos were separated from coho salmon embryos by their greater development and different coloration. Pink salmon fry were differentiated from chum salmon fry by their smaller size and lack of parr marks. An embryo was considered dead if it was opaque or discolored with concentrations of lipids. Sampling often killed fry (especially newly hatched fry), so fry were only considered dead if decomposition was evident.

Data Analysis

Embryo and Preemergent Fry Densities

Densities of live embryos ($\hat{E}_{ij}$) for stream i, zone j in m^2 were estimated by:

$$\hat{E}_{ij} = \frac{\sum_{k} LE_{ijk}}{0.186 n_{ij}} \quad , \tag{1}$$

where LE_{ijk} is the number of live embryos found in dig k, stream i, zone j, and n_{ij} is the number of digs from stream i, zone j. Densities of dead embryos as well as dead and live fry were found using the same estimator with appropriate substitutions.

Fry Mortality, Embryo Mortality, and Overwinter Survival

Pink salmon fry mortalities ($\hat{M}_{(fry)ijk}$) in the spring of 1989 were estimated for each dig in each stream using the following relationship:

$$\hat{M}_{(fry)ijk} = \frac{DF_{fijk}}{LF_{fijk} + DF_{fijk}} \quad , \tag{2}$$

where DF_{fijk} and LF_{fijk} are the number of dead and live fry from dig k, stream i, zone j, collected during the preemergent fry surveys (f) during the spring of 1989.

Pink salmon embryo mortalities ($\hat{M}_{(egg)ij}$) were estimated for each stream and zone using the following relationship:

$$\hat{M}_{(egg)ij} = \frac{\sum_k (DE_{eijk} + DF_{eijk})}{\sum_k (LE_{eijk} + DE_{eijk} + LF_{eijk} + DF_{eijk})} \quad , \tag{3}$$

where DE_{eijk}, DF_{eijk}, LE_{eijk}, and LF_{eijk} are the number of dead embryos, dead fry, live embryos, and live fry from dig k, stream i, zone j, collected during the embryo survey, respectively.

Pink salmon embryo to preemergent fry survivals ($\hat{S}_{ij}$) were estimated as:

$$\hat{S}_{ij} = \frac{\dfrac{\sum_k LF_{fijk}}{n_{fij}}}{\dfrac{\sum_k (LE_{eijk} + DE_{eijk} + LF_{eijk} + DF_{eijk})}{n_{eij}}} \quad , \tag{4}$$

where LF_{fijk} is the number of live fry from dig k, stream i, zone j, collected during the fry survey, and n_{eij} and n_{fij} are the number of digs for stream i, zone j for the embryo and fry surveys.

Statistical Tests

Differences in pink salmon fry density and mortality rate between the first and second samplings during the spring of 1989 were tested for each stream using a fixed effects two-way analysis of variance. The two factors were sampling period (two levels; first and second sampling) and height in the intertidal zone (four levels; 2.1, 2.7, and 3.4 m above mean low water and upstream).

Differences in embryo mortality and overwinter survival were examined using a mixed effects, two factor experiment with repeated measures on one factor (Neter et al. 1985):

$$Y_{ijk} = \mu_{...} + O_i + Z_j + (OZ)_{ij} + S_{k(i)} + \varepsilon_{(ijk)} \quad . \tag{5}$$

The two treatments were extent of oiling, (O_i, 2 levels; fixed effect; oiled and unoiled), and height in the intertidal zone (Z_j, 4 levels; fixed effect; 2.1, 2.7, and 3.4 m above mean low water and upstream). The data were blocked by stream ($S_{k(i)}$; random effect) which was nested within extent of oiling. The extent of oiling effect was tested using the mean square error due to the stream effect while the zone and interaction were tested using the overall mean square error. The assumption of constant variance for error terms was tested using the F_{max}-test (Sokal and Rohlf 1969) while normality of error terms was visually assessed using scatter plots, box plots, and normal probability plots. Appropriate transforms were examined if the data indicated non-constant variances or non-normal error terms. Assumptions relating to a valid split-plot analysis of the repeated measures factor, zone, were also examined. Tests of homogeneity of between-treatment covariance matrices and the degree of sphericity of the pooled covariance matrix (Mauchly 1940) were performed. Four contrasts (oil vs. unoiled for the four stream zones) and corresponding Bonferroni family confidence intervals ($\alpha = 0.10$ overall) were estimated if a significant difference due to oiling was detected. The SAS (SAS Institute Inc. 1988) General Linear Models Procedure was used to analyze the data.

The statistical power of the test for oil effects was examined if no statistical difference due to oil was observed. This analysis helped to evaluate whether sufficient sampling had been performed to detect a biologically meaningful difference if one existed. Power was defined as the probability of rejecting the null hypothesis at $\alpha=0.05$ given a true difference (d) between the means for the oil contaminated ($\bar{x}_o$) and control streams ($\bar{x}_c$), an estimate of the experimental error (MSE), and the sampling levels used (n_o and n_c).

Power was estimated by;

$$P(reject H_o \mid \alpha, d, MSE, n_c, n_o) = P\left(\frac{\bar{x}_o - \bar{x}_c - d}{S} > t_{1-\frac{\alpha}{2}} - \frac{d}{S}\right) + P\left(\frac{\bar{x}_o - \bar{x}_c - d}{S} < -t_{1-\frac{\alpha}{2}} - \frac{d}{S}\right) \quad (6)$$

$$= 1 - P\left(t < t_{1-\frac{\alpha}{2}} - \frac{d}{S}\right) + 1 - P\left(t > -t_{1-\frac{\alpha}{2}} - \frac{d}{S}\right)$$

where;

$$S = \sqrt{\frac{MSE}{n_o} + \frac{MSE}{n_c}} \quad . \quad (7)$$

Stream oiling classification for the 1989, 1990, and 1991 analysis was based on visual observations of streams (NRDA F/S Studies 1 and 2) and hydrocarbon results of 1989 mussel samples (NRDA F/S Study 1). Oiling designations conflicted for two streams; Loomis Creek (#506) and Hogan Bay Creek (#681). Visual observations indicated Loomis Creek was moderately oiled while Hogan Bay Creek was lightly oiled. Hydrocarbon analysis of mussel tissues were negative for *Exxon Valdez* oil for both streams.

Sensitivity of the embryo mortality and embryo to preemergent fry survival results to how Loomis and Hogan Bay Creeks were classified was examined by varying the oiling designation for the creeks in question. Five groupings of known oiled and known control streams in the southwest corner of Prince William Sound plus Loomis and Hogan Bay Creeks were inspected;

1. Controls: 14 known unoiled streams
   Oiled: 9 known oiled streams plus Loomis and Hogan Bay Creeks

2. Controls: 14 known unoiled streams plus Hogan Bay Creek
   Oiled: 9 known oiled streams plus Loomis Creek

3. Controls: 14 known unoiled streams plus Loomis and Hogan Bay Creeks
   Oiled: 9 known oiled streams

4. Controls: 14 known unoiled streams
   Oiled: 9 known oiled streams

5. Controls: 10 known unoiled streams in close proximity to oiled streams.
   Oiled: 9 known oiled streams

Streams from Montague Island and eastern Prince William Sound were excluded from these five groupings to reduce the geographical effect on the results. A sixth grouping which included all streams in the study and treated Loomis Creek as oiled and Hogan Bay as unoiled was also examined. All six groupings were analyzed and the results compared to determine the overall robustness of the conclusions.

Assessment of Lost Adult Production

Lost production of adult pink salmon will be estimated in NRDA F/S Study 28 using information obtained from this study and NRDA F/S Studies 1, 3, 4, and 28.

Documenting Hydrocarbon Contamination

Hydrocarbon Sampling

Samples used to determine hydrocarbon levels in preemergent fry were collected from intertidal stream channels during the 1989 (14 streams), 1990 (23 streams), and 1991 (three streams) preemergent fry surveys. Fry were dislodged from the stream gravel with a clam rake and caught in a stainless steel strainer pre-rinsed with dimethylchloride. Replicate samples of fry (approximately ten grams each) were collected from each stream about 2.5 m above mean low water. Samples were collected when the tide was below the sampling area to avoid contamination by oil on the salt water surface. Captured fry were placed in glass jars topped with teflon lined lids, and then frozen. In 1989, glass jars and lids were pre-rinsed three times with dimethylchloride, dried, and kept in locked storage prior to use. In 1990 and 1991, pre-rinsed sample jars were obtained from a certified laboratory. Field blanks (jars opened at the site, closed, and frozen with the tissue samples) were collected at about every third stream. Chain of custody procedures were followed for all samples.

Mussels (*Mytilus sp.*) were collected near the mouth of most streams in the study by NRDA F/S Study 1 in both 1989 and 1990. Analysis of these mussel samples for hydrocarbons were used to verify oil impact. Mussels were not collected at some streams which were obviously contaminated by oil.

Mixed-Function Oxidase Sampling

Embryo Sampling. Live and dead pink salmon embryos were collected for mixed-function oxidase (MFO) from 31 streams during the fall embryo surveys of 1990 and 1991. Samples were collected, whenever possible, from all four tide zones of each stream. Live pink salmon embryos were separated from dead embryos for all digs of a transect and randomly selected. Whenever possible, two samples of at least 50 live embryos and one sample of at least 50 dead embryos were collected and placed in eight oz. jars containing a phosphate buffered, 10% formalin solution. Labels on each jar had the following information: sample

number, stream number, stream name, stream location, latitude, longitude, tide zone, type of sample, collector, and sample date.

Preemergent Fry Sampling. Live pink salmon fry were collected for mixed-function oxidase from 35 streams in 1990 and 31 streams in 1991 and 1992. Whenever possible, two samples of at least 20 fry were collected from each of the four tide zones within each stream. Live fry were retained from all the digs of a transect and randomly selected. Fry were placed in glass jars containing a phosphate buffered, 10% formalin solution. Labels on each jar had the following information: sample number, stream number, stream name, stream location, latitude, longitude, tide zone, type of sample, collector, and sample date.

Histopathology Sampling

Preemergent fry were collected from the intertidal channels of 22 streams during the spring of 1989 to assess possible damage from oil exposure. Captured fry were placed in glass jars containing Bouin's solution, topped with teflon lined lids, and frozen. Live pink salmon fry were collected for histopathological sampling from 35 streams in 1990 and 31 streams in 1991 and 1992. Whenever possible, two samples of at least 20 fry were collected from each of the four tide zones within each stream. Live fry were retained from all the digs of a transect and randomly selected. Fry were placed in glass jars containing a phosphate buffered, 10% formalin solution. Labels on each jar had the following information: sample number, stream number, stream name, stream location, latitude, longitude, tide zone, type of sample, collector, and sample date.

A nested loglinear analysis was used to discern oiling effects for mixed-function oxidase and histopathological data. The statistical software package GLIM (Numerical Algorithms Group 1987) was used to fit the models.

RESULTS

Historic Data

Initial examination of the historic pink salmon embryo and preemergent fry data indicated that very few streams in southwestern Prince William Sound were sampled prior to the spill (Tables 1 and 2). Preemergent pink salmon fry have been sampled annually since 1961 while the pre-spill data for pink salmon embryo sampling extended from 1964-1977. However, pink salmon numbers in Prince William Sound, during this time were at their lowest recorded levels.

Table 1. Frequency of sampling for pink salmon embryos in Prince William Sound, Alaska, since 1961. An "x" indicates sampling occurred.

Stream	Obs.	Pre - Spill Years																			Post - Spill Years		
Number	Oiling	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	89	90	91
11	N					x				x		x	x	x										
35	N				x	x	x		x		x		x	x	x		x	x				x	x	x
36	N				x																			
52	N					x	x	x	x	x	x	x	x	x	x		x	x						
99	N								x	x	x	x												
117	N				x	x	x	x	x	x	x	x	x	x	x		x	x						
123	N											x												
133	N												x	x	x		x	x						
221	N												x	x	x									
241	N								x	x	x	x	x	x	x		x							
264	N																	x						
276	N												x	x	x		x	x						
322	N					x		x		x		x		x										
428	N				x																			
430	N						x	x	x	x	x	x	x	x	x		x	x						
479	N				x																			
480	N				x	x	x	x	x	x	x	x	x	x	x		x	x				x	x	x
485	N																					x	x	x
498	N																					x	x	x
506	Y																					x	x	x
508	N								x	x	x	x												
604	N				x			x	x	x	x	x	x	x	x		x	x				x	x	x
618	Y																					x	x	x
621	N																					x	x	x
623	N																					x	x	x
628	Y																					x	x	x
630	N																					x	x	x
632	N																					x	x	x
637	Y																					x	x	x
653	N																					x	x	x
656	N																					x	x	x
663	Y																					x	x	x
665	Y				x																	x	x	x
666	N																					x	x	x
673	N				x		x	x					x	x	x			x				x	x	x
677	Y																					x	x	x
678	Y																					x	x	x
681	Y																					x	x	x
682	Y																					x	x	x
692	Y																					x	x	x
695	N																					x	x	x
699	N																					x	x	x
707	N				x																			
740	N																					x	x	x
741	N						x	x				x												
744	N					x	x	x	x	x	x	x	x	x				x				x	x	x
745	N							x		x		x	x	x										
747	N																					x	x	x
749	N					x	x	x	x	x	x	x												
775	N							x	x		x		x	x				x						
812	N									x	x	x												
815	N				x		x	x	x	x	x	x	x	x	x		x	x						
828	N					x							x	x	x			x				x	x	x
847	N								x	x	x	x												
850	N				x	x	x	x	x	x	x	x	x	x	x			x						
861	N					x	x	x	x	x	x	x	x	x	x		x	x				x	x	x
Total		0	0	0	12	11	12	15	16	18	17	20	19	20	15	0	11	16	0	0	0	31	31	31

Table 2. Frequency of sampling for pink salmon preemergent fry in Prince William Sound, Alaska, since 1961. An "x" indicates sampling occurred.

Stream	Obs.	Pre - Spill Years																											Post - Spill Years			
Number	Oiling	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89(1)	89(2)	90	91
11	N	x	x	x		x	x		x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x
35	N	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x
52	N	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x
80	N	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x		x	x
89	N																															x	x
117	N	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x		x	x
123	N		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x		x	x
153	N		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x
265	N										x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x
276	N					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x
322	N		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x		x	x
421	N						x		x				x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x
430	N		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x
455	N	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
480	N			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
485	N																														x	x	x
498	N																															x	x
506	Y																														x	x	x
604	N	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
618	Y																														x	x	x
621	N			x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x								x	x	x	x
623	N																															x	x
628	Y			x																											x	x	x
630	N			x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x									x	x	x
632	N			x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
637	Y																														x	x	x
653	N																														x	x	x
656	N																															x	x
663	Y																														x	x	x
665	Y																															x	x
666	N	x	x	x	x		x	x																								x	x
673	N	x	x			x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x
677	Y			x		x		x		x		x	x	x	x	x	x	x	x	x	x	x								x	x	x	x
678	Y																															x	x
681	Y																													x	x	x	x
682	Y																													x	x	x	x
692	Y																													x	x	x	x
695	N																														x	x	x
699	N																														x	x	x
740	N																														x	x	x

Table 2. (Continued).

Stream Number	Obs. Oiling	Pre - Spill Years																											Post - Spill Years			
		61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89(1)	89(2)	90	91
744	N		x	x	x		x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x		x	x	x		x	x
747	N	x									x	x	x	x	x	x	x	x	x	x	x	x								x		x	x
749	N		x	x		x	x	x	x	x	x	x	x	x			x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
775	N					x	x	x	x	x	x	x	x	x	x		x		x		x	x	x	x	x	x	x	x	x	x		x	x
815	N	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x
828	N			x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
850	N			x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x
861	N	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Total		12	16	23	16	24	25	25	25	25	26	27	28	27	27	25	28	24	25	27	28	28	24	24	24	24	21	24	24	30	26	48	48

Only 4 of the 25 streams in southwestern Prince William Sound which were examined post-spill had a history of embryo sampling. One of these streams was oiled; although, this stream was only sampled in 1964, the year of the Alaskan Earthquake. A visual contrast between pre- (1969-1976) and post-spill mortalities was made for the remaining three control streams. Nine of the 36 observations made in 1989, 1990, and 1991 were outside the range of historic data collected during the late 1960's to mid-1970's (five with greater mortality and four with lower mortality; Figure 3).

Historic pink salmon embryo densities and the corresponding preemergent fry densities collected the next spring, were compared for the three streams in the spill area, for all three intertidal zones (Figures 4, 5, and 6). In all cases except one (stream 673, the 1.8-2.4 m zone), the historic embryo densities were greater than those estimated in 1989, 1990, or 1991. Historic preemergent fry densities were also greater in all cases except one (stream 673, the 1.8-2.4 m zone). In 14 of the 57 historic data pairs, the preemergent fry density was greater than the embryo density. Three of the 27 data pairs collected in 1989, 1990, and 1991 had larger preemergent fry densities.

Embryo and Preemergent Fry Densities

Embryo and preemergent fry densities were summarized for the 1989, 1990, and 1991 embryo surveys and the 1989, 1990, 1991, and 1992 fry surveys in Appendices A.1, A.2, A.3, B.1, B.2, B.3, B.4, and B.5.

1989 Preemergent Studies

Few dead pink salmon fry were found during the 1989 preemergent fry samplings. Only 9 of the 52 transects examined yielded more than five dead fry. The second sampling occurred on average 16 days after the first sampling (range of 14-18 days). No increase in fry mortality was detected between the first and second samplings for any of the streams examined; although, only 3 of the 14 streams examined were observed to be oiled (Table 3). No decrease in fry density was detected between the first and second samplings.

Embryo Mortality

Significant differences in embryo mortality between oiled and control streams were found for all six stream groupings in 1989 (Table 4). Significant differences were also detected in groupings one through five for 1990 and 1991 (Tables 5 and 6). No significant interactions were detected.

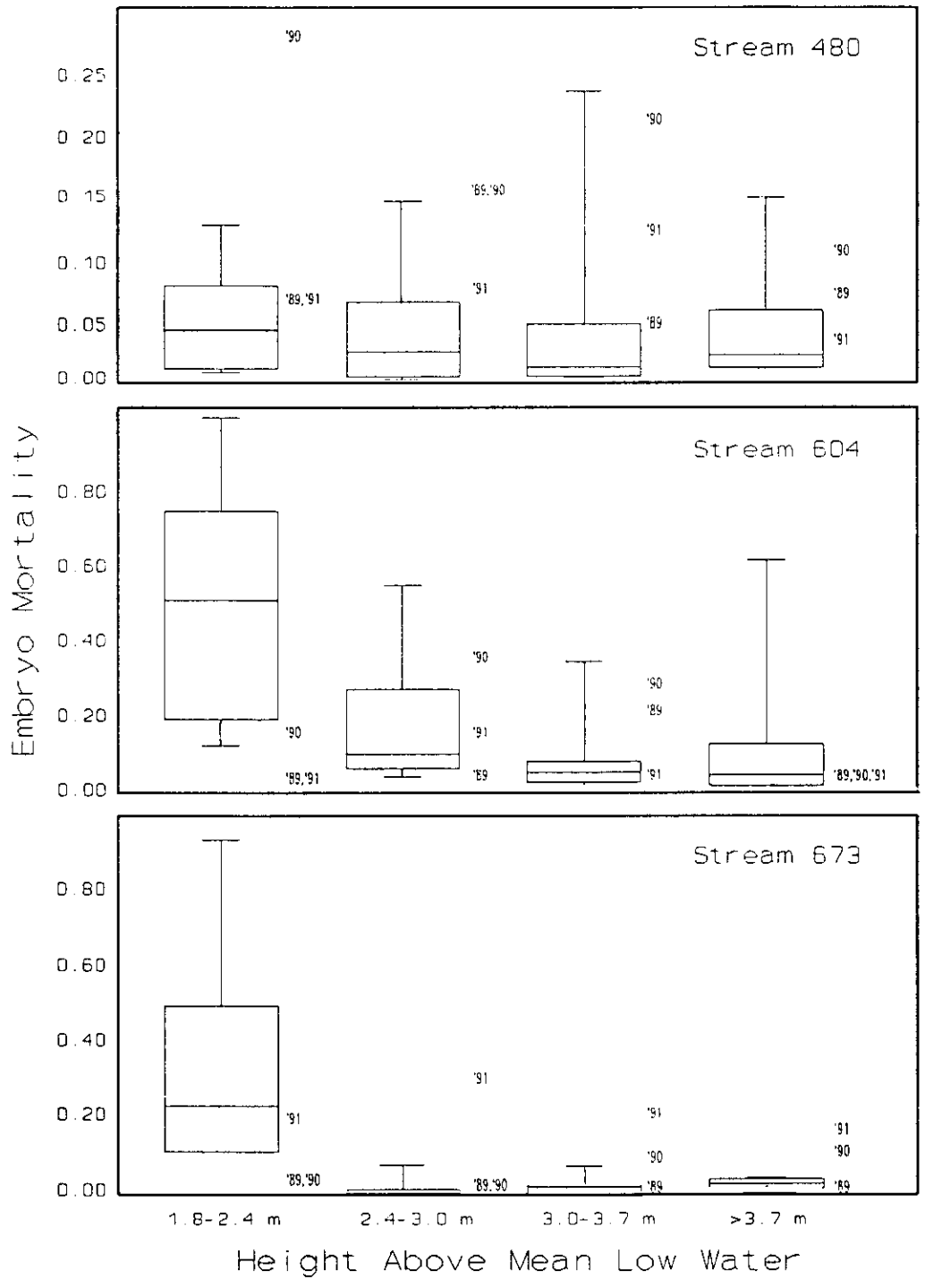

Figure 3. Comparison of historic (1969-76) embryo mortality data (box-plots) to data collected in 1989, 1990, and 1991, (located to the right of the box plots) for the three streams in southwestern Prince William Sound sampled prior to the spill.

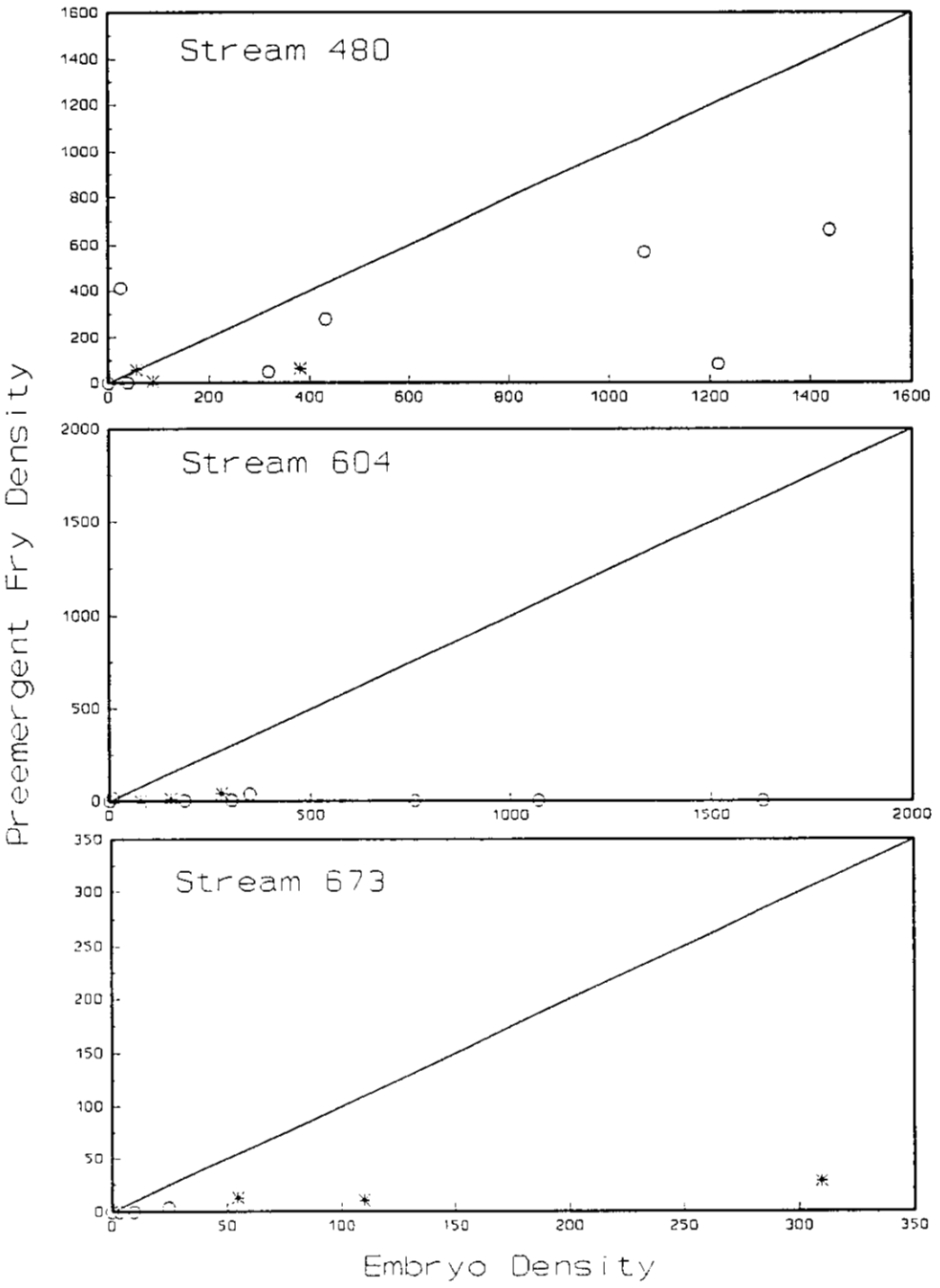

Figure 4. Pink Salmon preemergent fry and embryo densities for the 1.8-2.4 m intertidal zone for southwestern Prince William Sound streams with historical sampling. Open circles represent historical data while * indicates data collected by this study.

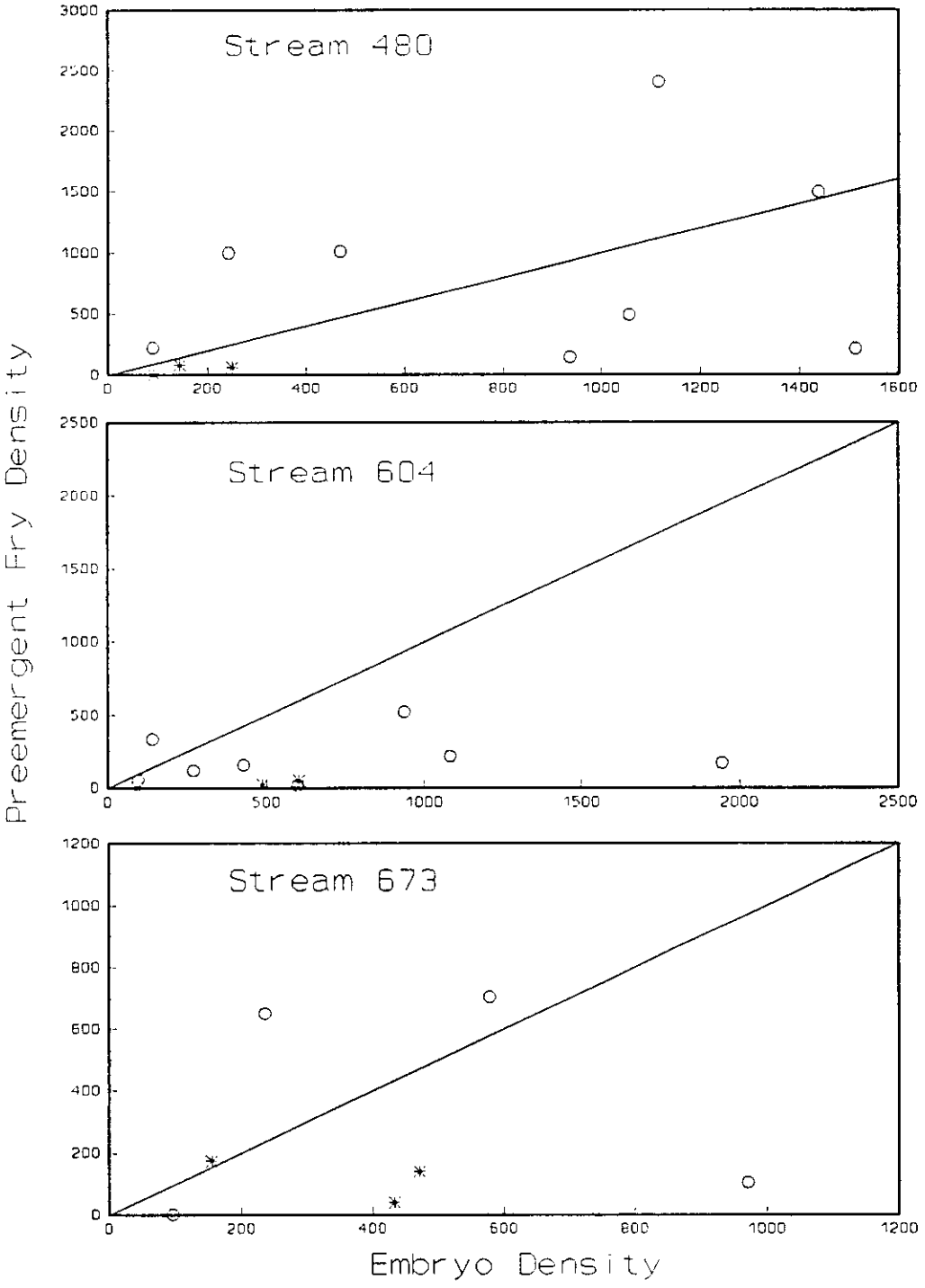

Figure 5. Pink Salmon preemergent fry and embryo densities for the 2.4-3.0 m intertidal zone for southwestern Prince William Sound streams with historical sampling. Open circles represent historical data while * indicates data collected by this study.

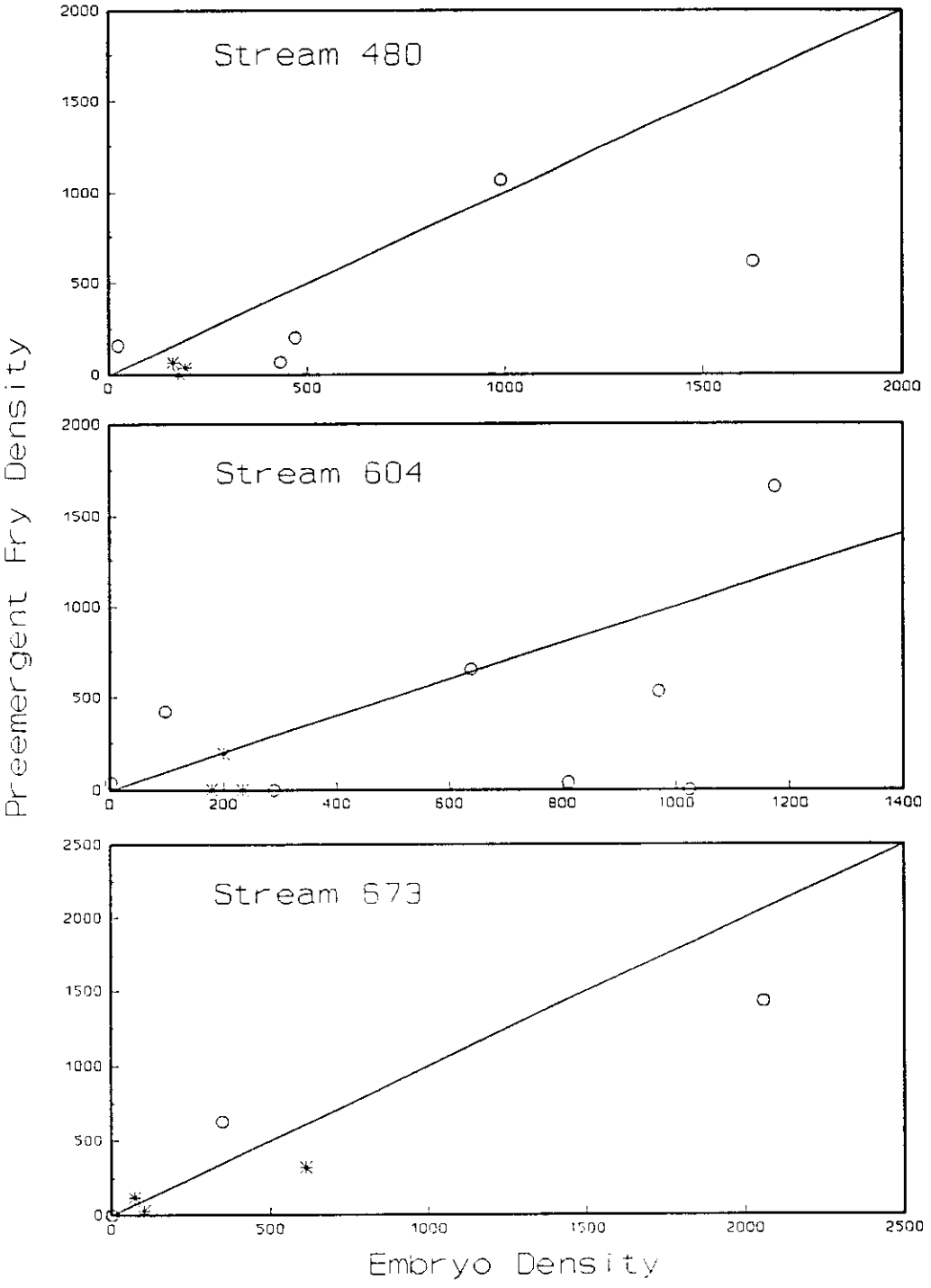

Figure 6. Pink Salmon preemergent fry and embryo densities for the 3.0-3.7 m intertidal zone for southwestern Prince William Sound streams with historical sampling. Open circles represent historical data while * indicates data collected by this study.

Table 3. Results of the repeated pink salmon preemergent fry digs during the spring of 1989, Prince William Sound, Alaska.

Stream		Obs.[a]	Date of Sample		Probability of a More Extreme Result (p value)					
					Live Fry Density			Fry Mortality		
No.	Name	Oiling	First	Second	Samp[b]	Zone[c]	Int[d]	Samp[e]	Zone[e]	Int[d]
35	Koppen	N	4/ 8	4/24	0.33	0.00[f]	0.98	0.70	0.26	0.98
455	Paulson	N	3/30	4/14	0.73	0.01[f]	0.78	[g]	[g]	[g]
480	Mink	N	3/30	4/15	0.00[fh]	0.00[f]	0.00[f]	0.39	0.01[f]	0.32
604	Erb	N	3/31	4/16	0.66	0.00[f]	0.33	0.30	0.13	0.11
621	Totemoff	N	3/31	4/16	0.97	0.00[f]	0.51	0.14	0.41	0.61
632	Claw	N	4/ 1	4/17	0.36	0.00[f]	0.34	0.14	0.41	0.39
673	Falls	N	4/ 1	4/18	0.79	0.00[f]	0.78	0.28	0.41	0.38
677	Hayden	Y	4/ 1	4/18	0.32	0.30	0.81	0.12	0.13	0.13
681	Hogan	N	4/ 4	4/21	0.36	0.16	0.81	0.31	0.29	0.29
682	Snug	Y	4/ 3	4/21	0.87	0.00[f]	0.31	0.78	0.01[f]	1.00
692	Herring	Y	4/ 3	4/19	0.73	0.46	0.33	0.80	0.62	0.92
749	Shad	N	4/ 5	4/22	0.48	0.26	0.06	[g]	[g]	[g]
828	Cook	N	4/ 6	4/23	0.84	0.05[f]	0.20	0.21	0.32	0.32
861	Bernard	N	4/ 9	4/23	0.15	0.00[f]	0.46	0.55	0.99	0.60

[a] Visual observations from NRDA F/S Studies 1 and 2.
[b] H_0: No change in fry density between the first and second Sample.
[c] H_0: No difference between stream Zones.
[d] H_0: No Sample by stream Zone interaction.
[e] H_0: No change in the percent dead fry between the first and second Sample.
[f] Statistically significant at $\alpha = 0.05$.
[g] Low sample size due to missing cells.
[h] Statistically different but more fry present in second sample than in first.

The results for all three years indicate there was an effect on embryo mortality due to oiling and that the conclusions were robust with respect to the oiling designation used for Loomis and Hogan Bay Creeks as well which streams were included in the analysis (Tables 4, 5, and 6). It was thought prior to the analysis that grouping two, where Loomis Creek was categorized oiled and Hogan Bay Creek was treated as control, most likely reflected the true designations.

The 1989 analysis for group two indicated a statistically significant difference in embryo mortality ($p=0.004$) between oiled and control streams (Figure 7). No significant zone effect ($p=0.499$) or oil by zone interaction ($p=0.863$) was evident. Examination of estimated contrasts indicated the differences in mortality were in the lower intertidal zones. The overall mean embryo mortalities for the oiled and control streams were 0.174 and 0.104.

The 1990 embryo mortality data for group two also showed a statistically significant difference ($p=0.023$) between oiled and control streams (Figure 8). No significant zone effect or oil by zone interaction ($p=0.595$ and $p=0.159$) was observed. Estimated contrasts indicated the differences due to oiling were in the upper intertidal zone or "bathtub ring". The overall mean embryo mortalities for the oiled and control streams were 0.295 and 0.195.

The 1991 embryo mortality data for group two indicated very significant differences between the oiled and control streams ($p=0.003$) (Figure 9). A significant zone effect ($p=0.011$) was evident; although, no oil by zone interaction was found ($p=0.816$). Estimated contrasts indicated differences due to oiling in all three intertidal zones as well as the upstream zone. The overall mean embryo mortalities for the oiled and control streams were 0.433 and 0.221.

Heteroscedastic variances were detected in the 1989, 1990, and 1991 embryo mortality data. A number of transformations (weighted mortality, logit, weighted logit, arcsin square root, and weighted arcsin square root) were examined and the resulting residuals (ϵ) visually evaluated for their performance in meeting the analysis of variance assumptions (Appendix C). The logit transform was selected and used to stabilize the variance for all three years of embryo mortality data.

Overwinter Survival

Embryo to preemergent fry survival data were edited prior to analysis to remove values greater than 2.0, i.e., overwinter survivals greater than 200%. Only one data point in the 1990 to 1991 embryo to fry survival was removed (9200% survival).

Table 4. Results of the 1989 embryo mortality and the 1989 to 1990 embryo to preemergent fry study, Prince William Sound, Alaska.

			Probability of a More Extreme Result (p value)					
	No. of Streams		Embryo Mortality			Embryo to Fry		
Group	Control	Oiled	Oil[a]	Zone[b]	Int[c]	Oil[d]	Zone[b]	Int[c]
1	14	11	.006[e]	.470	.834	.512	.179	.706
2	15	10	.004[e]	.499	.863	.820	.155	.594
3	16	9	.033[e]	.542	.836	.940	.134	.483
4	14	9	.011[e]	.617	.853	.826	.141	.583
5	10	9	.028[e]	.637	.835	.346	.178	.590
6	21	10	.016[e]	.681	.859	.827	.046[e]	.501

Group 1: 14 known control streams; 9 known oiled streams plus Loomis and Hogan Bay Creeks.
Group 2: 14 known control streams plus Hogan Bay Creek; 9 known oiled streams plus Loomis Creek.
Group 3: 14 known control streams plus Loomis and Hogan Bay Creeks; 9 known oiled streams.
Group 4: 14 known control streams; 9 known oiled streams.
Group 5: 10 known control streams in close proximity to the oiled streams; 9 known oiled streams.
Group 6: 20 known control streams plus Hogan Bay Creek; 9 known oiled streams plus Loomis Creek.

[a] H_0: No difference in embryo mortality between control and oiled streams (mortalities were logit transformed).

$$F^* = \frac{MSOil}{MSStream(Oil)}$$

[b] H_0: No difference between stream Zones.

[c] H_0: No Oil by stream Zone interaction.

[d] H_0: No difference in embryo to preemergent survival between control and oiled streams.

$$F^* = \frac{MSOil}{MSStream(Oil)}$$

[e] Statistically significant at $\alpha = 0.05$.

Table 5. Results of the 1990 embryo mortality and the 1990 to 1991 embryo to preemergent fry study, Prince William Sound, Alaska.

			Probability of a More Extreme Result (p value)					
	No. of Streams		Embryo Mortality			Embryo to Fry		
Group	Control	Oiled	Oil[a]	Zone[b]	Int[c]	Oil[d]	Zone[b]	Int[c]
1	14	11	.016[e]	.653	.174	.408	.102	.071
2	15	10	.023[e]	.595	.159	.713	.147	.113
3	16	9	.151	.589	.344	.963	.203	.152
4	14	9	.049[e]	.645	.250	.711	.163	.115
5	10	9	.031[e]	.845	.181	.457	.106	.080
6	21	10	.252	.262	.070	.577	.517	.228

Group 1: 14 known control streams; 9 known oiled streams plus Loomis and Hogan Bay Creeks.
Group 2: 14 known control streams plus Hogan Bay Creek; 9 known oiled streams plus Loomis Creek.
Group 3: 14 known control streams plus Loomis and Hogan Bay Creeks; 9 known oiled streams.
Group 4: 14 known control streams; 9 known oiled streams.
Group 5: 10 known control streams in close proximity to the oiled streams; 9 known oiled streams.
Group 6: 20 known control streams plus Hogan Bay Creek; 9 known oiled streams plus Loomis Creek.

[a] H_0: No difference in embryo mortality between control and oiled streams (mortalities were logit transformed).

$$F^* = \frac{MSOil}{MSStream(Oil)}$$

[b] H_0: No difference between stream Zones.

[c] H_0: No Oil by stream Zone interaction.

[d] H_0: No difference in embryo to preemergent survival between control and oiled streams.

$$F^* = \frac{MSOil}{MSStream(Oil)}$$

[e] Statistically significant at $\alpha = 0.05$.

Table 6. Results of the 1991 embryo mortality and the 1991 to 1992 embryo to preemergent fry study, Prince William Sound, Alaska.

			Probability of a More Extreme Result (p value)					
	No. of Streams		Embryo Mortality			Embryo to Fry		
Group	Control	Oiled	Oil[a]	Zone[b]	Int[c]	Oil[d]	Zone[b]	Int[c]
1	14	11	.001[e]	.011[e]	.894	.920	.007[e]	.762
2	15	10	.003[e]	.011[e]	.816	.983	.004[e]	.596
3	16	9	.005[e]	.015[e]	.968	.907	.004[e]	.729
4	14	9	.002[e]	.020[e]	.946	.977	.000[e]	.826
5	10	9	.013[e]	.012[e]	.957	.810	.001[e]	.689
6	21	10	.118	.000[e]	.361	.626	.001[e]	.575

Group 1: 14 known control streams; 9 known oiled streams plus Loomis and Hogan Bay Creeks.

Group 2: 14 known control streams plus Hogan Bay Creek; 9 known oiled streams plus Loomis Creek.

Group 3: 14 known control streams plus Loomis and Hogan Bay Creeks; 9 known oiled streams.

Group 4: 14 known control streams; 9 known oiled streams.

Group 5: 10 known control streams in close proximity to the oiled streams; 9 known oiled streams.

Group 6: 20 known control streams plus Hogan Bay Creek; 9 known oiled streams plus Loomis Creek.

[a] H_0: No difference in embryo mortality between control and oiled streams (mortalities were logit transformed).

$$F^* = \frac{MSOil}{MSStream(Oil)}$$

[b] H_0: No difference between stream Zones.

[c] H_0: No Oil by stream Zone interaction.

[d] H_0: No difference in embryo to preemergent survival between control and oiled streams.

$$F^* = \frac{MSOil}{MSStream(Oil)}$$

[e] Statistically significant at $\alpha = 0.05$.

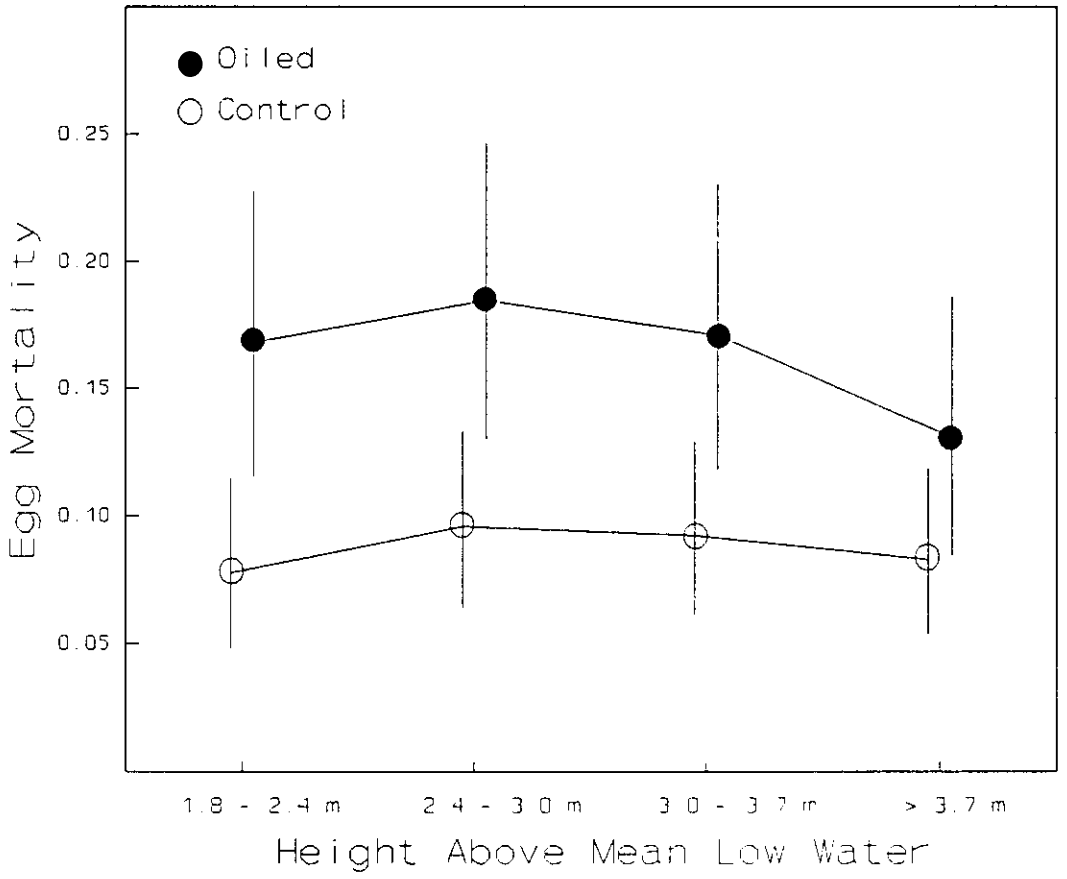

Figure 7. Mean mortalities of pink salmon embryos by tide zone for oiled and control (unoiled) streams in Prince William Sound, 1989. Factor means and 90% confidence bounds are presented.

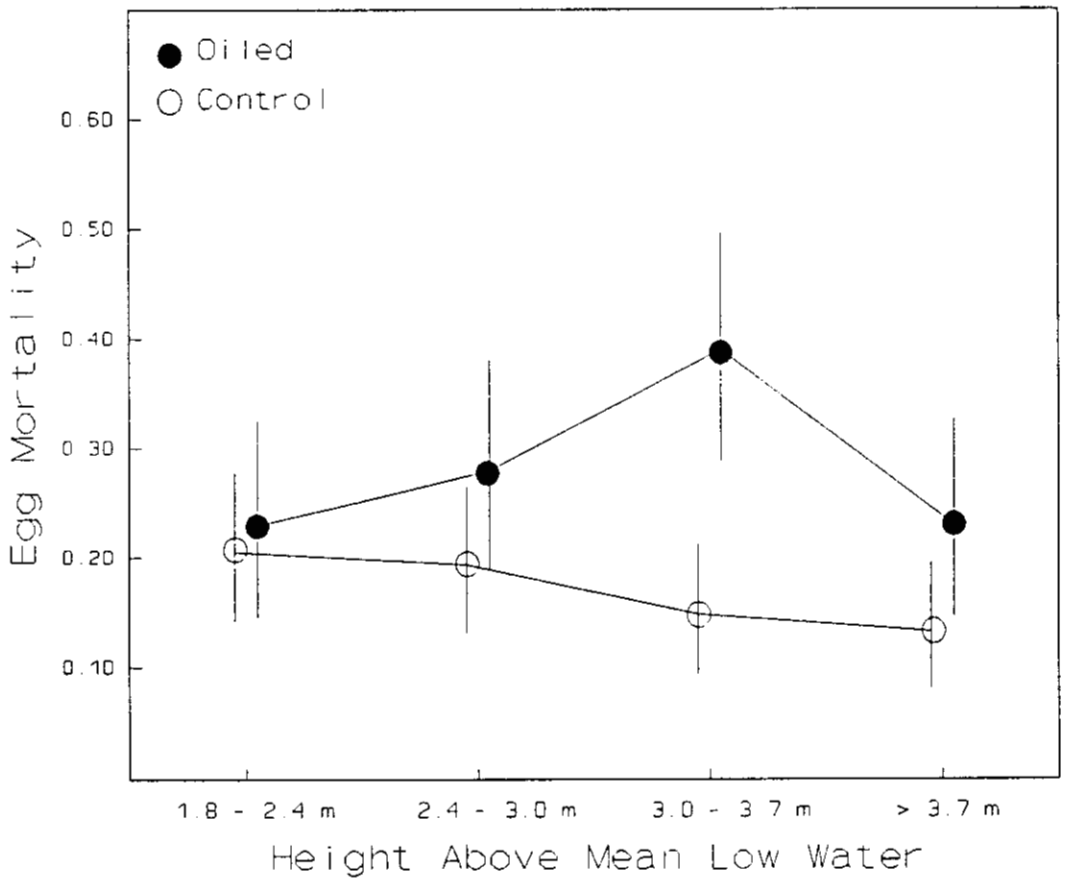

Figure 8. Mean mortalities of pink salmon embryos by tide zone for oiled and control (unoiled) streams in Prince William Sound, 1990. Factor means and 90% confidence bounds are presented.

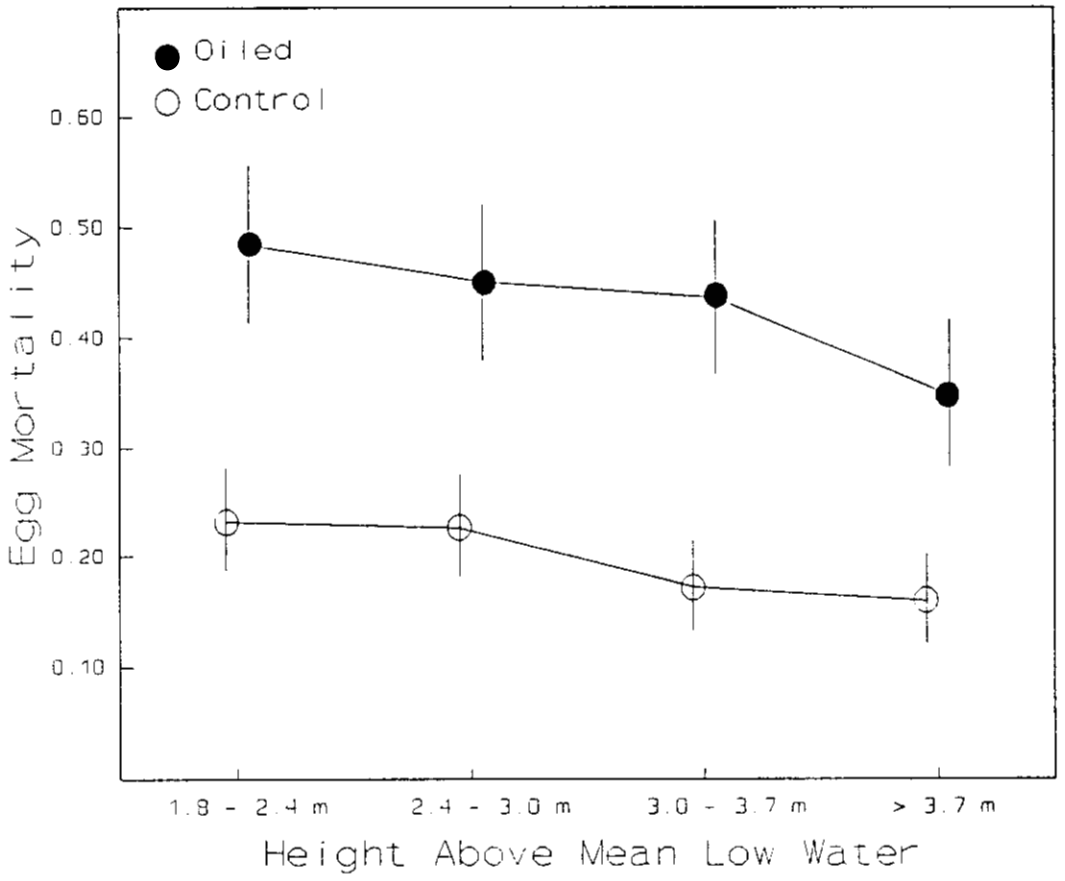

Figure 9. Mean mortalities of pink salmon embryos by tide zone for oiled and control (unoiled) streams in Prince William Sound, 1991. Factor means and 90% confidence bounds are presented.

No differences in conclusions were indicated by the six stream groupings; consequently, the analysis appears to be robust with regards to oiling designation for Loomis and Hogan Bay Creeks as well as which streams were included in the study (Tables 4, 5, and 6).

The 1989 to 1990 embryo to preemergent fry survival data for group two indicated no significant effects of oil ($p=0.820$) (Figure 10). No significant zone or oil by zone interaction was detected ($p=0.155$ and $p=0.594$). Similar results were obtained for the 1990 to 1991 embryo to fry survival data (Figure 11). No significant oil, zone, or oil by zone effect was found ($p=0.713$, $p=0.147$, and $p=0.112$, respectively). The 1991 to 1992 embryo to fry survival information again indicated no oil or oil by zone interaction ($p=0.983$ and $p=0.596$; Figure 12); although, there was evidence for a zone effect ($p=0.004$).

Statistical power was estimated for the group two comparisons for all three years of embryo to preemergent fry data. The test for differences in embryo to preemergent fry survival between oil contaminated and control streams for the 1990 to 1991 season was more powerful than for the other two years (Figure 13). The test for 1990 to 1991 survival should have detected a difference of ± 0.15 with a probability of 0.90, while the 1989-1990 and the 1991-1992 tests were able to detect a difference of ± 0.20 with the same probability.

Documentation of Hydrocarbon Contamination

Hydrocarbon Results

Analysis for hydrocarbons in mussels collected in 1989 by NRDA F/S Study 1 verified visual oiling classifications in 25 of the 27 streams where comparable data were collected (Table 7). Photographs and ground observations of oiling were used to classify Loomis and Hogan Bay Creeks, the two streams where visual and hydrocarbon data differed. Analysis of the 1990 mussel samples showed positive contamination in two and possible contamination in 3 of the 10 streams where oil was visually evident in 1989 (Table 7).

No hydrocarbon contamination was detected in the analyzed 1989 preemergent fry samples (Table 7); although, samples from only one oiled stream were examined. Hydrocarbon analysis of the 1990 preemergent fry samples also failed to detect contamination by *Exxon Valdez* oil. The 1990 samples were obtained from 18 streams, 8 of which were oiled. No results are available for the 1991 samples.

All hydrocarbon analysis results were interpreted by Dr. Carol Ann Manen, National Oceanic and Atmospheric Administration, Auke Bay Laboratory, Juneau, Alaska.

Mixed-Function Oxidase Results

Fry were collected from 31 streams in 1990, 1991, and 1992 for evaluation of mixed-function oxidase activity but only fry from nine streams collected in 1990 were analyzed (Table 7).

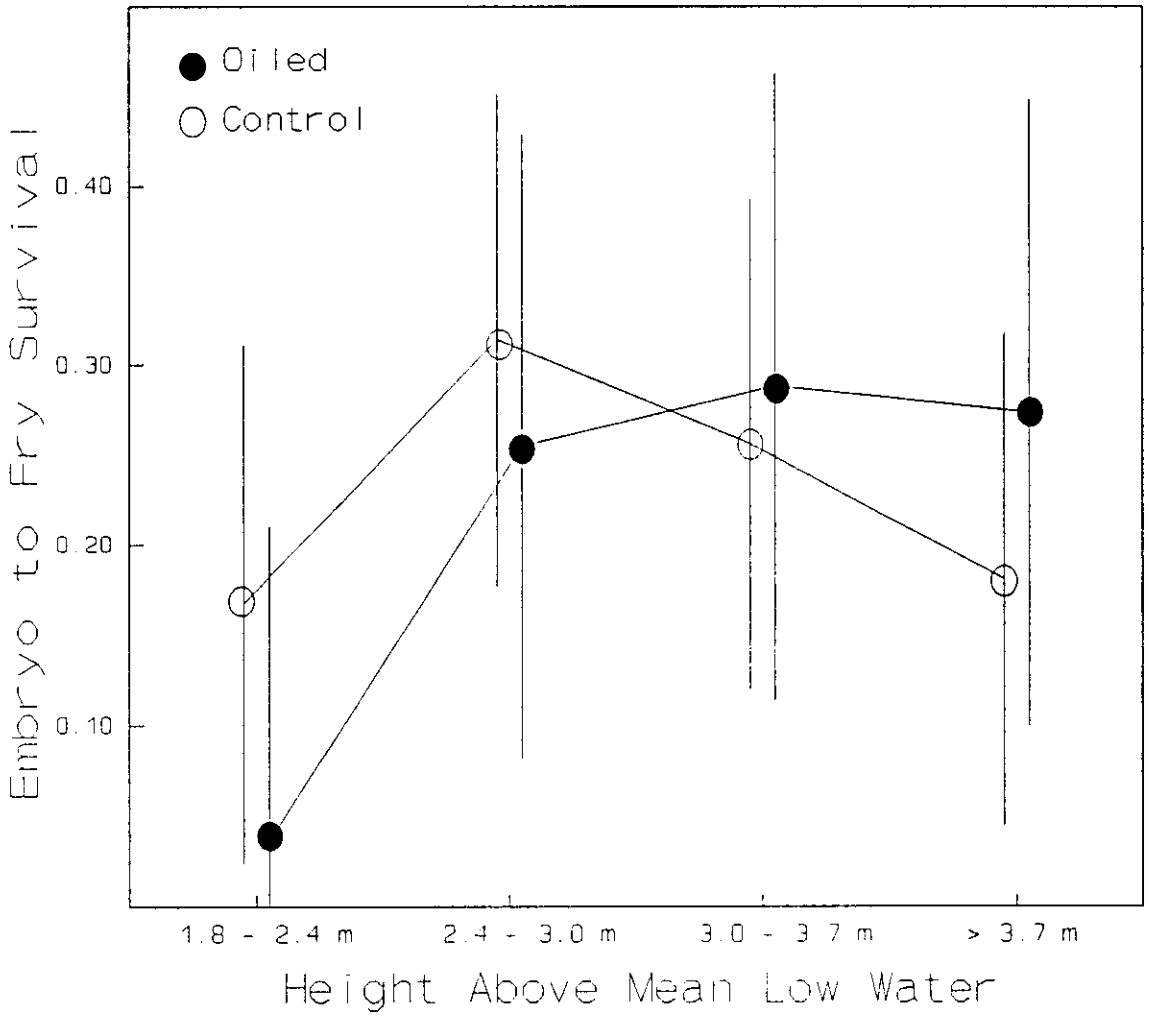

Figure 10. Mean pink salmon embryo to preemergent fry survival for oiled and control (unoiled) streams in Prince William Sound for the 1989 brood year. Factor means and 90% confidence bounds are presented.

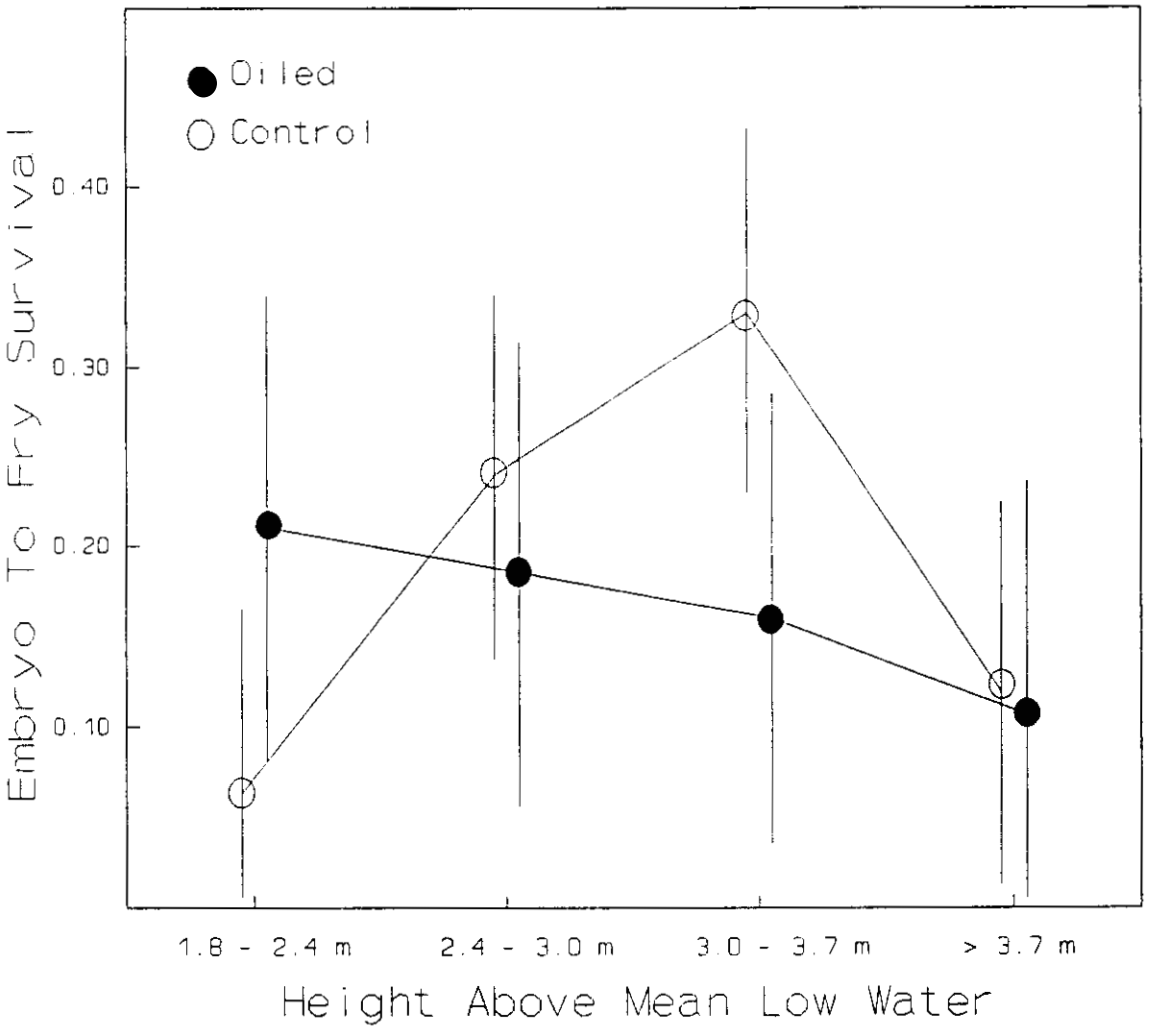

Figure 11. Mean pink salmon embryo to preemergent fry survival for oiled and control (unoiled) streams in Prince William Sound for the 1990 brood year. Factor means and 90% confidence bounds are presented.

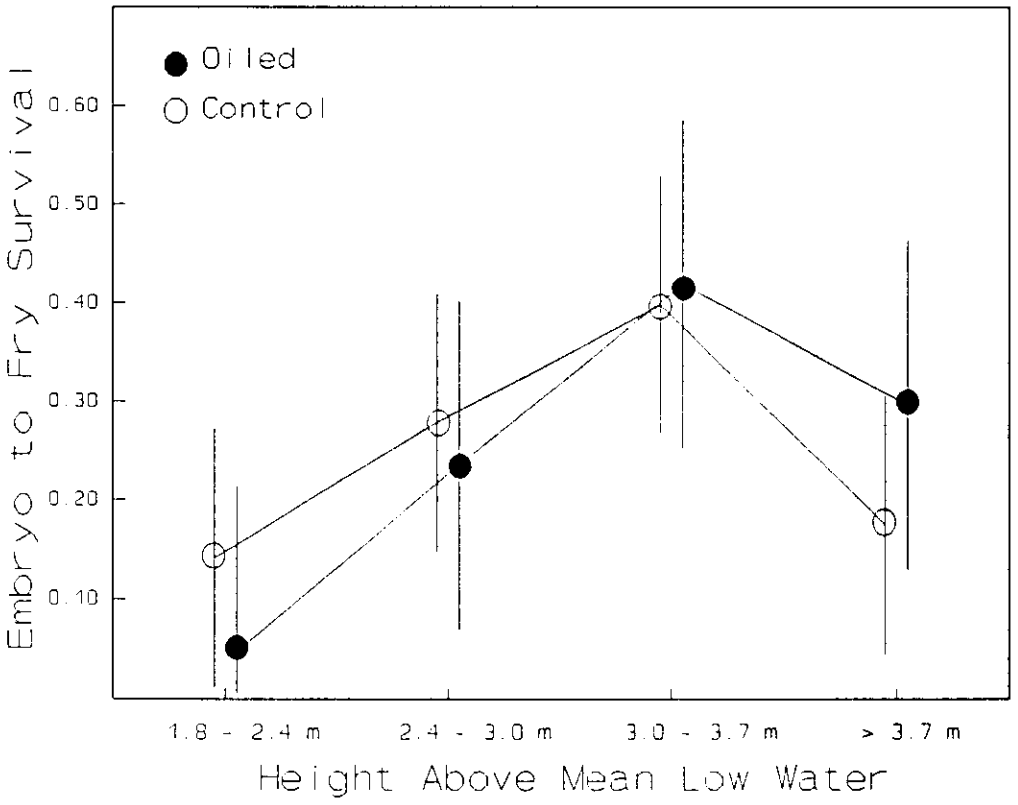

Figure 12. Mean pink salmon embryo to preemergent fry survival for oiled and control (unoiled) streams in Prince William Sound for the 1991 brood year. Factor means and 90% confidence bounds are presented.

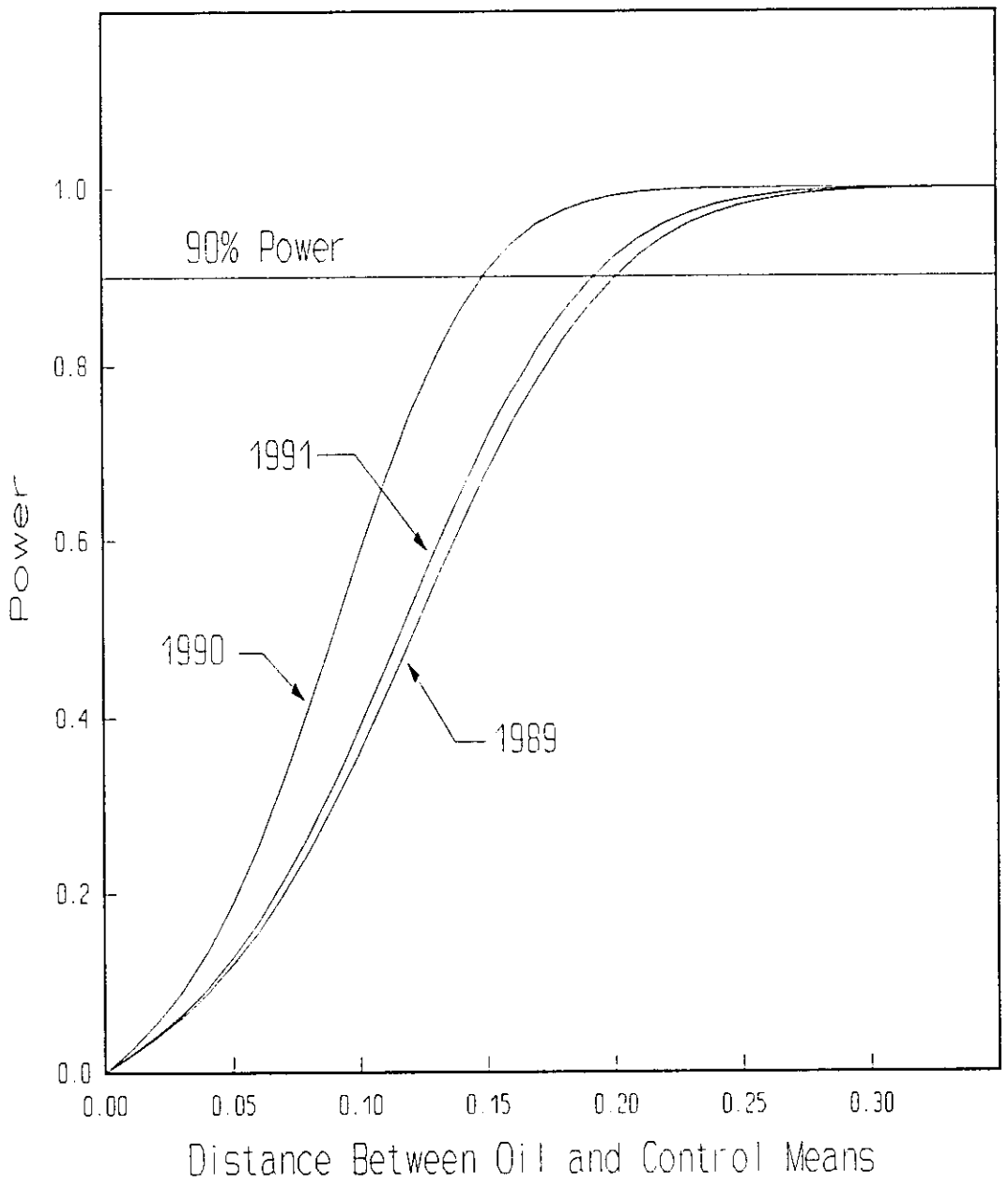

Figure 13. Estimated statistical power for the 1989-1990, 1990-1991, and 1991-1992 pink salmon overwinter survival studies.

The fry from 1990 were analyzed in two groups. The first was examined during May of 1990. These fish were transferred to Habitat Division of Alaska Department of Fish and Game for use in evaluating oil spill response. Six fry each from the 2.3-3.0 m intertidal zone from Point Countess, Hogg, Sleepy, Snug Harbor, and Herring Bay Creeks were examined. The second group was examined during the winter of 1991-1992. Six fry each from the 3.0-3.7 m intertidal zone from Loomis, Point Countess, Halverson, Snug Harbor, Herring Bay, Port Audrey, and Cathead Creeks were examined.

Results from three of the five streams examined in the first group agreed with other data collected to document hydrocarbon contamination. Herring Bay Creek, one of the streams most heavily oiled showed no response for mixed-function oxidase activity while Hogg Creek which showed no indication of oiling had a very strong response. We believe the sample labels were switched for these two streams. In the second group, only two fry, one from Loomis Creek and one from Point Countess Creek showed a response for mixed-function oxidase activity. Two heavily oiled streams, Snug Harbor and Herring Bay, were negative for mixed-function oxidase activity.

All mixed-function oxidase analyses were contracted to the Woods Hole Oceanographic Institution, Woods Hole, Massachusetts, USA, Dr. John Stegeman and Dr. Roxanna Smolowitz (Appendix D).

Histopathological Results

Pink salmon fry collected from Bainbridge, Audrey, Shelter, and Sleepy Creeks (two oiled and two unoiled) during the spring of 1989 and preserved in Bouin's solution for approximately 2.5 years were examined for histopathological abnormalities during the spring of 1992. Thirty two fry were examined from each stream. All fry were scored for the amount of hepatocellular glycogen, yolk sac presence and level of occurrence of five major lesions (epidermal atrophy, myofiber degeneration and necrosis, individual hepatocellular degeneration and necrosis, vacuolar degeneration of gastric glands, and epidermal cell necrosis and/or inflammation). Nearly all fry had yolk sacs (yolk sacs were absent in only 2 out of the 128 fry examined). No lesions were detected although collection trauma occurred more frequently ($p=0.023$) in fry from the oiled streams.

The same fry collected in 1990 and examined for mixed-function oxidase activity were examined for histopathological abnormalities. These fish were again examined in two groups. Each fry was scored for the amount of hepatocellular glycogen and level of occurrence of four major lesions (epidermal atrophy, myofiber degeneration and necrosis, individual hepatocellular degeneration and necrosis, and vacuolar degeneration of gastric glands). The second group of fry was also scored for epidermal cell necrosis and/or inflammation. No lesions were detected in either group that could be clearly related to oil exposure.

All histopathological analyses were contracted to the University of California, Davis, Davis, California, USA, Dr. David Hinton and Dr. Gary Marty (Appendix E).

Table 7. Samples collected from 31 Prince William Sound streams to document hydrocarbon contamination and results of analysis to date.

Stream		Obs.[d]	Hydrocarbon Samples [a,b,c]					Mixed Function Oxidase [b,c]					
			Mussels		Preemergent Fry			Preemergent Fry Survey				Embryo Survey	
No.	Name	Oiling	1989	1990	1989	1990	1991	1990[e]	1990[f]	1991	1992	1990	1991
35	Koppen Creek	N	NO	NO	X	NO			X	X	X	X	X
480	Mink Creek	N	NO	NO	NO	NO			X	X	X	X	X
485	W. Finger Creek	N	NO	NO	NO	NO			X	X	X	X	X
498	McClure Creek	N	NO	NO					X	X	X	X	X
506	Loomis Creek	Y	NO	NO?[g]	X	NO	X		YES?	X	X	X	X
604	Erb Creek	N	NO	NO	NO				X	X	X	X	X
618	Junction Creek	Y	YES	NO					X	X	X	X	X
621	Totemoff Creek	N	NO	NO	X	NO			X	X	X	X	X
623	Brizgaloff Creek	N	NO	NO		NO			X	X	X	X	X
628	Chenega Creek	Y		NO		NO			X	X	X	X	X
630	Bainbridge Creek	N	NO	NO		NO	X		X	X	X	X	X
632	Claw Creek	N	NO	NO		NO			X	X	X	X	X
637	Pt. Countess	Y	YES	NO	X	NO		YES	YES?	X	X	X	X
653	Hogg Creek	N	NO	NO		NO		YES	X	X	X	X	X
656	Halverson Creek	N	NO	NO					NO	X	X	X	X
663	Shelter Bay	Y	YES	NO?		NO			X	X	X	X	X
665	Bjorne Creek	Y		NO?					X	X	X	X	X
666	O'Brien Creek	N	NO			NO			X	X	X	X	X
673	Falls Creek	N	NO	NO	NO	NO			X	X	X	X	X
677	Hayden Creek	Y	YES	NO	NO	NO			X	X	X	X	X
678	Sleepy Bay	Y		YES		NO		YES	X	X	X	X	X
681	Hogan Bay	Y	NO	NO					X	X	X	X	X
682	Snug Harbor	Y	YES	NO	X	NO		YES	NO	X	X	X	X
692	Herring Bay	Y	YES	YES		NO		NO	NO	X	X	X	X
695	Port Audrey	N	NO	NO	X	X			NO	X	X	X	X
699	Cathead Bay	N	NO	NO	NO	X	X		NO	X	X	X	X
740	Kelez Creek	N	NO	NO	NO	X			X	X	X	X	X
744	Wilby Creek	N	NO	NO					X	X	X	X	X
747	Cabin Creek	N	NO	NO		X			X	X	X	X	X
828	Cook Creek	N	NO	NO	NO				X	X	X	X	X
861	Bernard Creek	N	NO	NO	NO	X			X	X	X	X	X

[a] A yes indicates oiling.
[b] A blank indicates no sample was taken.
[c] An X indicates that a sample was collected and analysis is pending.
[d] Visual observations from NRDA F/S Studies 1 and 2.
[e] Fry collected from 8-10 foot zone in 1990 and analyzed through Habitat Division during spring 1990.
[f] Fry collected from 10-12 foot zone in 1990 and analyzed in the spring of 1992.
[g] A ? indicates borderline results.

DISCUSSION

Pink salmon embryos incubating in oil contaminated intertidal spawning areas in Prince William Sound in 1989, 1990, and 1991 appear to have been adversely affected by the *Exxon Valdez* oil spill. Oil was deposited in varying thickness in the intertidal portions of streams utilized by spawning pink salmon during the spring of 1989. Visual observations of oiling in and immediately adjacent to stream beds made during NRDA F/S Study 1 were used to identify oiled and apparently unoiled streams. Embryos deposited in these oiled streams during the late summer of 1989 died at a significantly higher rate than those deposited in nearby unoiled streams. The increase in embryo mortality was present in the oiled intertidal areas whereas there was no detectable difference in embryo mortality between the oiled and unoiled streams in the area above mean high tide. Visual oiling observations made during the summer of 1990 indicated the remaining oil was deposited in the higher intertidal zones near the mean high tide mark or "bath tub" ring of Prince William Sound. Embryos deposited in the oiled streams during the summer of 1990 again showed a higher rate of mortality than those deposited in unoiled streams. The difference between oiled and unoiled streams was in the highest intertidal zone. These measured differences in embryo mortality again agreed with observed oiling.

The amount of surface oil in close proximity to spawning streams was greatly reduced in the spring and summer of 1991. We expected the difference in embryo mortality between oiled and unoiled streams to continue to decrease, possibly to a statistically undetectable level. The large difference detected in 1991 was unexpected and at this time unexplained. Nearly 50% of the embryos deposited in oiled streams in 1991 died prior to eyeing.

We have hypothesized that the difference may be due to genetic damage sustained during early development. The pink salmon which spawned in 1991 were the same fry which incubated in stream gravels during the fall of 1989 and spring of 1990. We found a significant increase in embryo mortality during the fall of 1989. There is a strong possibility the surviving embryos sustained sublethal damages which were manifested in the form of functional sterility.

This genetic damage hypothesis is consistent with previous laboratory experiments on the effects of crude oil on early life stages of fish and with other NRDA field observations. Long term intra-gravel oil exposures (7-8 months) to freshly fertilized embryos provide embryos sufficient time to accumulate polynuclear aromatic hydrocarbons (PAH's) from very low aqueous concentrations of crude oil. PAH's are abundant in crude oil and are capable of inducing chromosomal lesions (McBee and Bickham 1988). Mironov (1969) observed reduced survival of fish embryos and larvae exposed to very low aqueous doses (1 ul oil/l seawater) of oil. Moles et al. (1987) confirmed that pink salmon embryos take up PAH's and demonstrated that the uptake was much greater in an intertidal environment than in strictly freshwater conditions. Biggs et al. (1991) found greater numbers of chromosome aberrations in larval herring which incubated in oiled areas than in non-oiled areas. It is logical that the same type of damage may have occurred to pink salmon.

An alternative to the genetic hypothesis is that the observed discrepancies are due to environmental differences. This study is based on observational data and as such we were unable to randomize stream oiling to account for environmental variability between streams. We attempted to address this concern in our original experimental design by selecting unoiled or control streams in close proximity to oiled streams. There is a definite oiling pattern in southwestern Prince William Sound where streams on points which faced northeastward were most heavily oiled (Figure 14). Likewise, streams which faced west were most likely not oiled. The environmental consequences of this stream orientation was not accounted for and are unknown. There was no obvious difference in embryo density (Figure 15) or preemergent fry density (Figure 16) between oil contaminated and control streams.

Lost production due to increased embryo mortality has not been estimated. A life history model developed by NRDA F/S Study 28 will incorporate data from this study as well as other pink salmon studies to estimate losses throughout the pink salmon life cycle.

No difference in embryo to preemergent fry survival was detected. We expected embryo to preemergent fry survival to be reduced in oiled streams given that an increase in embryo mortality was already detected; this was not the case. The power analysis for the embryo to preemergent fry test indicated there was adequate statistical power to detect a biologically meaningful difference if one was present. We suspect unexpected changes in stream characteristics prevented us from sampling the same areas or populations for embryos in the fall and fry in the spring. Runoff from fall rains increase stream depth and width while spring water levels are usually low since the majority of the winters precipitation is tied up in ice and snow. Also stream channels in Prince William Sound are not well defined in intertidal areas. It is common for intertidal stream segments to migrate along the beach especially if the beach is exposed to winter storms. The magnitude of these changes was unexpected when this study was designed and initiated.

Hydrocarbon analysis of mussel tissue verified visual oiling classifications in 25 of the 27 streams where comparable data were collected. Photographs and ground observations of oiling were used to classify the two streams where visual and hydrocarbon data differed. No mussel samples were collected at three streams where heavy oiling was evident in 1989. All hydrocarbon analysis to date have been categorized as either oiled or unoiled. A project presently underway is attempting to quantify the amount of *Exxon Valdez* oil in a sample. If this project is successful, reanalysis of the data using the hydrocarbon measurement as a covariate should be considered.

Results of the analysis of preemergent fry for mixed-function oxidase response was not always consistent with observed oiling. Fry examined shortly after collection showed a strong response for mixed-function oxidase activity while samples collected at the same time but analyzed 1.5 years later showed very little response. This was most evident for Snug Harbor Creek, a heavily oiled stream. Snug Harbor Creek was positive for mixed-

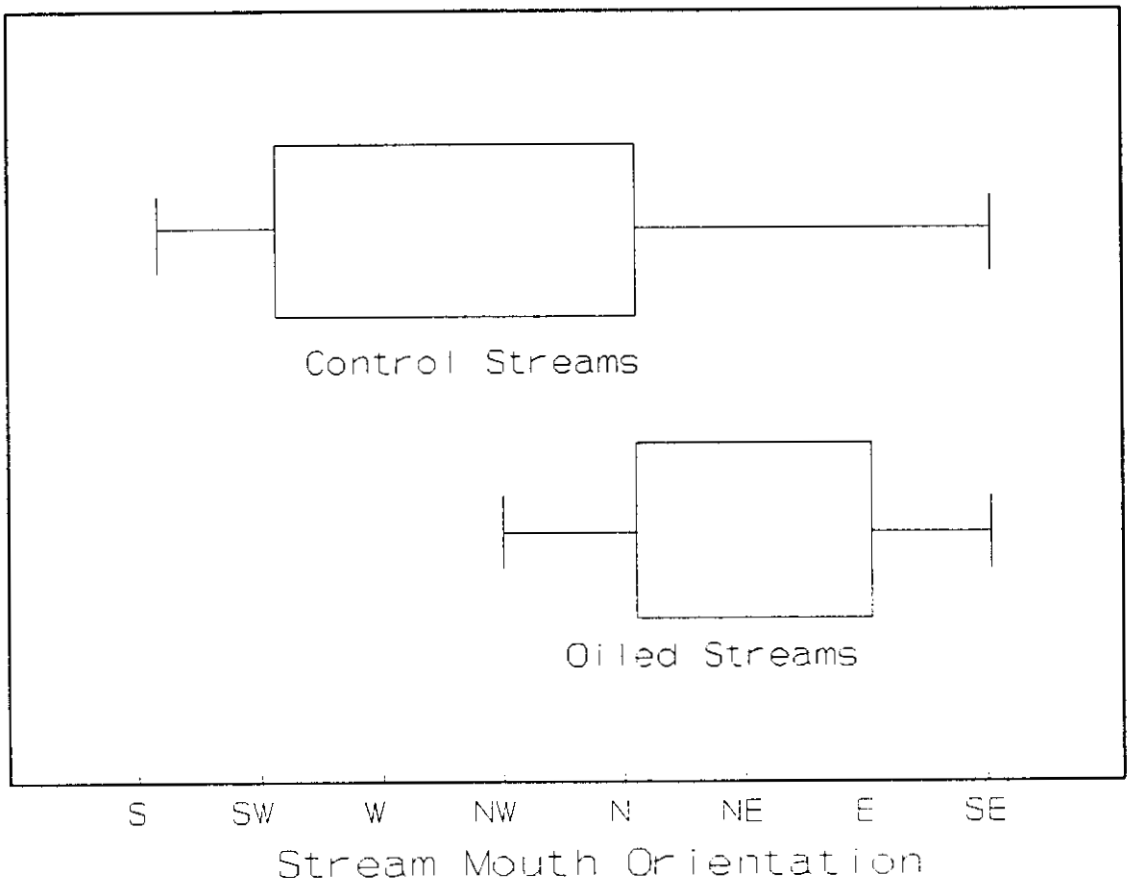

Figure 14. Stream mouth orientation for the 15 control and 10 oil contaminated streams in stream grouping 2.

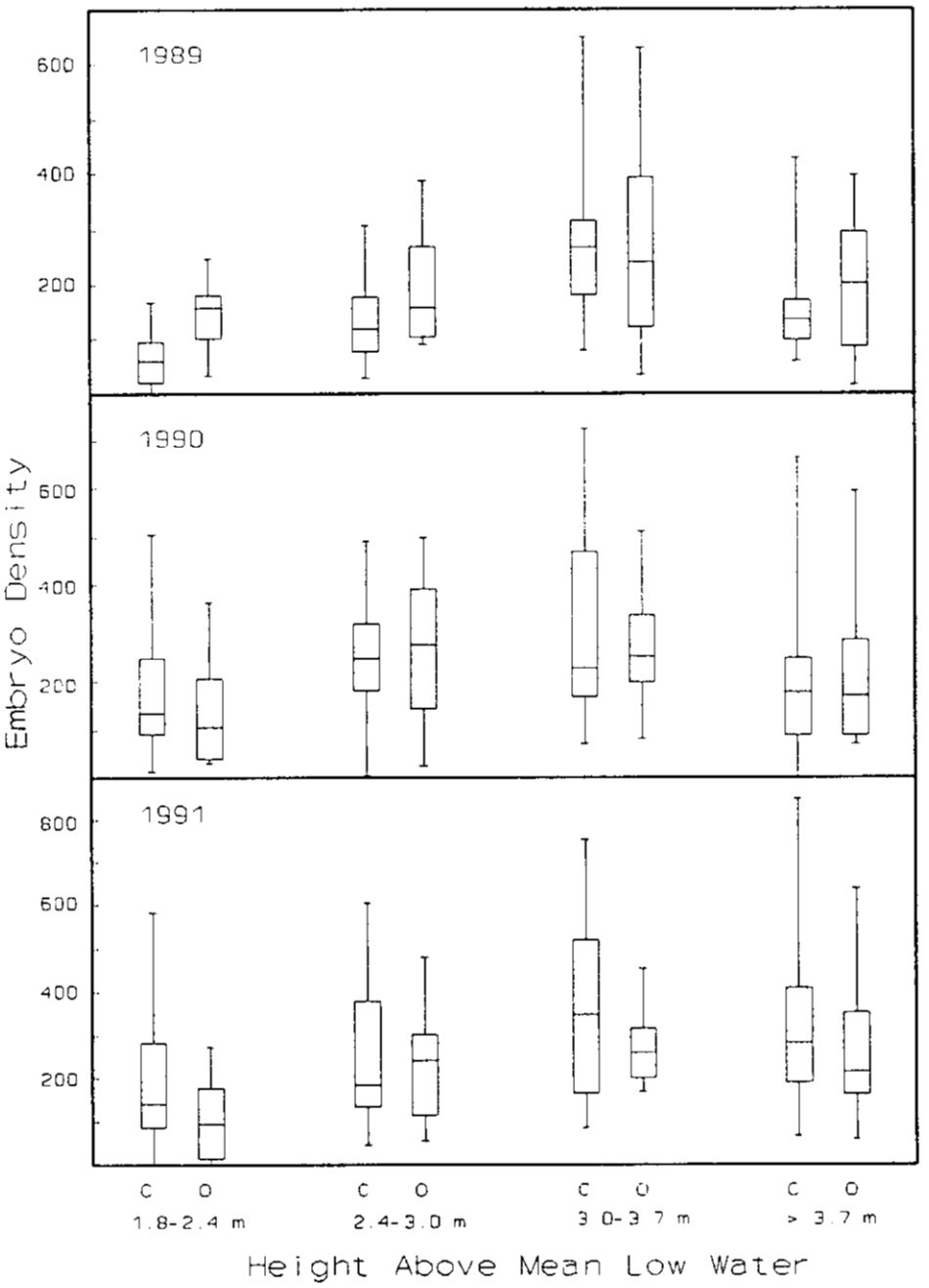

Figure 15. Pink salmon embryo density (embryo/m^2) for 15 control (C) and 10 oil contaminated (O) streams by stream zone for 1989, 1990, and 1991.

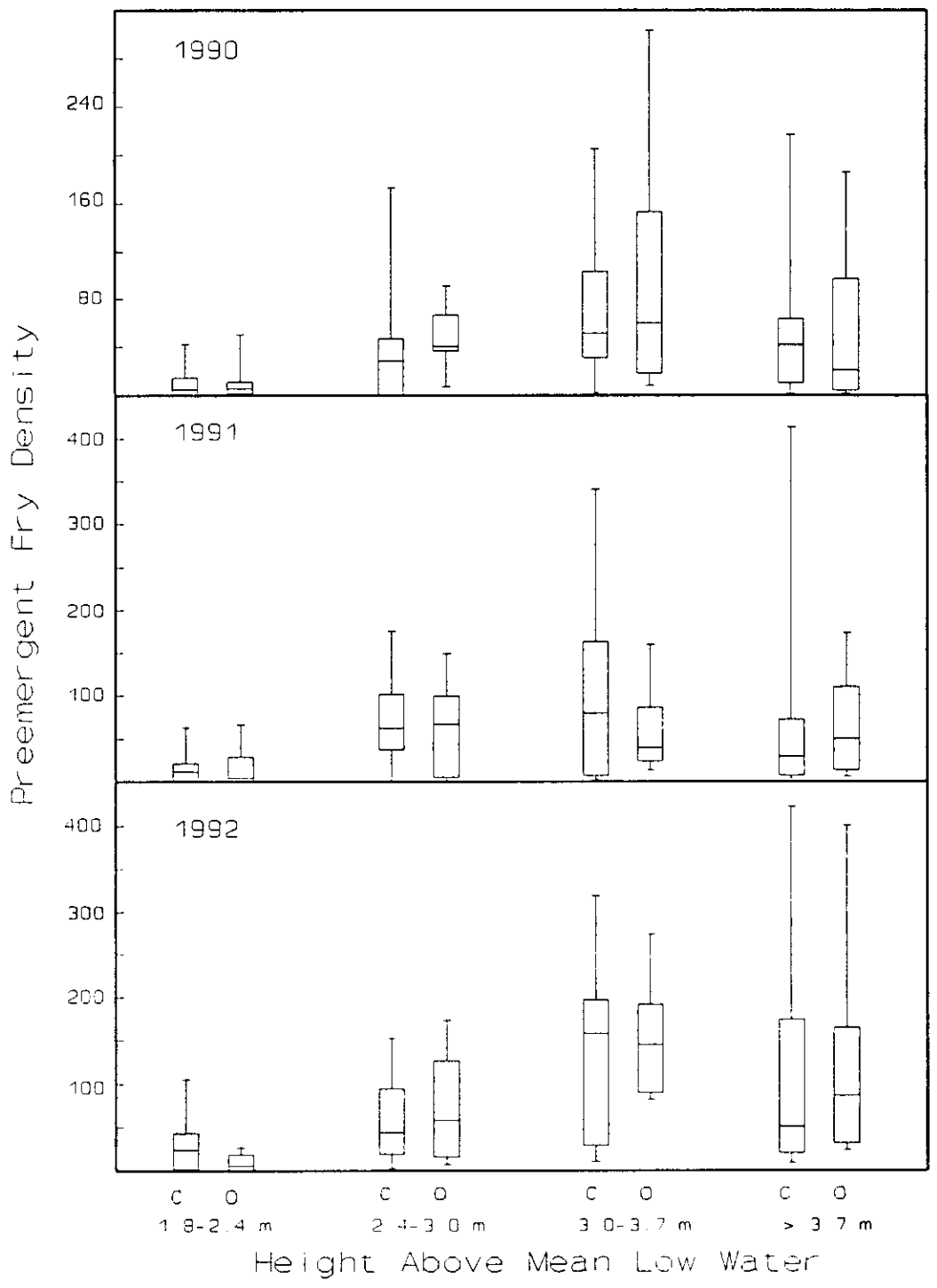

Figure 16. Pink salmon preemergent fry density (fry/m^2) for 15 control (C) and 10 oil contaminated (O) streams by stream zone for 1990, 1991, and 1992.

function oxidase when examined in the spring of 1990 while no response was noted when tested during late winter 1991. Fink (1992) and Wiedmer (1992) detected mixed-function oxidase activity for all streams where visual oiling was present.

No lesions were found during histopathological analysis of preemergent fry collected during the spring of 1990. This result is not surprising. Fink (1992) collected fry in December of 1989, May/June of 1990, March of 1991, and May of 1991. He detected mixed-function oxidase activity in all groups exposed to oil, but only observed lesions in fry collected from May or June. His data suggested the lesions did not appear until late in the intergravel development. The fry examined in this study were collected during late March and early April and were most likely not old enough to have developed lesions.

Elevated collection trauma was detected in preemergent fry from oiled streams in 1989. This observation was based on the examination of fry from four streams (two oiled and two unoiled) and could easily be attributed to chance given the small number of streams involved. Preemergent fry were collected and preserved from an additional 18 streams in 1989. Fry from some of these streams should be examined to determine whether this observation is due to chance alone. Pink salmon fry are likely to be subjected to natural traumatic events such as narrow escapes from predators, and would be at a distinct disadvantage if their ability to control hemorrhaging was reduced.

We are continuing to monitor pink salmon embryos and fry. A controlled experiment has been initiated to determine if the observed embryo mortality differences were due to oil. Another experiment has also been initiated to determine if the observed results can be accounted for by stream environment.

It is essential that spawning escapement goals be met if the wild pink salmon impacted by the *Exxon Valdez* spill are to be fully restored. The oiled area is the major pink salmon migratory corridor with nearly all Prince William Sound wild pink salmon stocks present at some time during the summer. Additional information on both hatchery and wild stock abundance is necessary if precise management actions are to be taken to ensure adequate escapements into the oil damaged streams.

CONCLUSIONS

Elevated pink salmon embryo mortalities were detected in oiled streams in 1989, 1990, and 1991. It is reasonable to conclude, based on the evidence presented, that it is more likely than not that the decreased embryo survivals in the oiled streams were due to factors associated with oiling of the environment.

Further, it is reasonable to conclude that the inability to detect differences in embryo to fry survival between oiled and unoiled sites was due to the fact that physical changes in stream sites made sampling from the same biological populations impossible, thereby compromising the experimental design.

LITERATURE CITED

Biggs, E., T. Baker, M. McGurk, J.E. Hose, R. Kocan. 1991. Injury to Prince William Sound Herring. State/Federal Natural Resources Damage Assessment Draft Preliminary Status Report. Cordova, Alaska, USA.

Draper, N.R. and H. Smith. 1981. Applied regression analysis - second edition. John Wiley and Sons, New York.

Fink, M.J.. 1992. MFO induction and histopathology in pink salmon fry from oiled streams in Prince William Sound, Alaska 1990-1991. Alaska Department of Fish and Game, Habitat Division, Technical Report No. 92-1, Juneau, Alaska, USA.

Helle, J. H., R. S. Williamson, and J. E. Bailey. 1964. Intertidal ecology and life history of pink salmon at Olsen Creek, Prince William Sound, Alaska. U.S. Fish and Wildlife Service, Special Scientific Report--Fisheries No. 483. Washington D.C., USA.

Hinton, D.E. and D.J. Laurén. 1990. Integrative histopathological approaches to detecting effects on environmental stressors on fishes. American Fisheries Society Symposium 8:51-66.

Jimenez, B.D. and J.J. Stegeman. 1990. Detoxication enzymes as indicators of environmental stress on fish. American Fisheries Society Symposium 8:67-79.

Mauchly, J.W. 1940. Significance test for sphericity of a normal n-variate distribution. Annals of Mathematical Statistics, Vol. 11.

McBee, K. and J.W. Bickham. 1988. Petrochemical-related DNA damage in wild rodents detected by flow cytometry. Bull Environ. Contam. Toxicol. 40:343-349.

Mironov, O G. 1969. The development of some Black Sea fishes in seawater polluted by petroleum products. Probl. Ichthyol. 9(6)(59):1136-1139

Moles, A., M.M. Babcock, and S.D. Rice. 1987. Effects of oil exposure on pink salmon, *O. gorbuscha*, alevins in a simulated Intertidal Environment. Marine Environmental Research, 21:49-58.

Neter, J., W. Wasserman, and M.H. Kutner. 1985. Applied Linear Statistical Models. Irwin, Homewood, Illinois, USA.

Numerical Algorithms Group. 1987. The GLIM system release 3.77. Downers Grove, Illinois, USA.

Pirtle, R.B., and M.L. McCurdy. 1977. Prince William Sound general districts 1976 pink and chum salmon aerial and ground escapement surveys and consequent brood year egg deposition and preemergent fry index programs. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Data Report 9, Juneau, Alaska, USA.

Rice, S.D., D.A. Moles, and J.W. Short. 1975. The effect of Prudhoe Bay crude oil on survival and growth of eggs, alevins, and fry of pink salmon, *Oncorhynchus gorbuscha*. Pages 503-507 *in* Proceedings of the 1975 Conference on Prevention and Control of Oil Pollution. San Francisco, California. American Petroleum Institute.

SAS Institute Inc. 1988. SAS/STAT™ User's Guide, Release 6.03 Edition. SAS Institute Inc., Cary, North Carolina, USA.

Sokal, R.R., and F.J. Rohlf. 1969. Biometry. W.H. Freeman and Company, San Francisco, California, USA.

Spies, R.B., J.S. Felton, and L. Dillare. 1982. Hepatic mixed-function oxidases in California flatfish are increased in contaminated environments and by oil and PCB ingestion. Marine Biology 70:117-127.

Wiedmer, M. 1992. Cytochrome P-450 induction of pink salmon (*Oncorhynchus gorbuscha*) eggs and larvae in Prince William Sound, Alaska: Effects of the *Exxon Valdez* oil spill. Alaska Department of Fish and Game, Habitat Division, Technical Report No. 92-3, Juneau, Alaska, USA.

APPENDIX A.1

1989 Prince William Sound pink and chum salmon egg survey data summary

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc[a]	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Eggs Density[b]	Pink Salmon Eggs SE	Pink Salmon Fry Dead	Pink Salmon Fry Live	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Eggs Density	Chum Salmon Eggs SE	Chum Salmon Fry Dead	Chum Salmon Fry Live	No. of Digs
35	Koppen Creek	10-15-89															
			2.7	30	455	3688	1415.90	249.67	0	0	289	940	360.89	187.00	0	39	14
			3.4	40	3390	8463	3249.13	708.74	0	3	519	624	239.57	93.50	0	69	14
			6.1	60	2126	6085	2336.16	541.97	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			3845	12151	2332.51	408.72	0	3	808	1564	300.23	103.25	0	108	28
		Total Upstream			2126	6085	2336.16	541.97	0	0	0	0	0.00	0.00	0	0	14
480	Mink Creek	9-27-89															
			2.1	20	71	1169	448.80	218.66	1	0	33	272	104.43	55.87	0	311	14
			2.7	30	160	1138	436.90	213.75	0	0	458	606	232.66	132.14	0	75	14
			3.4	40	98	2597	997.04	335.25	0	1	22	60	23.04	16.47	0	1045	14
			6.1	60	85	1311	503.32	165.55	0	2	15	11	4.22	4.22	0	156	14
		Total Intertidal			329	4904	627.58	153.05	1	1	513	938	120.04	48.84	0	1431	42
		Total Upstream			85	1311	503.32	165.55	0	2	15	11	4.22	4.22	0	156	14
485	W. Finger Creek	9-29-89															
			2.1	20	0	0	0.00	0.00	0	0	158	1255	481.82	188.28	0	54	14
			2.7	30	52	656	251.85	171.41	0	0	154	906	347.83	188.42	0	228	14
			3.4	40	13	3026	1161.75	355.42	0	0	100	629	241.49	181.62	0	993	14
			6.1	60	65	2772	1064.23	340.35	0	5	0	0	0.00	0.00	0	0	14
		Total Intertidal			65	3682	471.20	150.10	0	0	412	2790	357.05	105.93	0	1275	42
		Total Upstream			65	2772	1064.23	340.35	0	5	0	0	0.00	0.00	0	0	14
498	McClure Creek	9-29-89															
			2.1	20	317	1355	520.21	148.49	0	1	22	0	0.00	0.00	0	0	14
			2.7	30	484	3119	1197.45	351.06	0	1	0	0	0.00	0.00	0	0	14
			3.4	40	843	6625	2543.48	498.03	0	210	0	0	0.00	0.00	0	0	14
			6.1	60	61	1174	450.72	219.13	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			1644	11099	1420.38	242.52	0	212	22	0	0.00	0.00	0	0	42
		Total Upstream			61	1174	450.72	219.13	0	0	0	0	0.00	0.00	0	0	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc[a]	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Eggs Density[b]	Pink Salmon Eggs SE	Pink Salmon Fry Dead	Pink Salmon Fry Live	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Eggs Density	Chum Salmon Eggs SE	Chum Salmon Fry Dead	Chum Salmon Fry Live	No. of Digs
506	Loomis Creek	9-30-89															
			2.1	20	1094	2369	909.51	336.58	0	2	61	94	36.09	28.63	0	5	14
			2.7	30	2474	2929	1124.51	267.92	0	0	34	11	4.22	3.83	0	0	14
			3.4	40	1591	7250	2783.43	605.06	0	0	0	0	0.00	0.00	0	0	14
			6.1	60	360	1688	1296.12	413.27	0	0	0	0	0.00	0.00	0	0	7
		Total Intertidal			5159	12548	1605.82	274.51	0	2	95	105	13.44	9.72	0	5	42
		Total Upstream			360	1688	1296.12	413.27	0	0	0	0	0.00	0.00	0	0	7
604	Erb Creek	10- 2-89															
			2.1	20	57	999	383.54	299.19	0	18	38	92	35.32	35.32	0	5	14
			2.7	30	83	1181	453.41	218.17	0	0	527	468	179.68	178.44	0	32	14
			3.4	40	842	2407	924.10	352.41	0	18	0	0	0.00	0.00	0	1	14
			6.1	60	164	1876	720.24	356.22	0	95	0	1	0.38	0.38	0	23	14
		Total Intertidal			982	4587	587.02	170.36	0	36	565	560	71.67	60.37	0	38	42
		Total Upstream			164	1876	720.24	356.22	0	95	0	1	0.38	0.38	0	23	14
618	Chenega SE	10- 2-89															
			2.1	20	422	1507	675.00	318.64	0	0	0	0	0.00	0.00	0	0	12
			2.7	30	274	1669	747.56	253.80	0	0	0	0	0.00	0.00	0	0	12
			3.4	40	305	1266	567.05	216.01	0	0	0	0	0.00	0.00	0	0	12
			6.1	60	78	946	423.72	185.44	0	0	0	0	0.00	0.00	0	0	12
		Total Intertidal			1001	4442	663.20	149.77	0	0	0	0	0.00	0.00	0	0	36
		Total Upstream			78	946	423.72	185.44	0	0	0	0	0.00	0.00	0	0	12

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc'	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Eggs Density	Pink Salmon Eggs SE	Pink Salmon Fry Dead	Pink Salmon Fry Live	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Eggs Density	Chum Salmon Eggs SE	Chum Salmon Fry Dead	Chum Salmon Fry Live	No. of Digs
621	Totemoff Creek	10- 2-89															
			2.1	20	126	140	53.75	22.45	0	2	0	0	0.00	0.00	0	0	14
			2.7	30	242	2136	820.06	301.79	0	16	0	0	0.00	0.00	0	0	14
			3.4	40	828	2732	1048.87	318.36	0	176	0	0	0.00	0.00	0	0	14
			6.1	60	432	788	302.53	155.01	0	3	0	0	0.00	0.00	0	0	14
		Total Intertidal			1196	5008	640.89	157.51	0	194	0	0	0.00	0.00	0	0	42
		Total Upstream			432	788	302.53	155.01	0	3	0	0	0.00	0.00	0	0	14
623	Brizgaloff Creek	10- 3-89															
			2.1	20	13	507	194.65	109.97	0	1	0	0	0.00	0.00	0	0	14
			2.7	30	47	1960	752.49	348.45	0	0	0	0	0.00	0.00	0	0	14
			3.4	40	1083	2760	1059.62	356.85	0	191	0	0	0.00	0.00	0	0	14
			6.1	60	1567	4335	1664.30	484.38	0	59	0	0	0.00	0.00	0	0	14
		Total Intertidal			1143	5227	668.92	175.20	0	192	0	0	0.00	0.00	0	0	42
		Total Upstream			1567	4335	1664.30	484.38	0	59	0	0	0.00	0.00	0	0	14
628	Chenega NE	9-30-89															
			2.1	20	468	1898	728.68	327.18	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	516	1687	647.68	228.87	0	1	0	0	0.00	0.00	0	0	14
			3.4	40	544	2814	1080.35	318.03	0	0	0	0	0.00	0.00	0	0	14
			3.4	43	532	3604	1383.65	322.32	0	48	0	0	0.00	0.00	0	0	14
			6.1	63	977	3660	1405.15	302.83	0	2	2	39	14.97	13.36	0	0	14
		Total Intertidal			2060	10003	960.09	152.00	0	49	0	0	0.00	0.00	0	0	56
		Total Upstream			977	3660	1405.15	302.83	0	2	2	39	14.97	13.36	0	0	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc*	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Eggs Density**	Pink Salmon Eggs SE	Pink Salmon Fry Dead	Pink Salmon Fry Live	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Eggs Density	Chum Salmon Eggs SE	Chum Salmon Fry Dead	Chum Salmon Fry Live	No. of Digs
630	Bainbridge Creek	10- 3-89															
			2.1	20	1	206	79.09	53.89	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	180	973	373.56	163.72	0	1	0	0	0.00	0.00	0	0	14
			3.4	40	159	3469	1331.82	238.65	0	184	0	0	0.00	0.00	0	0	14
			6.1	60	725	5215	2002.15	499.42	0	18	0	0	0.00	0.00	0	1	14
		Total Intertidal			340	4648	594.82	127.03	0	185	0	0	0.00	0.00	0	0	42
		Total Upstream			725	5215	2002.15	499.42	0	18	0	0	0.00	0.00	0	1	14
632	Claw Creek	10- 4-89															
			2.1	20	10	294	112.87	75.03	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	38	242	92.91	66.98	0	0	0	0	0.00	0.00	0	0	14
			2.7	33	20	188	202.10	93.57	0	0	0	0	0.00	0.00	0	0	5
			3.4	40	146	6993	2684.76	665.85	0	16	0	0	0.00	0.00	0	0	14
			6.1	60	67	1914	734.83	224.86	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			214	7717	882.51	261.21	0	16	0	0	0.00	0.00	0	0	47
		Total Upstream			67	1914	734.83	224.86	0	0	0	0	0.00	0.00	0	0	14
637	Pt. Countess	10- 4-89															
			2.1	20	1814	1429	548.62	216.73	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	170	1828	701.81	141.31	0	0	0	0	0.00	0.00	0	0	14
			3.4	41	213	1270	975.16	357.33	0	0	0	0	0.00	0.00	0	0	7
			3.4	42	549	3272	2512.38	750.90	0	0	0	0	0.00	0.00	0	0	7
			6.1	61	146	1201	922.18	240.15	0	0	0	0	0.00	0.00	0	0	7
			6.1	62	311	2290	1758.36	574.28	0	0	0	0	0.00	0.00	0	0	7
		Total Intertidal			2746	7799	998.07	188.74	0	0	0	0	0.00	0.00	0	0	42
		Total Upstream			457	3491	1340.27	320.72	0	0	0	0	0.00	0.00	0	0	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc'	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Eggs Density	Pink Salmon Eggs SE	Pink Salmon Fry Dead	Pink Salmon Fry Live	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Eggs Density	Chum Salmon Eggs SE	Chum Salmon Fry Dead	Chum Salmon Fry Live	No. of Digs
653	Hogg Creek	10-26-89															
			2.1	20	10	1783	684.53	222.29	0	0	0	0	0.00	0.00	0	0	14
			2.7	31	5	269	180.73	140.33	0	0	0	0	0.00	0.00	0	0	8
			2.7	32	31	834	747.11	502.98	0	0	0	0	0.00	0.00	0	0	6
			3.4	40	20	2153	826.58	263.95	9	0	0	0	0.00	0.00	0	0	14
			6.1	60	68	1952	749.41	330.37	0	4	0	0	0.00	0.00	0	0	14
		Total Intertidal			66	5039	644.86	137.67	9	0	0	0	0.00	0.00	0	0	42
		Total Upstream			68	1952	749.41	330.37	0	4	0	0	0.00	0.00	0	0	14
656	Halverson Creek	10- 5-89															
			2.1	20	75	373	143.20	68.81	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	737	1973	757.48	244.48	0	3	0	0	0.00	0.00	0	0	14
			3.4	40	600	3731	1432.41	427.73	0	26	0	0	0.00	0.00	0	0	14
			6.1	60	296	5459	2095.83	387.86	0	180	0	0	0.00	0.00	0	0	14
		Total Intertidal			1412	6077	777.70	181.43	0	29	0	0	0.00	0.00	0	0	42
		Total Upstream			296	5459	2095.83	387.86	0	180	0	0	0.00	0.00	0	0	14
663	Shelter Bay	10- 9-89															
			2.1	20	19	771	296.00	216.47	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	81	840	376.24	197.22	0	0	0	0	0.00	0.00	0	0	12
			2.7	33	12	273	1467.35		0	0	0	0	0.00		0	0	1
			3.4	40	1128	4315	1932.72	215.81	0	0	0	0	0.00	0.00	0	0	12
			6.1	60	250	2149	962.55	261.05	0	0	0	0	0.00	0.00	0	0	12
		Total Intertidal			1240	6199	854.33	166.83	0	0	0	0	0.00	0.00	0	0	39
		Total Upstream			250	2149	962.55	261.05	0	0	0	0	0.00	0.00	0	0	12

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc*	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Eggs Density	Pink Salmon Eggs SE	Pink Salmon Fry Dead	Pink Salmon Fry Live	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Eggs Density	Chum Salmon Eggs SE	Chum Salmon Fry Dead	Chum Salmon Fry Live	No. of Digs
665	Bjorne Creek	10-10-89															
			2.1	20	408	2359	905.67	273.16	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	1147	3940	1512.65	389.81	0	0	0	0	0.00	0.00	0	0	14
			3.4	41	169	1180	906.05	304.36	0	0	0	0	0.00	0.00	0	0	7
			3.4	42	312	17	13.05	10.61	0	0	0	0	0.00	0.00	0	0	7
			3.4	43	119	360	161.25	100.56	0	0	0	0	0.00	0.00	0	0	12
			6.1	60	554	4971	1908.47	311.58	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			2155	7856	781.95	148.39	0	0	0	0	0.00	0.00	0	0	54
		Total Upstream			554	4971	1908.47	311.58	0	0	0	0	0.00	0.00	0	0	14
666	O'Brien Creek	10-10-89															
			2.1	20	173	1049	402.73	266.54	0	0	0	0	0.00	0.00	0	0	14
			2.1	23	85	316	141.54	117.81	0	0	0	0	0.00	0.00	0	0	12
			2.7	30	175	2655	1019.31	262.70	0	0	0	0	0.00	0.00	0	0	14
			3.4	40	223	3529	1354.86	308.95	0	1	0	0	0.00	0.00	0	0	14
			6.1	60	63	712	546.70	275.24	0	0	0	0	0.00	0.00	0	0	7
			6.1	63	360	1093	839.25	373.22	0	0	0	0	0.00	0.00	0	0	7
		Total Intertidal			656	7549	751.39	141.08	0	1	0	0	0.00	0.00	0	0	54
		Total Upstream			423	1805	692.98	226.43	0	0	0	0	0.00	0.00	0	0	14
673	Falls Creek	10-10-89															
			2.1	21	24	560	376.24	155.93	0	0	0	0	0.00	0.00	0	0	8
			2.1	22	32	584	224.21	178.38	0	1	0	0	0.00	0.00	0	0	14
			2.7	30	53	2089	802.01	388.71	0	31	0	0	0.00	0.00	0	0	14
			3.4	40	80	1345	516.37	194.66	0	10	0	0	0.00	0.00	0	0	14
			6.1	60	29	1757	674.55	227.59	0	1	0	0	0.00	0.00	0	0	14
		Total Intertidal			189	4578	492.13	134.03	0	42	0	0	0.00	0.00	0	0	50
		Total Upstream			29	1757	674.55	227.59	0	1	0	0	0.00	0.00	0	0	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc*	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Eggs Density*	Pink Salmon Eggs SE	Pink Salmon Fry Dead	Pink Salmon Fry Live	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Eggs Density	Chum Salmon Eggs SE	Chum Salmon Fry Dead	Chum Salmon Fry Live	No. of Digs
677	Hayden Creek	10-10-89															
			2.1	21	151	1154	886.09	427.54	0	0	0	0	0.00	0.00	0	0	7
			2.1	22	27	774	594.31	200.02	0	1	0	0	0.00	0.00	0	0	7
			2.7	31	49	627	481.44	205.97	0	0	0	0	0.00	0.00	0	0	7
			2.7	32	66	834	640.38	214.31	0	7	0	0	0.00	0.00	0	0	7
			3.4	41	7	86	66.03	60.70	0	0	0	0	0.00	0.00	0	0	7
			3.4	42	103	274	210.39	171.97	0	0	0	0	0.00	0.00	0	0	7
			6.1	61	4	19	14.59	9.44	0	0	0	0	0.00	0.00	0	0	7
			6.1	62	26	142	109.03	109.03	0	0	0	0	0.00	0.00	0	0	7
		Total Intertidal			403	3749	479.77	101.10	0	8	0	0	0.00	0.00	0	0	42
		Total Upstream			30	161	61.81	54.18	0	0	0	0	0.00	0.00	0	0	14
678	Sleepy Bay	10- 9-89															
			2.1	20	13	381	170.65	82.36	0	0	0	0	0.00	0.00	0	0	12
			2.7	30	111	956	428.20	153.05	0	0	0	0	0.00	0.00	0	0	12
			3.4	40	231	1770	792.80	256.17	0	0	0	0	0.00	0.00	0	0	12
			6.1	60	316	901	345.91	184.64	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			355	3107	463.88	109.09	0	0	0	0	0.00	0.00	0	0	36
		Total Upstream			316	901	345.91	184.64	0	0	0	0	0.00	0.00	0	0	14
681	Hogan Bay	10-11-89															
			2.1	20	186	2178	836.18	285.52	0	0	0	0	0.00	0.00	0	0	14
			2.7	31	141	1137	873.04	331.44	0	0	0	0	0.00	0.00	0	0	7
			2.7	32	432	2583	1983.34	563.55	0	0	0	0	0.00	0.00	0	0	7
			3.4	40	960	8167	3135.49	316.58	0	1	0	0	0.00	0.00	0	0	14
			6.1	60	93	1290	495.26	201.47	0	1	0	0	0.00	0.00	0	0	14
		Total Intertidal			1719	14065	1799.95	235.19	0	1	0	0	0.00	0.00	0	0	42
		Total Upstream			93	1290	495.26	201.47	0	1	0	0	0.00	0.00	0	0	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc*	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Eggs Density**	Pink Salmon Eggs SE	Pink Salmon Fry Dead	Pink Salmon Fry Live	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Eggs Density	Chum Salmon Eggs SE	Chum Salmon Fry Dead	Chum Salmon Fry Live	No. of Digs
682	Snug Harbor	10-11-89															
			2.1	20	350	1644	736.36	261.24	0	0	0	0	0.00	0.00	0	0	12
			2.7	30	1000	2658	1020.46	380.50	0	31	0	0	0.00	0.00	0	0	14
			3.4	40	477	4582	1759.13	395.90	0	27	0	0	0.00	0.00	0	0	14
			6.1	60	134	1000	383.92	130.29	0	8	0	0	0.00	0.00	0	0	14
		Total Intertidal			1827	8884	1193.77	213.77	0	58	0	0	0.00	0.00	0	0	40
		Total Upstream			134	1000	383.92	130.29	0	8	0	0	0.00	0.00	0	0	14
692	Herring Bay	9-29-89															
			2.1	20	286	1887	724.46	332.80	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	1163	2619	1005.49	398.39	0	0	0	0	0.00	0.00	0	0	14
			3.4	40	718	5044	1936.50	266.12	0	0	0	0	0.00	0.00	0	0	14
			6.1	60	301	3841	1474.64	431.29	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			2167	9550	1222.15	206.18	0	0	0	0	0.00	0.00	0	0	42
		Total Upstream			301	3841	1474.64	431.29	0	0	0	0	0.00	0.00	0	0	14
695	Port Audrey	10- 1-89															
			2.1	21	29	288	221.14	148.90	0	0	0	0	0.00	0.00	0	0	7
			2.1	22	81	1958	1503.44	523.13	0	21	0	0	0.00	0.00	0	0	7
			2.7	31	190	432	331.71	122.87	0	0	0	0	0.00	0.00	0	0	7
			2.7	32	107	1662	1276.15	834.48	0	0	0	0	0.00	0.00	0	0	7
			3.4	40	1015	3821	1466.96	563.73	0	5	0	0	0.00	0.00	0	0	14
			6.1	60	94	1669	640.76	231.95	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			1422	8161	1044.39	255.93	0	26	0	0	0.00	0.00	0	0	42
		Total Upstream			94	1669	640.76	231.95	0	0	0	0	0.00	0.00	0	0	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc[1]	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Eggs Density[2]	Pink Salmon Eggs SE	Pink Salmon Fry Dead	Pink Salmon Fry Live	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Eggs Density	Chum Salmon Eggs SE	Chum Salmon Fry Dead	Chum Salmon Fry Live	No. of Digs
699	Cathead Bay	10- 1-89															
			2.1	20	137	814	312.51	155.10	0	0	222	0	0.00	0.00	0	0	14
			2.7	30	88	691	265.29	149.26	2	0	0	0	0.00	0.00	0	0	14
			3.4	40	118	999	383.54	219.54	0	0	0	0	0.00	0.00	0	0	14
			6.1	60	59	737	282.95	154.55	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			343	2504	320.45	100.24	2	0	222	0	0.00	0.00	0	0	42
		Total Upstream			59	737	282.95	154.55	0	0	0	0	0.00	0.00	0	0	14
740	Kelez Creek	10-12-89															
			2.1	20	11	269	103.27	100.80	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	85	944	362.42	122.33	0	0	0	0	0.00	0.00	0	0	14
			3.4	40	91	17	7.61	3.47	0	5	0	0	0.00	0.00	0	0	12
			3.4	43	114	1109	496.73	280.20	0	0	0	0	0.00	0.00	0	0	12
			6.1	60	125	1334	512.15	249.33	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			301	2339	241.77	79.71	0	5	0	0	0.00	0.00	0	0	52
		Total Upstream			125	1334	512.15	249.33	0	0	0	0	0.00	0.00	0	0	14
744	Wilby Creek	10-13-89															
			2.1	20	20	587	225.36	123.77	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	3	67	25.72	23.28	0	0	0	0	0.00	0.00	0	0	14
			3.4	40	3	44	33.79	22.03	0	0	0	0	0.00	0.00	0	0	7
			3.4	43	4	30	23.04	16.03	0	0	0	0	0.00	0.00	0	0	7
			6.1	60	28	325	124.77	86.91	0	1	0	0	0.00	0.00	0	0	14
		Total Intertidal			30	728	93.16	43.68	0	0	0	0	0.00	0.00	0	0	42
		Total Upstream			28	325	124.77	86.91	0	1	0	0	0.00	0.00	0	0	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc'	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Eggs Density'	Pink Salmon Eggs SE	Pink Salmon Fry Dead	Pink Salmon Fry Live	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Eggs Density	Chum Salmon Eggs SE	Chum Salmon Fry Dead	Chum Salmon Fry Live	No. of Digs
747	Cabin Creek	10-13-89	2.1	20	442	706	271.05	166.17	0	1	0	0	0.00	0.00	0	0	14
			2.7	30	147	2185	838.87	306.06	0	1	0	0	0.00	0.00	0	0	14
			3.4	40	1387	1752	724.37	218.78	0	0	0	0	0.00	0.00	0	0	13
			6.1	60	406	1123	431.14	87.49	0	3	0	0	0.00	0.00	0	0	14
		Total Intertidal			1976	4643	608.67	139.80	0	2	0	0	0.00	0.00	0	0	41
		Total Upstream			406	1123	431.14	87.49	0	3	0	0	0.00	0.00	0	0	14
828	Cook Creek	10-13-89	2.1	20	0	3	1.15	0.61	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	603	1757	674.55	260.15	0	0	0	0	0.00	0.00	0	0	14
			3.4	41	39	739	567.44	363.51	0	0	0	1	0.77	0.77	0	0	7
			3.4	42	88	361	277.19	212.58	0	0	0	0	0.00	0.00	0	0	7
			3.4	43	111	96	86.00	81.71	0	0	0	0	0.00	0.00	0	0	6
			6.1	60	881	4820	1850.50	386.40	0	257	0	0	0.00	0.00	0	1	14
			6.1	100	1075	5297	2033.63	645.22	17	231	0	0	0.00	0.00	0	258	14
		Total Intertidal			841	2956	331.00	102.96	0	0	0	1	0.11	0.11	0	0	48
		Total Upstream			1956	10117	1942.07	369.43	17	488	0	0	0.00	0.00	0	259	28
861	Bernard Creek	10-14-89	2.1	20	209	826	317.12	113.02	0	1	0	0	0.00	0.00	0	0	14
			2.7	30	79	1229	471.84	180.74	0	2	0	0	0.00	0.00	0	0	14
			3.4	40	227	4481	1720.35	485.03	0	100	0	0	0.00	0.00	0	0	14
			6.1	60	550	5736	2202.17	481.30	0	417	0	0	0.00	0.00	0	0	14
		Total Intertidal			515	6536	836.44	198.22	0	103	0	0	0.00	0.00	0	0	42
		Total Upstream			550	5736	2202.17	481.30	0	417	0	0	0.00	0.00	0	0	14
Prince William Sound Summary																	
		Total Intertidal			37809	194731	791.14	34.13	12	1117	2637	5958	24.21	62.93	0	2857	1323
		Total Upstream			13408	85186	1015.24	62.93	17	1335	17	51	.61	79.07	0	439	451

Notes:

' Location code used to separate digs within tide zone.

' Number of eggs per meter squared.

APPENDIX A.2

1990 Prince William Sound pink and chum salmon egg survey data summary.

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc'	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Eggs Density	Pink Salmon Eggs SE	Pink Salmon Fry Dead	Pink Salmon Fry Live	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Eggs Density	Chum Salmon Eggs SE	Chum Salmon Fry Dead	Chum Salmon Fry Live	No. of Digs
35	Koppen Creek	9-24-90															
			2.7	30	6107	1859	713.71	315.76	0	0	102	117	44.92	44.09	0	2	14
			3.4	40	7946	3209	1232.00	404.96	0	0	2	18	6.91	5.33	0	0	14
			6.1	60	5205	1113	427.30	171.01	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			14053	5068	972.86	256.85	0	0	104	135	25.91	22.10	0	2	28
		Total Upstream			5205	1113	427.30	171.01	0	0	0	0	0.00	0.00	0	0	14
480	Mink Creek	9-25-90															
			2.1	20	1441	3886	1491.92	315.70	0	0	6	1	0.38	0.38	0	1	14
			2.7	30	450	3033	1164.43	342.57	0	18	303	188	72.18	38.61	0	170	14
			3.4	40	417	1979	759.78	241.95	0	70	20	110	42.23	38.97	0	31	14
			6.1	60	350	3595	1380.20	436.56	0	7	79	314	120.55	96.21	0	181	14
		Total Intertidal			2308	8898	1138.71	176.95	0	88	329	299	38.26	18.42	0	202	42
		Total Upstream			350	3595	1380.20	436.56	0	7	79	314	120.55	96.21	0	181	14
485	W. Finger Creek	9-26-90															
			2.1	20	89	1694	650.36	189.81	0	0	29	344	132.07	120.25	0	0	14
			2.7	30	138	3827	1469.27	372.93	0	158	3	97	37.24	24.79	0	10	14
			3.4	40	302	4131	1585.98	456.03	0	14	44	929	356.66	199.37	0	110	14
			6.1	60	710	2588	993.59	245.13	0	16	38	333	127.85	113.05	0	0	14
		Total Intertidal			529	9652	1235.20	211.46	0	172	76	1370	175.32	78.94	0	120	42
		Total Upstream			710	2588	993.59	245.13	0	16	38	333	127.85	113.05	0	0	14
498	McClure Creek	9-25-90															
			2.1	20	1769	1937	743.66	240.19	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	3396	3460	1328.37	329.59	0	7	0	0	0.00	0.00	0	0	14
			3.4	40	3480	5665	2174.91	499.31	0	28	0	0	0.00	0.00	0	0	14
			6.1	60	469	2702	1037.36	515.03	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			8645	11062	1415.65	228.80	0	35	0	0	0.00	0.00	0	0	42
		Total Upstream			469	2702	1037.36	515.03	0	0	0	0	0.00	0.00	0	0	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc[a]	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Eggs Density[b]	Pink Salmon Eggs SE	Pink Salmon Fry Dead	Pink Salmon Fry Live	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Eggs Density	Chum Salmon Eggs SE	Chum Salmon Fry Dead	Chum Salmon Fry Live	No. of Digs
506	Loomis Creek	9-30-90															
			2.1	20	1245	3377	1296.50	412.19	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	4348	2627	1008.56	417.00	0	1	0	0	0.00	0.00	0	0	14
			3.4	40	3283	1350	518.29	218.33	0	0	0	0	0.00	0.00	0	0	14
			6.1	60	1914	2487	954.81	278.58	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			8876	7354	941.12	209.50	0	1	0	0	0.00	0.00	0	0	42
		Total Upstream			1914	2487	954.81	278.58	0	0	0	0	0.00	0.00	0	0	14
604	Erb Creek	10-29-90															
			2.1	20	262	1043	800.86	492.88	0	0	0	0	0.00	0.00	0	0	7
			2.1	23	199	627	481.44	187.29	0	9	0	0	0.00	0.00	0	0	7
			2.7	30	2884	3930	1508.81	523.42	0	1	634	20	7.68	6.89	0	0	14
			3.4	40	845	1662	638.08	234.06	0	2	3	24	9.21	6.48	0	18	14
			6.1	60	119	1302	499.87	275.21	0	1	0	0	0.00	0.00	0	0	14
		Total Intertidal			4190	7262	929.35	214.08	0	12	637	44	5.63	3.14	0	18	42
		Total Upstream			119	1302	499.87	275.21	0	1	0	0	0.00	0.00	0	0	14
618	Junction Creek	10- 1-90															
			2.1	20	267	2268	1015.86	499.59	0	0	0	0	0.00	0.00	0	0	12
			2.7	30	151	1446	647.68	604.18	0	0	0	0	0.00	0.00	0	0	12
			3.4	40	1539	974	436.26	192.53	0	0	0	0	0.00	0.00	0	0	12
			6.1	60	452	495	221.71	218.79	0	0	0	0	0.00	0.00	0	0	12
		Total Intertidal			1957	4688	699.93	264.41	0	0	0	0	0.00	0.00	0	0	36
		Total Upstream			452	495	221.71	218.79	0	0	0	0	0.00	0.00	0	0	12

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc*	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Eggs Density**	Pink Salmon Eggs SE	Pink Salmon Fry Dead	Pink Salmon Fry Live	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Eggs Density	Chum Salmon Eggs SE	Chum Salmon Fry Dead	Chum Salmon Fry Live	No. of Digs
621	Totemoff Creek	10- 2-90															
			2.1	20	3195	3843	1475.41	390.39	52	16	0	0	0.00	0.00	0	0	14
			2.7	30	406	2494	957.50	304.48	0	7	0	0	0.00	0.00	0	0	14
			3.4	40	595	2673	1026.22	364.74	0	290	0	0	0.00	0.00	0	0	14
			6.1	60	39	423	162.40	87.78	1	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			4196	9010	1153.04	203.11	52	313	0	0	0.00	0.00	0	0	42
		Total Upstream			39	423	162.40	87.78	1	0	0	0	0.00	0.00	0	0	14
623	Brizgaloff Creek	10- 2-90															
			2.1	20	1855	4747	1822.47	490.17	0	1	0	0	0.00	0.00	0	0	14
			2.7	30	1749	1694	650.36	280.75	0	0	9	2	0.77	0.77	0	0	14
			3.4	40	2585	4331	1662.76	589.97	0	0	2	0	0.00	0.00	0	0	14
			6.1	60	3301	4220	1620.15	382.57	0	76	0	0	0.00	0.00	0	0	14
		Total Intertidal			6189	10772	1378.53	277.64	0	1	11	2	0.26	0.26	0	0	42
		Total Upstream			3301	4220	1620.15	382.57	0	76	0	0	0.00	0.00	0	0	14
628	Chenega Creek	10- 1-90															
			2.1	20	169	276	105.96	68.64	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	969	5465	2098.13	482.99	0	0	0	0	0.00	0.00	0	0	14
			3.4	40	1507	2066	793.18	212.70	0	0	0	0	0.00	0.00	0	0	14
			6.1	60	989	7325	2812.22	483.72	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			2645	7807	999.09	215.84	0	0	0	0	0.00	0.00	0	0	42
		Total Upstream			989	7325	2812.22	483.72	0	0	0	0	0.00	0.00	0	0	14
630	Bainbridge Creek	10-14-90															
			2.1	20	164	17	6.53	3.04	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	780	3342	1283.07	336.74	13	342	0	0	0.00	0.00	0	0	14
			3.4	40	622	8727	3350.48	574.87	12	798	0	0	0.00	0.00	0	8	14
			6.1	60	817	7867	3020.31	533.90	22	571	0	0	0.00	0.00	4	3	14
		Total Intertidal			1566	12086	1546.69	305.31	25	1140	0	0	0.00	0.00	0	8	42
		Total Upstream			817	7867	3020.31	533.90	22	571	0	0	0.00	0.00	4	3	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc*	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Eggs Density**	Pink Salmon Eggs SE	Pink Salmon Fry Dead	Pink Salmon Fry Live	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Eggs Density	Chum Salmon Eggs SE	Chum Salmon Fry Dead	Chum Salmon Fry Live	No. of Digs
632	Claw Creek	10-14-90															
			2.1	20	67	1665	639.23	316.57	0	261	0	0	0.00	0.00	0	0	14
			2.7	30	263	4038	1550.27	405.15	0	248	0	0	0.00	0.00	0	0	14
			3.4	40	260	7164	2750.41	587.22	0	639	0	0	0.00	0.00	0	0	14
			6.1	60	0	0	0.00	0.00	0	1	0	0	0.00	0.00	0	0	7
		Total Intertidal			590	12867	1646.64	287.43	0	1148	0	0	0.00	0.00	0	0	42
		Total Upstream			0	0	0.00	0.00	0	1	0	0	0.00	0.00	0	0	7
637	Pt. Countess	10- 3-90															
			2.1	20	1793	3324	1276.15	350.32	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	1400	4349	1669.67	452.29	0	37	0	0	0.00	0.00	0	0	14
			3.4	41	1777	3321	1275.00	252.80	0	8	0	0	0.00	0.00	0	0	14
			6.1	61	368	2223	1706.91	374.08	0	7	0	0	0.00	0.00	0	0	7
			6.1	62	251	577	443.05	147.24	0	0	0	0	0.00	0.00	0	0	7
		Total Intertidal			4970	10994	1406.94	205.40	0	45	0	0	0.00	0.00	0	0	42
		Total Upstream			619	2800	1074.98	260.80	0	7	0	0	0.00	0.00	0	0	14
653	Hogg Creek	10-15-90															
			2.1	20	132	2044	784.74	311.12	0	185	0	0	0.00	0.00	0	0	14
			2.7	31	26	633	486.04	224.71	0	0	0	0	0.00	0.00	0	0	7
			2.7	32	9	214	164.32	158.14	0	2	0	0	0.00	0.00	0	0	7
			3.4	40	35	2553	980.15	557.02	0	299	0	0	0.00	0.00	0	0	14
			6.1	60	517	1795	689.14	285.77	0	14	0	0	0.00	0.00	0	0	14
		Total Intertidal			202	5444	696.69	216.60	0	486	0	0	0.00	0.00	0	0	42
		Total Upstream			517	1795	689.14	285.77	0	14	0	0	0.00	0.00	0	0	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc*	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Eggs Density*	Pink Salmon Eggs SE	Pink Salmon Fry Dead	Pink Salmon Fry Live	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Eggs Density	Chum Salmon Eggs SE	Chum Salmon Fry Dead	Chum Salmon Fry Live	No. of Digs
656	Halverson Creek	10-15-90															
			2.1	22	100	774	297.16	131.06	0	75	0	0	0.00	0.00	0	0	14
			2.7	30	223	1473	565.52	186.32	0	1467	0	0	0.00	0.00	0	0	14
			3.4	40	590	5282	2027.87	381.31	0	659	0	0	0.00	0.00	0	0	14
			6.1	60	1282	4639	1781.01	192.75	0	879	0	0	0.00	0.00	0	0	14
		Total Intertidal			913	7529	963.51	186.98	0	2201	0	0	0.00	0.00	0	0	42
		Total Upstream			1282	4639	1781.01	192.75	0	879	0	0	0.00	0.00	0	0	14
663	Shelter Bay	10-13-90															
			2.1	20	81	1223	547.79	439.43	0	0	0	0	0.00	0.00	0	0	12
			2.7	30	291	2287	1024.37	279.91	0	0	0	0	0.00	0.00	0	0	12
			3.4	40	629	3597	1611.13	547.41	0	0	0	0	0.00	0.00	0	0	12
			6.1	60	148	1026	459.55	199.93	0	0	0	0	0.00	0.00	0	0	12
		Total Intertidal			1001	7107	1061.09	255.41	0	0	0	0	0.00	0.00	0	0	36
		Total Upstream			148	1026	459.55	199.93	0	0	0	0	0.00	0.00	0	0	12
665	Bjorne Creek	10- 4-90															
			2.1	20	697	1255	481.82	455.21	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	1957	2038	782.43	222.12	0	0	0	0	0.00	0.00	0	0	14
			3.4	40	1820	1718	659.58	222.52	0	16	0	0	0.00	0.00	0	0	14
			6.1	60	1357	2271	871.89	313.52	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			4474	5011	641.28	180.89	0	16	0	0	0.00	0.00	0	0	42
		Total Upstream			1357	2271	871.89	313.52	0	0	0	0	0.00	0.00	0	0	14
666	O'Brien Creek	10-11-90															
			2.1	20	177	1275	489.50	180.17	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	88	1239	475.68	144.09	0	4	0	0	0.00	0.00	0	0	14
			3.4	40	675	3579	1374.05	292.02	0	118	0	0	0.00	0.00	0	0	14
			6.1	60	645	1607	616.96	237.17	0	1	0	0	0.00	0.00	0	0	14
		Total Intertidal			940	6093	779.74	137.65	0	122	0	0	0.00	0.00	0	0	42
		Total Upstream			645	1607	616.96	237.17	0	1	0	0	0.00	0.00	0	0	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc[a]	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Eggs Density[b]	Pink Salmon Eggs SE	Pink Salmon Fry Dead	Pink Salmon Fry Live	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Eggs Density	Chum Salmon Eggs SE	Chum Salmon Fry Dead	Chum Salmon Fry Live	No. of Digs
673	Falls Creek	10-12-90															
			2.1	20	57	1299	498.71	264.89	0	183	0	0	0.00	0.00	0	0	14
			2.7	30	204	4995	1917.69	482.25	0	1399	0	0	0.00	0.00	0	0	14
			3.4	40	98	843	323.65	167.21	0	85	0	0	0.00	0.00	0	0	14
			6.1	60	63	489	187.74	63.57	0	122	0	0	0.00	0.00	0	0	14
		Total Intertidal			359	7137	913.35	217.66	0	1667	0	0	0.00	0.00	0	0	42
		Total Upstream			63	489	187.74	63.57	0	122	0	0	0.00	0.00	0	0	14
677	Hayden Creek	10-12-90															
			2.1	21	17	140	107.50	56.38	0	2	0	0	0.00	0.00	0	0	7
			2.1	22	59	300	230.35	137.78	0	45	0	0	0.00	0.00	0	0	7
			2.7	31	90	1340	1028.91	402.66	0	7	0	0	0.00	0.00	0	0	7
			2.7	32	247	1834	1408.22	510.00	0	340	0	0	0.00	0.00	0	0	7
			3.4	41	293	1049	805.47	514.64	0	0	0	0	0.00	0.00	0	0	7
			3.4	42	175	1683	1292.28	793.68	0	437	0	0	0.00	0.00	0	0	7
			6.1	61	9	89	68.34	45.63	0	0	0	0	0.00	0.00	0	0	7
			6.1	62	452	1361	1045.03	376.08	0	61	0	0	0.00	0.00	0	0	7
		Total Intertidal			881	6346	812.12	196.54	0	831	0	0	0.00	0.00	0	0	42
		Total Upstream			461	1450	556.69	226.86	0	61	0	0	0.00	0.00	0	0	14
678	Sleepy Bay	10- 3-90															
			2.1	20	37	462	206.93	134.16	0	0	0	0	0.00	0.00	0	0	12
			2.7	30	117	141	63.16	49.28	0	0	0	0	0.00	0.00	0	0	12
			3.4	40	574	433	193.94	149.90	0	0	0	0	0.00	0.00	0	0	12
			6.1	60	131	827	317.50	168.85	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			728	1036	154.68	67.93	0	0	0	0	0.00	0.00	0	0	36
		Total Upstream			131	827	317.50	168.85	0	0	0	0	0.00	0.00	0	0	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc*	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Eggs Density	Pink Salmon Eggs SE	Pink Salmon Fry Dead	Pink Salmon Fry Live	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Eggs Density	Chum Salmon Eggs SE	Chum Salmon Fry Dead	Chum Salmon Fry Live	No. of Digs
681	Hogan Bay	10-16-90															
			2.1	20	60	201	77.17	59.61	0	1	0	0	0.00	0.00	0	0	14
			2.7	30	33	9	3.46	2.30	0	0	0	0	0.00	0.00	0	0	14
			3.4	40	207	1303	500.25	249.82	0	7	0	0	0.00	0.00	0	0	14
			6.1	60	159	1489	571.66	297.39	0	10	0	0	0.00	0.00	0	0	14
		Total Intertidal			300	1513	193.62	90.23	0	8	0	0	0.00	0.00	0	0	42
		Total Upstream			159	1489	571.66	297.39	0	10	0	0	0.00	0.00	0	0	14
682	Snug Harbor	10-16-90															
			2.1	20	1218	1438	552.08	183.71	0	234	0	0	0.00	0.00	0	0	14
			2.7	30	2208	2908	1116.44	313.71	0	63	0	0	0.00	0.00	0	0	14
			3.4	40	1289	5018	1926.52	455.80	0	894	0	0	0.00	0.00	0	0	14
			6.1	60	616	4667	1791.76	525.21	3	1042	0	0	0.00	0.00	0	0	14
		Total Intertidal			4715	9364	1198.35	209.01	0	1191	0	0	0.00	0.00	0	0	42
		Total Upstream			616	4667	1791.76	525.21	3	1042	0	0	0.00	0.00	0	0	14
692	Herring Bay	9-30-90															
			2.1	20	394	954	366.26	166.44	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	629	1563	600.07	237.54	0	1	0	0	0.00	0.00	0	0	14
			3.4	40	1089	3150	1209.35	285.43	0	0	0	0	0.00	0.00	0	0	14
			6.1	60	564	1796	689.52	232.24	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			2112	5667	725.23	143.47	0	1	0	0	0.00	0.00	0	0	42
		Total Upstream			564	1796	689.52	232.24	0	0	0	0	0.00	0.00	0	0	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc[a]	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Eggs Density[b]	Pink Salmon Eggs SE	Pink Salmon Fry Dead	Pink Salmon Fry Live	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Eggs Density	Chum Salmon Eggs SE	Chum Salmon Fry Dead	Chum Salmon Fry Live	No. of Digs
695	Port Audrey	9-29-90															
			2.1	21	119	1028	789.34	376.68	0	10	0	0	0.00	0.00	0	0	7
			2.1	22	83	625	479.90	250.55	4	20	0	0	0.00	0.00	0	0	7
			2.7	30	1863	2279	874.96	380.32	0	6	0	0	0.00	0.00	0	0	14
			3.4	40	908	1578	605.83	277.68	0	14	0	0	0.00	0.00	0	0	14
			6.1	60	490	2434	934.46	388.78	1	9	0	0	0.00	0.00	0	0	14
		Total Intertidal			2973	5510	705.14	170.23	4	50	0	0	0.00	0.00	0	0	42
		Total Upstream			490	2434	934.46	388.78	1	9	0	0	0.00	0.00	0	0	14
699	Cathead Bay	10- 1-90															
			2.1	20	381	3043	1168.27	384.32	0	39	603	0	0.00	0.00	0	0	14
			2.7	30	153	3160	1213.19	321.41	0	3	0	0	0.00	0.00	0	0	14
			3.4	40	183	2071	795.10	279.78	0	0	0	0	0.00	0.00	0	0	14
			6.1	60	156	2437	935.62	453.44	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			717	8274	1058.86	188.84	0	42	603	0	0.00	0.00	0	0	42
		Total Upstream			156	2437	935.62	453.44	0	0	0	0	0.00	0.00	0	0	14
740	Kelez Creek	10-10-90															
			2.1	20	586	690	264.91	103.82	0	6	0	0	0.00	0.00	0	0	14
			2.7	30	101	849	325.95	172.58	0	8	0	0	0.00	0.00	0	0	14
			3.4	40	394	564	216.53	91.76	0	27	0	0	0.00	0.00	0	0	14
			6.1	60	97	1242	476.83	192.22	0	6	0	0	0.00	0.00	0	0	14
		Total Intertidal			1081	2103	269.13	72.29	0	41	0	0	0.00	0.00	0	0	42
		Total Upstream			97	1242	476.83	192.22	0	6	0	0	0.00	0.00	0	0	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc*	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Eggs Density*	Pink Salmon Eggs SE	Pink Salmon Fry Dead	Pink Salmon Fry Live	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Eggs Density	Chum Salmon Eggs SE	Chum Salmon Fry Dead	Chum Salmon Fry Live	No. of Digs
744	Wilby Creek	10- 9-90															
			2.1	20	79	36	13.82	3.77	0	0	0	0	0.00	0.00	0	0	14
			2.7	31	2	4	3.07	1.98	0	0	0	0	0.00	0.00	0	0	7
			2.7	32	174	236	181.21	175.86	0	13	0	0	0.00	0.00	0	0	7
			3.4	40	310	2777	1066.15	275.71	0	192	0	0	0.00	0.00	0	0	14
			6.1	60	4	620	238.03	165.45	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			565	3053	390.70	120.18	0	205	0	0	0.00	0.00	0	0	42
		Total Upstream			4	620	238.03	165.45	0	0	0	0	0.00	0.00	0	0	14
747	Cabin Creek	10- 9-90															
			2.1	20	1946	283	108.65	47.88	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	620	447	171.61	108.06	0	0	0	0	0.00	0.00	0	0	14
			3.4	40	2477	1734	665.72	203.18	0	0	0	0	0.00	0.00	0	0	14
			6.1	60	1133	1024	393.14	108.91	0	2	0	0	0.00	0.00	0	0	14
		Total Intertidal			5043	2464	315.33	85.75	0	0	0	0	0.00	0.00	0	0	42
		Total Upstream			1133	1024	393.14	108.91	0	2	0	0	0.00	0.00	0	0	14
828	Cook Creek	10-18-90															
			2.1	20	26	625	239.95	137.97	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	985	4226	1622.45	390.62	0	218	0	0	0.00	0.00	0	0	14
			3.4	40	235	3865	1483.86	429.80	0	168	0	0	0.00	0.00	0	0	14
			6.1	60	157	1883	722.92	244.06	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			1246	8716	1115.42	217.00	0	386	0	0	0.00	0.00	0	0	42
		Total Upstream			157	1883	722.92	244.06	0	0	0	0	0.00	0.00	0	0	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc[a]	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Eggs Density[b]	Pink Salmon Eggs SE	Pink Salmon Fry Dead	Pink Salmon Fry Live	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Eggs Density	Chum Salmon Eggs SE	Chum Salmon Fry Dead	Chum Salmon Fry Live	No. of Digs
861	Bernard Creek	10-17-90															
			2.1	20	1429	990	380.08	148.23	0	1	0	0	0.00	0.00	0	0	14
			2.7	30	2466	1430	549.01	225.90	0	0	0	0	0.00	0.00	0	0	14
			3.4	40	1339	5019	1926.90	574.83	0	48	0	0	0.00	0.00	0	0	14
			6.1	60	60	667	256.08	249.09	0	1	0	0	0.00	0.00	0	0	14
		Total Intertidal			5234	7439	952.00	233.12	0	49	0	0	0.00	0.00	0	0	42
		Total Upstream			60	667	256.08	249.09	0	1	0	0	0.00	0.00	0	0	14
Prince William Sound Summary																	
		Total Intertidal			94198	217326	919.79	37.72	81	10251	1760	1850	7.83	63.94	0	350	1270
		Total Upstream			23024	69280	880.33	63.94	27	2826	117	647	8.22	76.98	4	184	423

Notes:

[a] Location code used to separate digs within tide zone.

[b] Number of eggs per meter squared.

APPENDIX A.2

1990 Prince William Sound pink and chum salmon egg survey data summary.

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc[a]	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Eggs Density[b]	Pink Salmon Eggs SE	Pink Salmon Fry Dead	Pink Salmon Fry Live	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Eggs Density	Chum Salmon Eggs SE	Chum Salmon Fry Dead	Chum Salmon Fry Live	No. of Digs
35	Koppen Creek	9-23-91	2.7	30	2461	177	67.95	41.96	0	0	0	0	0.00	0.00	0	0	14
			3.4	40	5771	1492	572.81	226.06	0	0	66	68	26.11	26.11	0	0	14
			6.1	60	6021	1748	671.09	215.98	0	0	1	0	0.00	0.00	0	0	14
		Total Intertidal			8232	1669	320.38	122.83	0	0	66	68	13.05	13.05	0	0	28
		Total Upstream			6021	1748	671.09	215.98	0	0	1	0	0.00	0.00	0	0	14
480	Mink Creek	10- 9-91															
			2.1	20	46	726	278.73	113.39	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	126	1880	721.77	232.12	0	2	6	60	23.04	23.04	0	81	14
			3.4	41	71	1017	780.90	448.63	2	108	0	0	0.00	0.00	0	0	7
			3.4	42	132	835	641.15	374.98	1	93	0	0	0.00	0.00	0	0	7
			6.1	60	60	2291	879.56	266.29	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			375	4458	570.51	128.34	3	203	6	60	7.68	7.68	0	81	42
		Total Upstream			60	2291	879.56	266.29	0	0	0	0	0.00	0.00	0	0	14
485	W. Finger Creek	10- 8-91															
			2.1	20	0	15	5.76	3.80	0	0	0	24	9.21	7.59	0	0	14
			2.7	30	172	5346	2052.44	726.27	0	1	8	599	229.97	223.77	0	34	14
			3.4	40	94	5546	2129.23	318.89	3	10	10	286	109.80	88.40	4	291	14
			6.1	60	126	3855	1480.02	521.26	0	1	0	0	0.00	0.00	0	0	14
		Total Intertidal			266	10907	1395.81	300.14	3	11	18	909	116.33	79.52	4	325	42
		Total Upstream			126	3855	1480.02	521.26	0	1	0	0	0.00	0.00	0	0	14
498	McClure Creek	10- 8-91															
			2.1	20	402	1452	557.45	136.57	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	813	4375	1679.66	415.96	0	3	0	0	0.00	0.00	0	0	14
			3.4	40	681	4695	1802.51	320.79	0	193	83	0	0.00	0.00	0	0	14
			6.1	60	3238	5242	2012.52	552.91	0	1	0	0	0.00	0.00	0	0	14
		Total Intertidal			1896	10522	1346.54	196.95	0	196	83	0	0.00	0.00	0	0	42
		Total Upstream			3238	5242	2012.52	552.91	0	1	0	0	0.00	0.00	0	0	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc*	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Eggs Density*	Pink Salmon Eggs SE	Pink Salmon Fry Dead	Pink Salmon Fry Live	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Eggs Density	Chum Salmon Eggs SE	Chum Salmon Fry Dead	Chum Salmon Fry Live	No. of Digs
506	Loomis Creek	10- 9-91															
			2.1	20	520	830	318.65	108.99	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	1299	2064	792.41	290.23	0	0	0	0	0.00	0.00	0	0	14
			3.4	40	2300	2150	825.43	300.54	0	0	0	0	0.00	0.00	0	0	14
			6.1	60	557	1978	759.40	288.49	0	1	0	0	0.00	0.00	0	0	14
		Total Intertidal			4119	5044	645.50	144.96	0	0	0	0	0.00	0.00	0	0	42
		Total Upstream			557	1978	759.40	288.49	0	1	0	0	0.00	0.00	0	0	14
604	Erb Creek	10-10-91															
			2.1	20	222	3641	1397.86	357.07	0	31	0	0	0.00	0.00	0	0	14
			2.7	30	1825	6606	2536.18	417.37	0	1	103	22	8.45	8.04	0	16	14
			3.4	40	167	2633	1010.86	412.77	0	0	0	0	0.00	0.00	0	0	14
			6.1	60	252	3688	1415.90	307.39	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			2214	12880	1648.30	245.19	0	32	103	22	2.82	2.69	0	16	42
		Total Upstream			252	3688	1415.90	307.39	0	0	0	0	0.00	0.00	0	0	14
618	Junction Creek	10- 1-91															
			2.1	20	28	9	4.03	1.77	0	0	0	0	0.00	0.00	0	0	12
			2.7	30	486	690	309.06	193.77	0	0	0	0	0.00	0.00	0	0	12
			3.4	40	822	1855	830.87	318.85	0	0	0	0	0.00	0.00	0	0	12
			6.1	60	189	499	223.51	187.15	0	0	0	0	0.00	0.00	0	0	12
		Total Intertidal			1336	2554	381.32	133.85	0	0	0	0	0.00	0.00	0	0	36
		Total Upstream			189	499	223.51	187.15	0	0	0	0	0.00	0.00	0	0	12
621	Totemoff Creek	10-10-91															
			2.1	20	3892	4286	1645.49	490.59	0	1	0	0	0.00	0.00	0	0	14
			2.7	30	885	2166	831.57	291.59	0	2	0	0	0.00	0.00	0	0	14
			3.4	40	2065	5026	1929.59	373.30	4	451	1	0	0.00	0.00	0	0	14
			6.1	60	648	4406	1691.56	452.48	0	154	0	0	0.00	0.00	0	0	14
		Total Intertidal			6842	11478	1468.88	233.31	4	454	1	0	0.00	0.00	0	0	42
		Total Upstream			648	4406	1691.56	452.48	0	154	0	0	0.00	0.00	0	0	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc*	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Eggs Density	Pink Salmon Eggs SE	Pink Salmon Fry Dead	Pink Salmon Fry Live	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Eggs Density	Chum Salmon Eggs SE	Chum Salmon Fry Dead	Chum Salmon Fry Live	No. of Digs
623	Brizgaloff Creek	10-11-91															
			2.1	20	797	608	233.42	161.27	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	820	2824	1084.19	321.95	0	0	0	0	0.00	0.00	0	0	14
			3.4	40	1926	3119	1197.45	427.34	0	0	0	0	0.00	0.00	0	0	14
			6.1	60	2682	9093	3491.00	962.92	0	56	0	0	0.00	0.00	0	0	14
		Total Intertidal			3543	6551	838.36	193.70	0	0	0	0	0.00	0.00	0	0	42
		Total Upstream			2682	9093	3491.00	962.92	0	56	0	0	0.00	0.00	0	0	14
628	Chenega Creek	10- 1-91															
			2.1	20	437	1169	448.80	249.07	0	1	0	0	0.00	0.00	0	0	14
			2.7	30	907	3979	1527.62	397.06	0	0	0	0	0.00	0.00	0	0	14
			3.4	40	1087	3910	1501.13	273.02	0	4	0	0	0.00	0.00	0	0	14
			6.1	60	1059	6564	25 6.16	424.66	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			2431	9058	1159.19	193.01	0	5	0	0	0.00	0.00	0	0	42
		Total Upstream			1059	6564	2520.06	424.66	0	0	0	0	0.00	0.00	0	0	14
630	Bainbridge Creek	10-11-91															
			2.1	20	773	1010	387.76	162.09	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	1632	4896	1879.68	458.30	0	0	0	0	0.00	0.00	0	0	14
			3.4	40	1440	8924	3426.11	486.40	0	210	0	0	0.00	0.00	0	0	14
			6.1	60	1931	6384	2450.95	383.37	0	125	1	0	0.00	0.00	0	0	14
		Total Intertidal			3845	14830	1897.85	295.82	0	210	0	0	0.00	0.00	0	0	42
		Total Upstream			1931	6384	2450.95	383.37	0	125	1	0	0.00	0.00	0	0	14
632	Claw Creek	9-30-91															
			2.1	20	301	2600	998.20	273.88	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	117	2145	823.51	326.97	0	0	0	0	0.00	0.00	0	0	14
			3.4	40	497	6728	2583.02	491.03	0	0	0	0	0.00	0.00	0	0	14
			6.1	60	17	438	336.32	332.74	0	0	0	0	0.00	0.00	0	0	7
		Total Intertidal			915	11473	1468.24	244.93	0	0	0	0	0.00	0.00	0	0	42
		Total Upstream			17	438	336.32	332.74	0	0	0	0	0.00	0.00	0	0	7

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc*	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Eggs Density	Pink Salmon Eggs SE	Pink Salmon Fry Dead	Pink Salmon Fry Live	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Eggs Density	Chum Salmon Eggs SE	Chum Salmon Fry Dead	Chum Salmon Fry Live	No. of Digs
637	Pt. Countess	9-30-91															
			2.1	20	975	1143	438.82	146.57	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	757	2619	1005.49	358.86	0	0	0	0	0.00	0.00	0	0	14
			3.4	41	269	444	340.92	224.42	0	0	0	0	0.00	0.00	0	0	7
			3.4	42	449	1448	1111.84	487.73	0	0	0	0	0.00	0.00	0	0	7
			6.1	61	424	997	765.54	273.14	0	0	0	0	0.00	0.00	0	0	7
			6.1	62	95	1284	985.91	523.57	0	0	0	0	0.00	0.00	0	0	7
		Total Intertidal			2450	5654	723.56	159.45	0	0	0	0	0.00	0.00	0	0	42
		Total Upstream			519	2281	875.72	285.33	0	0	0	0	0.00	0.00	0	0	14
653	Hogg Creek	10-12-91															
			2.1	20	702	4657	1787.92	382.48	0	0	0	0	0.00	0.00	0	0	14
			2.7	31	49	14	10.75	3.89	0	0	0	0	0.00	0.00	0	0	7
			2.7	32	79	477	366.26	249.29	0	0	0	0	0.00	0.00	0	0	7
			3.4	40	321	4439	1704.23	467.12	0	0	0	0	0.00	0.00	0	0	14
			6.1	60	546	3876	1488.08	443.05	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			1151	9587	1226.88	231.24	0	0	0	0	0.00	0.00	0	0	42
		Total Upstream			546	3876	1488.08	443.05	0	0	0	0	0.00	0.00	0	0	14
656	Halverson Creek	9-30-91															
			2.1	22	91	2726	1046.57	291.53	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	518	886	340.15	161.51	0	0	0	0	0.00	0.00	0	0	14
			3.4	40	1383	2360	906.05	186.90	0	0	0	0	0.00	0.00	0	0	14
			6.1	60	858	4405	1691.17	423.96	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			1992	5972	764.26	133.06	0	0	0	0	0.00	0.00	0	0	42
		Total Upstream			858	4405	1691.17	423.96	0	0	0	0	0.00	0.00	0	0	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc[a]	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Eggs Density[b]	Pink Salmon Eggs SE	Pink Salmon Fry Dead	Pink Salmon Fry Live	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Eggs Density	Chum Salmon Eggs SE	Chum Salmon Fry Dead	Chum Salmon Fry Live	No. of Digs
663	Shelter Bay	9-27-91															
			2.1	20	10	6	2.69	2.69	0	0	0	0	0.00	0.00	0	0	12
			2.7	30	474	155	69.43	50.99	0	0	0	0	0.00	0.00	0	0	12
			3.4	40	3528	1941	869.39	310.89	0	0	0	0	0.00	0.00	0	0	12
			6.1	60	718	957	428.65	211.07	0	0	0	0	0.00	0.00	0	0	12
		Total Intertidal			4012	2102	313.83	121.78	0	0	0	0	0.00	0.00	0	0	36
		Total Upstream			718	957	428.65	211.07	0	0	0	0	0.00	0.00	0	0	12
665	Bjorne Creek	9-27-91															
			2.1	20	316	116	44.53	37.30	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	1610	188	72.18	26.49	0	0	0	0	0.00	0.00	0	0	14
			3.4	40	2738	941	361.27	135.05	0	0	0	0	0.00	0.00	0	0	14
			6.1	60	3942	2060	790.88	290.82	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			4664	1245	159.33	51.47	0	0	0	0	0.00	0.00	0	0	42
		Total Upstream			3942	2060	790.88	290.82	0	0	0	0	0.00	0.00	0	0	14
666	O'Brien Creek	9-28-91															
			2.1	20	145	51	19.58	8.29	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	508	451	173.15	95.22	0	0	0	0	0.00	0.00	0	0	14
			3.4	40	272	960	368.56	119.28	0	0	0	0	0.00	0.00	0	0	14
			6.1	60	1037	2395	919.49	321.64	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			925	1462	187.10	54.47	0	0	0	0	0.00	0.00	0	0	42
		Total Upstream			1037	2395	919.49	321.64	0	0	0	0	0.00	0.00	0	0	14
673	Falls Creek	9-28-91															
			2.1	20	918	3417	1311.86	539.91	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	1967	4095	1572.16	272.18	0	0	0	0	0.00	0.00	0	0	14
			3.4	40	1810	6742	2588.40	493.63	0	0	0	0	0.00	0.00	0	0	14
			6.1	60	1254	5683	2181.83	487.92	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			4695	14254	1824.14	267.94	0	0	0	0	0.00	0.00	0	0	42
		Total Upstream			1254	5683	2181.83	487.92	0	0	0	0	0.00	0.00	0	0	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc*	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Eggs Density	Pink Salmon Eggs SE	Pink Salmon Fry Dead	Pink Salmon Fry Live	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Eggs Density	Chum Salmon Eggs SE	Chum Salmon Fry Dead	Chum Salmon Fry Live	No. of Digs
677	Hayden Creek	10-12-91															
			2.1	21	198	1284	985.91	392.74	0	0	0	0	0.00	0.00	0	0	7
			2.1	22	270	2081	1597.88	721.78	0	14	0	0	0.00	0.00	0	0	7
			2.7	31	258	1399	1074.21	632.31	0	0	0	0	0.00	0.00	0	0	7
			2.7	32	464	1443	1108.00	815.44	0	2	0	0	0.00	0.00	0	0	7
			3.4	41	473	994	763.24	311.92	0	0	0	0	0.00	0.00	0	0	7
			3.4	42	433	1933	1484.24	381.09	0	0	0	0	0.00	0.00	0	0	7
			6.1	61	405	1195	917.57	389.06	0	0	0	0	0.00	0.00	0	0	7
			6.1	62	547	1243	954.43	222.55	0	0	0	0	0.00	0.00	0	0	7
		Total Intertidal			2096	9134	1168.91	224.42	0	16	0	0	0.00	0.00	0	0	42
		Total Upstream			952	2438	936.00	215.38	0	0	0	0	0.00	0.00	0	0	14
678	Sleepy Bay	9-25-91															
			2.1	20	199	182	81.52	38.74	0	0	0	0	0.00	0.00	0	0	12
			2.7	30	1264	1245	557.65	187.91	0	0	0	0	0.00	0.00	0	0	12
			3.4	40	1335	688	308.16	99.82	0	0	0	0	0.00	0.00	0	0	12
			6.1	60	1510	1027	460.00	167.56	0	0	0	0	0.00	0.00	0	0	12
		Total Intertidal			2798	2115	315.78	77.33	0	0	0	0	0.00	0.00	0	0	36
		Total Upstream			1510	1027	460.00	167.56	0	0	0	0	0.00	0.00	0	0	12
681	Hogan Bay	9-27-91															
			2.1	20	925	877	336.70	128.44	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	1091	994	381.62	176.40	0	0	0	0	0.00	0.00	0	0	14
			3.4	40	3367	4681	1797.14	357.48	0	0	0	0	0.00	0.00	0	0	14
			6.1	60	1340	1356	520.60	172.13	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			5383	6552	838.48	172.50	0	0	0	0	0.00	0.00	0	0	42
		Total Upstream			1340	1356	520.60	172.13	0	0	0	0	0.00	0.00	0	0	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc[1]	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Eggs Density[2]	Pink Salmon Eggs SE	Pink Salmon Fry Dead	Pink Salmon Fry Live	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Eggs Density	Chum Salmon Eggs SE	Chum Salmon Fry Dead	Chum Salmon Fry Live	No. of Digs
682	Snug Harbor	9-26-91															
			2.1	20	1957	1073	411.95	126.56	0	5	0	0	0.00	0.00	0	0	14
			2.7	30	3663	3049	1170.58	364.14	0	0	0	0	0.00	0.00	0	0	14
			3.4	40	1677	1357	520.98	342.10	0	0	0	0	0.00	0.00	0	0	14
			6.1	60	5256	3624	1391.33	255.17	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			7297	5479	701.17	175.53	0	5	0	0	0.00	0.00	0	0	42
		Total Upstream			5256	3624	1391.33	255.17	0	0	0	0	0.00	0.00	0	0	14
692	Herring Bay	10- 7-91															
			2.1	20	1039	1864	715.63	207.85	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	2336	3971	1524.55	316.70	0	0	0	0	0.00	0.00	0	0	14
			3.4	40	1084	3445	1322.61	253.01	0	0	0	0	0.00	0.00	0	0	14
			6.1	60	748	3081	1182.86	406.45	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			4459	9280	1187.60	157.53	0	0	0	0	0.00	0.00	0	0	42
		Total Upstream			748	3081	1182.86	406.45	0	0	0	0	0.00	0.00	0	0	14
695	Port Audrey	10- 2-91															
			2.1	20	286	1866	716.40	312.75	0	3	0	0	0.00	0.00	0	0	14
			2.7	31	342	1231	945.21	472.18	0	0	0	0	0.00	0.00	0	0	7
			2.7	32	77	348	267.21	133.71	0	0	0	0	0.00	0.00	0	0	7
			3.4	40	250	1620	621.95	447.36	0	7	0	0	0.00	0.00	0	0	14
			6.1	60	170	1719	659.96	315.28	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			955	5065	648.19	195.85	0	10	0	0	0.00	0.00	0	0	42
		Total Upstream			170	1719	659.96	315.28	0	0	0	0	0.00	0.00	0	0	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc'	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Eggs Density	Pink Salmon Eggs SE	Pink Salmon Fry Dead	Pink Salmon Fry Live	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Eggs Density	Chum Salmon Eggs SE	Chum Salmon Fry Dead	Chum Salmon Fry Live	No. of Digs
699	Cathead Bay	10- 2-91															
			2.1	20	1781	2750	1055.78	393.54	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	584	2226	854.61	267.56	0	0	0	0	0.00	0.00	0	0	14
			3.4	40	654	1719	659.96	180.79	0	0	0	0	0.00	0.00	0	0	14
			6.1	60	679	2744	1053.48	470.49	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			3019	6695	856.78	167.41	0	0	0	0	0.00	0.00	0	0	42
		Total Upstream			679	2744	1053.48	470.49	0	0	0	0	0.00	0.00	0	0	14
740	Kelez Creek	9-25-91															
			2.1	20	373	349	133.99	81.34	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	1340	1918	736.36	307.20	0	0	0	0	0.00	0.00	0	0	14
			3.4	40	1300	1557	597.77	142.66	0	0	0	0	0.00	0.00	0	0	14
			6.1	60	308	2125	815.83	366.43	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			3013	3824	489.37	120.18	0	0	0	0	0.00	0.00	0	0	42
		Total Upstream			308	2125	815.83	366.43	0	0	0	0	0.00	0.00	0	0	14
744	Wilby Creek	9-25-91															
			2.1	20	873	76	29.18	21.37	0	31	0	0	0.00	0.00	0	0	14
			2.7	31	530	1074	412.33	167.37	0	0	0	0	0.00	0.00	0	0	14
			3.4	40	593	1885	723.69	320.69	0	0	0	0	0.00	0.00	0	0	14
			6.1	60	150	681	261.45	153.30	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			1996	3035	388.40	125.88	0	31	0	0	0.00	0.00	0	0	42
		Total Upstream			150	681	261.45	153.30	0	0	0	0	0.00	0.00	0	0	14
747	Cabin Creek	9-24-91															
			2.1	20	377	127	48.76	23.40	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	1927	1801	691.44	192.00	0	0	0	0	0.00	0.00	0	0	14
			3.4	40	585	1956	750.95	283.43	0	0	0	0	0.00	0.00	0	0	14
			6.1	60	1018	1515	581.64	267.73	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			2889	3884	497.05	122.10	0	0	0	0	0.00	0.00	0	0	42
		Total Upstream			1018	1515	581.64	267.73	0	0	0	0	0.00	0.00	0	0	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc[a]	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Eggs Density[b]	Pink Salmon Eggs SE	Pink Salmon Fry Dead	Pink Salmon Fry Live	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Eggs Density	Chum Salmon Eggs SE	Chum Salmon Fry Dead	Chum Salmon Fry Live	No. of Digs
828	Cook Creek	9-24-91															
			2.1	20	28	6	2.30	0.74	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	687	893	342.84	108.59	0	0	0	0	0.00	0.00	0	0	14
			3.4	41	713	744	571.28	237.96	0	0	0	0	0.00	0.00	0	0	7
			3.4	42	420	1265	971.32	590.62	0	0	0	0	0.00	0.00	0	0	7
			6.1	60	2323	3533	1356.39	334.38	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			1848	2908	372.15	117.79	0	0	0	0	0.00	0.00	0	0	42
		Total Upstream			2323	3533	1356.39	334.38	0	0	0	0	0.00	0.00	0	0	14
861	Bernard Creek	9-23-91															
			2.1	20	22	1	0.38	0.38	0	0	0	0	0.00	0.00	0	0	14
			2.7	30	1977	895	343.61	228.03	0	0	0	0	0.00	0.00	0	0	14
			3.4	40	1944	1269	487.20	156.76	0	0	0	0	0.00	0.00	0	0	14
			6.1	60	3298	2769	1063.08	308.39	0	0	0	0	0.00	0.00	0	0	14
		Total Intertidal			3943	2165	277.06	95.45	0	0	0	0	0.00	0.00	0	0	42
		Total Upstream			3298	2769	1063.08	308.39	0	0	0	0	0.00	0.00	0	0	14
Prince William Sound Summary																	
		Total Intertidal			95599	201836	854.23	35.38	10	1173	277	1059	4.48	76.17	4	422	1270
		Total Upstream			43406	94455	1205.93	76.17	0	338	2	0	.00	96.25	0	0	421

Notes:

[a] Location code used to separate digs within tide zone.
[b] Number of eggs per meter squared.

APPENDIX B.1

1989 Prince William Sound pink and chum salmon fry survey data summary, first pass

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
11	Humpy Creek	4- 9-89															
			2.1	20	0	0	2	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			2.7	30	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			3.4	40	0	0	1	112	60.20	60.20	0	0	0	0	0.00	0.00	10
			6.1	90	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			6.1	100	15	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			6.1	120	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			6.1	123	2	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
		Total Intertidal			0	0	3	112	20.07	20.07	0	0	0	0	0.00	0.00	30
		Total Upstream			17	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	40
35	Koppen Creek	4- 8-89															
			2.7	30	47	0	53	3095	1663.53	459.54	18	0	0	369	198.33	80.70	10
			2.7	33	61	0	13	755	405.80	327.25	0	0	0	0	0.00	0.00	10
			2.7	34	55	0	40	2394	1286.75	400.21	10	0	1	386	207.47	107.34	10
			3.4	40	608	8	4	418	224.67	106.44	365	0	1	10	5.37	2.66	10
			6.1	90	29	0	15	360	193.50	107.11	46	0	4	164	88.15	69.70	10
			6.1	100	455	0	1	496	266.60	230.18	252	0	0	144	77.40	65.33	10
			6.1	120	51	0	0	0	0.00	0.00	6	0	0	1	0.54	0.54	10
		Total Intertidal			771	8	110	6662	895.19	193.49	393	0	2	765	102.79	36.03	40
		Total Upstream			535	0	16	856	153.36	84.28	304	0	4	309	55.36	31.57	30
52	Control Creek	4- 7-89															
			2.1	20	54	0	0	892	479.44	132.92	1	0	0	15	8.06	5.90	10
			2.7	30	292	72	0	71	38.16	15.81	0	0	0	0	0.00	0.00	10
			3.4	40	807	0	0	1156	621.34	212.59	147	2	0	179	96.21	42.13	10
			6.1	80	12	0	0	462	354.74	220.62	0	308	0	16	12.29	11.41	7
			6.1	90	0	0	1	343	184.36	140.54	1	0	0	310	166.62	76.71	10
			6.1	100	313	0	3	347	169.55	114.41	52	0	0	308	150.50	117.38	11
			6.1	120	271	0	3	163	87.61	85.83	153	0	0	86	46.22	45.63	10
		Total Intertidal			1153	72	0	2119	379.65	93.03	148	2	0	194	34.76	15.90	30
		Total Upstream			596	0	7	1315	186.00	66.53	206	308	0	720	101.84	41.26	38

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon						Chum Salmon						No. of Digs
					Eggs		Fry				Eggs		Fry				
					Dead	Live	Dead	Live	Density	SE	Dead	Live	Dead	Live	Density	SE	
80	Whalen Creek	4- 7-89															
			2.1	20	132	40	2	98	52.67	26.74	0	0	0	0	0.00	0.00	10
			2.7	30	209	0	0	86	46.22	30.45	1	1	0	0	0.00	0.00	10
			3.4	40	1310	21	0	1	0.54	0.54	149	0	0	0	0.00	0.00	10
			6.1	100	264	0	0	1	0.54	0.54	169	0	0	17	9.14	9.14	10
			6.1	120	466	0	0	1	0.54	0.54	35	0	0	2	1.07	0.72	10
		Total Intertidal			1651	61	2	185	33.15	13.73	150	1	0	0	0.00	0.00	30
		Total Upstream			730	0	0	2	0.54	0.37	204	0	0	19	5.11	4.56	20
87	Sunny River	4- 7-89															
			2.1	20	1	0	0	191	102.66	101.47	18	0	0	53	28.49	22.26	10
			2.7	30	118	0	0	294	158.02	92.44	7	0	0	0	0.00	0.00	10
			2.7	33	98	0	1	566	304.22	110.41	10	0	1	275	147.81	98.25	10
			3.4	40	0	0	1	145	77.94	58.17	0	0	0	110	59.12	56.15	10
			3.4	43	166	0	0	33	17.74	11.07	269	0	1	310	166.62	93.93	10
			3.4	44	0	0	0	38	20.42	16.22	1	0	75	465	249.93	156.06	10
		Total Intertidal			383	0	2	1267	113.50	32.36	305	0	77	1213	108.66	36.20	60
		Total Upstream															0
104	Virgin Bay	3-28-89															
			2.1	20	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			2.7	30	0	0	0	3	1.61	1.61	5	0	0	1	0.54	0.54	10
			3.4	40	0	0	0	0			0	0	0	0			0
			6.1	60	0	0	0	0			0	0	0	0			0
		Total Intertidal			0	0	0	3	0.81	0.81	5	0	0	1	0.27	0.27	20
		Total Upstream															0

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
106	Gladhough Creek	3-26-89															
			2.1	20	188	0	3	88	47.30	28.33	0	0	0	0	0.00	0.00	10
			2.7	30	175	0	3	1366	734.21	206.41	0	0	0	0	0.00	0.00	10
			3.4	40	15	0	0	1705	916.42	306.68	0	0	0	0	0.00	0.00	10
			6.1	60	0	0	0	0			0	0	0	0			0
		Total Intertidal			378	0	6	3159	565.98	138.02	0	0	0	0	0.00	0.00	30
		Total Upstream															0
107	Black Creek	3-26-89															
			2.1	20	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			2.7	30	1	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			3.4	40	13	0	1	992	533.19	308.11	0	0	0	0	0.00	0.00	10
		Total Intertidal			14	0	1	992	177.73	109.54	0	0	0	0	0.00	0.00	30
		Total Upstream															0
117	Indian Creek	3-26-89															
			2.1	20	6	0	0	165	88.69	29.56	0	0	0	0	0.00	0.00	10
			2.7	30	495	0	11	619	332.71	131.06	0	0	0	13	6.99	3.85	10
			3.4	40	488	0	1	11	5.91	4.84	0	0	0	2	1.07	0.72	10
			6.1	60	31	0	1	532	285.94	156.96	0	0	0	190	102.12	65.58	10
			6.1	63	0	0	0	0			0	0	0	0			0
		Total Intertidal			989	0	12	795	142.43	50.33	0	0	0	15	2.69	1.38	30
		Total Upstream			31	0	1	532	285.94	156.96	0	0	0	190	102.12	65.58	10
123	Gregorieff Creek	3-27-89															
			2.1	80	0	0	0	0	0.00	0.00	0	0	0	1	0.54	0.54	10
			2.7	90	0	0	0	942	506.32	180.30	0	0	0	656	352.59	147.98	10
			3.4	100	2	0	0	71	38.16	23.60	0	0	0	13	6.99	4.17	10
			6.1	120	0	0	3	67	36.01	19.10	41	0	0	58	31.17	16.84	10
		Total Intertidal			2	0	0	1013	181.49	72.44	0	0	0	670	120.04	56.57	30
		Total Upstream			0	0	3	67	36.01	19.10	41	0	0	58	31.17	16.84	10

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
153	Stellar Creek	3-27-89															
			2.1	80	25	0	0	17	9.14	8.56	0	0	0	8	4.30	2.75	10
			2.7	90	135	0	0	27	14.51	8.74	50	0	0	6	3.22	1.43	10
			3.4	100	25	0	1	1089	585.33	251.76	25	0	0	86	46.22	23.85	10
			3.4	103	0	0	0	48	25.80	11.93	355	0	0	2026	1088.95	371.35	10
			6.1	120	30	0	111	1650	886.86	362.90	15	0	18	499	268.21	90.34	10
		Total Intertidal			185	0	1	1181	158.69	72.32	430	0	0	2126	285.68	116.24	40
		Total Upstream			30	0	111	1650	886.86	362.90	15	0	18	499	268.21	90.34	10
265	Unakwik Creek	3-29-89															
			2.1	20	0	0	0	400	215.00	104.19	0	0	0	0	0.00	0.00	10
			2.7	30	1	0	0	561	301.53	115.82	0	0	0	0	0.00	0.00	10
			3.4	40	23	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			3.4	43	0	0	0	0			0	0	0	0			0
		Total Intertidal			24	0	0	961	172.18	55.36	0	0	0	0	0.00	0.00	30
		Total Upstream															0
276	Black Bear Creek	3-29-89															
			2.1	20	14	0	0	1224	657.89	318.46	0	0	0	19	10.21	9.08	10
			2.7	30	0	0	1	722	388.07	216.15	1	0	1	136	73.10	68.37	10
			3.4	40	0	0	0	1306	638.15	196.30	0	0	0	406	198.38	127.45	11
			6.1	60	1	0	0	455	244.56	150.75	0	0	0	0	0.00	0.00	10
		Total Intertidal			14	0	1	3252	563.84	139.24	1	0	1	561	97.27	50.89	31
		Total Upstream			1	0	0	455	244.56	150.75	0	0	0	0	0.00	0.00	10
322	Coghill River	3-29-89															
			1.5	10	0	0	0	32	11.47	7.71	0	0	0	409	146.56	98.55	15
		Total Intertidal			0	0	0	32	11.47	7.71	0	0	0	409	146.56	98.55	15
		Total Upstream															0

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
421	Mill Creek	3-30-89															
			2.1	20	0	0	0	202	108.57	61.00	0	0	0	13	6.99	6.99	10
			2.7	30	23	0	0	274	147.27	87.18	38	0	0	139	74.71	42.54	10
			3.4	40	0	0	0	0	0.00	0.00	19	0	0	723	388.61	247.27	10
			6.1	60	0	0	0	0			0	0	0	0			0
		Total Intertidal			23	0	0	476	85.28	36.13	57	0	0	875	156.77	86.43	30
		Total Upstream															0
430	Meacham Creek	3-30-89															
			2.1	20	6	0	0	140	75.25	45.96	0	0	0	0	0.00	0.00	10
			2.7	30	187	0	0	877	471.38	168.82	0	0	0	0	0.00	0.00	10
			2.7	33	64	0	2	53	28.49	27.31	0	0	0	1	0.54	0.54	10
			3.4	41	5	0	0	1383	743.35	376.35	1	0	0	536	288.09	120.70	10
			3.4	42	0	0	0	218	117.17	54.51	0	0	0	276	148.35	108.17	10
			6.1	60	16	0	0	603	324.11	135.70	0	0	0	10	5.37	3.93	10
		Total Intertidal			262	0	2	2671	287.13	89.59	1	0	0	813	87.40	35.18	50
		Total Upstream			16	0	0	603	324.11	135.70	0	0	0	10	5.37	3.93	10
455	Paulson Creek	3-30-89															
			2.1	20	0	0	0	271	145.66	83.05	0	0	0	1	0.54	0.54	10
			2.7	30	0	0	0	0	0.00	0.00	39	0	0	0	0.00	0.00	10
			3.4	40	0	0	0	0			0	0	0	0			0
			6.1	60	0	0	0	0			0	0	0	0			0
		Total Intertidal			0	0	0	271	72.83	43.73	39	0	0	1	0.27	0.27	20
		Total Upstream															0

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
480	Mink Creek	3-30-89															
			2.1	80	57	0	0	523	281.11	115.11	23	0	0	97	52.14	45.18	10
			2.7	90	8	0	0	14	7.52	3.32	18	0	0	0	0.00	0.00	10
			3.4	100	1	0	25	844	453.64	162.71	0	0	0	300	161.25	120.43	10
			6.1	120	164	0	5	393	211.23	95.24	25	0	0	91	48.91	38.44	10
			6.1	123	0	0	0	0	0.00	0.00	76	0	0	0	0.00	0.00	10
		Total Intertidal			66	0	25	1381	247.42	72.62	41	0	0	397	71.13	43.21	30
		Total Upstream			164	0	5	393	105.62	52.30	101	0	0	91	24.46	19.53	20
604	Erb Creek	3-31-89															
			2.1	20	6	0	0	5	2.69	1.20	0	0	0	0	0.00	0.00	10
			2.7	30	4	0	1	249	133.83	66.09	0	0	0	0	0.00	0.00	10
			2.7	33	5	0	2	792	425.69	136.54	0	0	0	0	0.00	0.00	10
			3.4	40	110	0	16	2187	1175.49	326.84	0	0	0	1	0.54	0.54	10
			6.1	60	0	0	0	0			0	0	0	0			0
		Total Intertidal			125	0	19	3233	434.43	113.07	0	0	0	1	0.13	0.13	40
		Total Upstream															0
621	Totemoff Creek	3-31-89															
			2.1	20	97	0	1	503	270.36	83.89	0	0	0	0	0.00	0.00	10
			2.7	30	9	0	2	1022	549.31	146.76	0	0	0	0	0.00	0.00	10
			3.4	40	220	0	0	1434	770.76	164.08	0	0	0	0	0.00	0.00	10
			6.1	60	505	0	40	2319	1246.44	276.08	0	0	0	0	0.00	0.00	10
		Total Intertidal			326	0	3	2959	530.14	84.77	0	0	0	0	0.00	0.00	30
		Total Upstream			505	0	40	2319	1246.44	276.08	0	0	0	0	0.00	0.00	10

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
632	Claw Creek	4- 1-89															
			2.1	20	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			2.7	30	3	0	0	1	0.54	0.54	0	0	0	0	0.00	0.00	10
			2.7	33	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	5
			3.4	40	5	0	5	1148	617.04	222.54	0	0	0	0	0.00	0.00	10
			6.1	60	0	0	0	0			0	0	0	0			0
		Total Intertidal			8	0	5	1149	176.45	77.65	0	0	0	0	0.00	0.00	35
		Total Upstream															0
673	Falls Creek	4- 1-89															
			2.1	20	1	0	0	113	60.74	45.77	0	0	0	0	0.00	0.00	10
			2.7	30	0	0	0	2379	1278.69	340.34	0	0	0	0	0.00	0.00	10
			3.4	40	0	0	0	547	294.01	152.27	0	0	0	0	0.00	0.00	10
			6.1	60	25	0	6	1239	665.95	254.89	0	0	0	0	0.00	0.00	10
		Total Intertidal			1	0	0	3039	544.48	155.58	0	0	0	0	0.00	0.00	30
		Total Upstream			25	0	6	1239	665.95	254.89	0	0	0	0	0.00	0.00	10
677	Hayden Creek	4- 1-89															
			2.1	20	6	0	0	1093	587.48	144.97	0	0	0	0	0.00	0.00	10
			2.7	30	0	0	0	1336	718.09	246.29	0	0	0	0	0.00	0.00	10
			3.4	40	91	0	0	579	311.21	173.37	0	0	0	0	0.00	0.00	10
			6.1	60	0	0	0	0			0	0	0	0			0
		Total Intertidal			97	0	0	3008	538.92	112.03	0	0	0	0	0.00	0.00	30
		Total Upstream															0

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
681	Hogan Bay	4- 4-89															
			2.1	20	33	0	0	381	204.78	93.50	0	0	0	0	0.00	0.00	10
			2.7	30	2	0	0	275	147.81	144.85	0	0	0	0	0.00	0.00	10
			3.4	40	17	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			6.1	60	0	0	0	0			0	0	0	0			0
		Total Intertidal			52	0	0	656	117.53	57.72	0	0	0	0	0.00	0.00	30
		Total Upstream															0
682	Snug Harbor	4- 3-89															
			2.1	20	182	0	9	2155	1158.29	329.86	0	0	0	0	0.00	0.00	10
			2.7	30	979	0	15	1556	836.33	372.43	0	0	0	0	0.00	0.00	10
			3.4	40	136	0	199	3656	1965.06	566.43	0	0	0	0	0.00	0.00	10
			6.1	60	0	0	71	3933	2113.95	379.36	0	0	0	0	0.00	0.00	10
		Total Intertidal			1297	0	223	7367	1319.90	258.01	0	0	0	0	0.00	0.00	30
		Total Upstream			0	0	71	3933	2113.95	379.36	0	0	0	0	0.00	0.00	10
684	Marsha Bay	4- 4-89															
			2.1	20	9	0	0	198	212.85	159.20	0	0	0	0	0.00	0.00	5
			2.7	30	42	0	2	57	61.27	59.94	0	0	0	0	0.00	0.00	5
			3.4	40	63	0	0	27	29.02	18.74	0	0	0	0	0.00	0.00	5
			6.1	60	147	0	2	741	398.28	262.89	0	0	0	0	0.00	0.00	10
		Total Intertidal			114	0	2	282	101.05	56.99	0	0	0	0	0.00	0.00	15
		Total Upstream			147	0	2	741	398.28	262.89	0	0	0	0	0.00	0.00	10
687	Bay of Isles	4- 3-89															
			2.1	20	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	5
			2.7	30	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	5
			3.4	40	4	0	0	23	13.74	12.45	0	0	0	0	0.00	0.00	9
			6.1	60	15	0	0	5	2.69	2.69	0	0	0	0	0.00	0.00	10
		Total Intertidal			4	0	0	23	6.51	5.94	0	0	0	0	0.00	0.00	19
		Total Upstream			15	0	0	5	2.69	2.69	0	0	0	0	0.00	0.00	10

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
689	Louis Bay	4- 4-89															
			2.1	20	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			3.4	40	0	0	0	0			0	0	0	0			0
			6.1	60	0	0	0	0			0	0	0	0			0
		Total Intertidal			0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
		Total Upstream															0
692	Herring Bay	4- 3-89															
			1.5	10	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			2.1	20	0	0	1	21	11.29	11.29	0	0	0	0	0.00	0.00	10
			2.7	30	0	0	0	1	0.54	0.54	0	0	0	0	0.00	0.00	10
			3.4	40	5	0	6	431	231.66	176.12	0	0	0	0	0.00	0.00	10
			6.1	60	0	0	0	0			0	0	0	0			0
		Total Intertidal			5	0	7	453	60.87	45.24	0	0	0	0	0.00	0.00	40
		Total Upstream															0
707	MacLeod Creek	4- 2-89															
			2.1	20	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			2.7	30	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			3.4	40	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			6.1	60	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			6.1	80	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			6.1	90	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	11
			6.1	100	0	0	0	0			0	0	0	0			0
			6.1	120	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
		Total Intertidal			0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	30
		Total Upstream			0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	41

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
711	Quadra Creek	4- 2-89															
			2.1	20	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			2.7	30	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			3.4	40	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			6.1	60	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			6.1	80	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			6.1	90	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			6.1	100	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
		Total Intertidal			0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	30
		Total Upstream			0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	40
744	Wilby Creek	4- 4-89															
			2.1	20	26	0	1	155	83.31	83.31	0	0	0	0	0.00	0.00	10
			2.7	30	0	0	0	22	11.82	11.82	0	0	0	0	0.00	0.00	10
			3.4	40	0	0	0	4	2.15	0.88	0	0	0	0	0.00	0.00	10
			6.1	60	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
		Total Intertidal			26	0	1	181	32.43	27.89	0	0	0	0	0.00	0.00	30
		Total Upstream			0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
747	Cabin Creek	4- 5-89															
			2.1	20	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			2.7	30	8	0	0	100	53.75	24.72	0	0	0	0	0.00	0.00	10
			3.4	40	30	0	6	461	247.78	112.73	0	0	0	0	0.00	0.00	10
			6.1	60	555	0	224	128	68.80	45.61	0	69	0	0	0.00	0.00	10
		Total Intertidal			38	0	6	561	100.51	42.05	0	0	0	0	0.00	0.00	30
		Total Upstream			555	0	224	128	68.80	45.61	0	69	0	0	0.00	0.00	10

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
749	Shad Creek	4- 5-89															
			2.1	20	11	0	0	14	7.52	4.75	0	0	0	0	0.00	0.00	10
			2.7	30	56	0	0	796	427.84	253.87	0	0	0	0	0.00	0.00	10
			3.4	40	1	0	0	6	3.22	2.29	0	0	0	0	0.00	0.00	10
			6.1	90	10	0	0	9	4.84	2.19	0	0	0	0	0.00	0.00	10
			6.1	100	5	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			6.1	120	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
		Total Intertidal			68	0	0	816	146.20	89.65	0	0	0	0	0.00	0.00	30
		Total Upstream			15	0	0	9	1.61	0.82	0	0	0	0	0.00	0.00	30
775	Pautzke Creek	4- 5-89															
			2.1	20	0	0	0	0			0	0	0	0			0
			2.7	30	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			3.4	40	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			6.1	60	2	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			6.1	120	64	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
		Total Intertidal			0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	20
		Total Upstream			66	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	20
815	Constantine Creek	4- 6-89															
			2.7	30	24	0	0	13	6.99	3.76	0	0	0	0	0.00	0.00	10
			3.0	33	0	0	6	267	143.51	65.14	1	0	0	47	25.26	18.60	10
			3.4	40	0	0	0	1	0.54	0.54	15	0	0	1	0.54	0.54	10
			12.0	43	2	0	0	17	9.14	7.08	4	0	0	95	51.06	44.60	10
			13.0	50	109	0	2	121	65.04	55.13	632	0	0	3	1.61	1.15	10
			6.1	80	0	5	2	83	44.61	43.42	340	0	0	153	82.24	50.83	10
			6.1	90	0	0	0	0	0.00	0.00	712	0	0	3	1.61	1.61	10
			6.1	100	0	0	0	0	0.00	0.00	268	0	0	0	0.00	0.00	10
			6.1	120	0	0	0	197	105.89	104.70	0	0	0	2	1.07	0.72	10
		Total Intertidal			26	0	6	298	40.04	18.45	20	0	0	143	19.22	12.09	40
		Total Upstream			109	5	4	401	43.11	24.84	1952	0	0	161	17.31	10.80	50

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
828	Cook Creek	4- 6-89															
			2.7	30	80	0	0	619	332.71	125.02	35	0	0	0	0.00	0.00	10
			3.4	40	363	0	0	1130	607.36	250.54	37	0	0	598	321.42	160.89	10
			6.1	80	32	0	0	125	67.19	45.60	0	0	0	0	0.00	0.00	10
			6.1	90	0	0	0	0			0	0	0	0			0
			6.1	100	191	0	2	18	9.67	7.96	148	0	0	68	36.55	30.35	10
			6.1	120	40	0	0	293	157.48	143.92	215	0	32	560	300.99	229.35	10
		Total Intertidal			443	0	0	1749	470.03	139.86	72	0	0	598	160.71	86.55	20
		Total Upstream			263	0	2	436	78.12	49.92	363	0	32	628	112.51	78.47	30
850	Canoe Creek	4- 8-89															
			2.1	21	0	0	0	142	152.65	135.36	0	0	0	0	0.00	0.00	5
			2.1	22	4	0	0	197	211.77	149.17	0	0	0	0	0.00	0.00	5
			2.7	31	0	0	0	604	649.29	606.88	7	0	0	1	1.07	1.07	5
			2.7	32	23	0	0	22	23.65	14.68	0	0	0	0	0.00	0.00	5
			3.4	41	230	0	0	87	93.52	57.25	0	0	0	3	3.22	2.15	5
			3.4	42	17	0	0	107	115.02	83.35	0	0	0	0	0.00	0.00	5
			6.1	100	45	0	5	814	437.52	198.66	5	0	3	40	21.50	13.04	10
			6.1	120	821	0	95	1535	825.05	548.11	44	0	0	3	1.61	1.61	10
		Total Intertidal			274	0	0	1159	207.65	105.34	7	0	0	4	0.72	0.43	30
		Total Upstream			866	0	100	2349	631.28	287.19	49	0	3	43	11.56	6.79	20

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
861	Bernard Creek	4- 9-89															
			2.1	20	14	0	2	571	306.91	162.23	0	0	0	0	0.00	0.00	10
			2.7	30	33	0	26	1955	1050.79	465.94	0	0	0	0	0.00	0.00	10
			3.4	40	14	0	51	3536	1900.56	476.47	0	0	0	0	0.00	0.00	10
			6.1	90	27	0	1	772	414.94	213.29	0	0	0	0	0.00	0.00	10
			6.1	100	18	0	0	182	97.82	34.46	0	0	0	0	0.00	0.00	10
			6.1	120	256	0	0	38	20.42	13.90	0	0	0	0	0.00	0.00	10
		Total Intertidal			61	0	79	6062	1086.09	251.56	0	0	0	0	0.00	0.00	30
		Total Upstream			301	0	1	992	177.73	76.51	0	0	0	0	0.00	0.00	30
Prince William Sound Summary																	
		Total Intertidal			8989	141	518	59648	270.56	19.59	2301	3	80	8789	39.87	21.08	1185
		Total Upstream			4878	5	591	18304	189.56	26.20	2603	377	57	2725	28.22	27.46	519

Notes:

[a] Location code used to separate digs within tide zone.
[b] Number of fry per meter squared.

APPENDIX B.2

1989 Prince William Sound pink and chum salmon fry survey data summary, second pass

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
35	Koppen Creek	4-24-89															
			2.7	30	59	0	19	2670	1435.10	300.98	35	0	0	157	84.39	81.41	10
			2.7	34	112	0	28	2050	1101.85	257.80	265	0	0	566	304.22	117.27	10
			3.4	40	545	0	0	85	45.69	13.32	648	0	0	175	94.06	83.58	10
			6.1	90	94	0	10	738	396.67	191.43	6	0	0	117	62.89	35.98	10
			6.1	100	19	0	0	49	43.90	25.64	8	0	0	1	0.90	0.90	6
			6.1	110	53	0	0	1	1.34	1.34	0	0	0	0	0.00	0.00	4
			6.1	120	12	0	0	2	1.07	1.07	0	0	0	0	0.00	0.00	10
		Total Intertidal			716	0	47	4805	860.88	168.41	948	0	0	898	160.89	56.44	30
		Total Upstream			178	0	10	790	141.54	70.32	14	0	0	118	21.14	12.81	30
455	Paulson Creek	4-14-89															
			2.1	20	0	0	0	344	184.90	94.15	0	0	0	0	0.00	0.00	10
			2.7	30	1	0	1	7	3.76	3.76	4	0	0	2	1.07	1.07	10
			3.4	40	77	0	7	154	82.77	31.73	28	0	6	744	399.89	160.00	10
			6.1	60	216	0	7	893	479.98	228.78	130	0	18	618	332.17	95.78	10
		Total Intertidal			78	0	8	505	90.48	34.82	32	0	6	746	133.66	62.21	30
		Total Upstream			216	0	7	893	479.98	228.78	130	0	18	618	332.17	95.78	10
480	Mink Creek	4-15-89															
			2.1	80	40	0	2	640	312.72	106.05	0	0	0	66	32.25	29.63	11
			2.7	90	14	0	3	326	194.69	157.27	8	0	0	70	41.80	27.45	9
			3.4	100	0	0	29	2514	1351.25	241.82	0	0	3	436	234.35	164.85	10
			6.1	120	162	0	10	247	132.76	130.97	0	0	0	0	0.00	0.00	10
		Total Intertidal			54	0	34	3480	623.49	136.86	8	0	3	572	102.48	57.32	30
		Total Upstream			162	0	10	247	132.76	130.97	0	0	0	0	0.00	0.00	10

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
485	W. Finger Creek	4-14-89															
			2.1	20	0	0	0	324	174.15	121.71	0	0	0	41	22.04	15.06	10
			2.7	30	47	0	2	1819	977.69	287.42	8	0	0	402	216.07	118.37	10
			3.4	40	19	0	20	370	198.87	101.09	7	0	0	4	2.15	1.64	10
			6.1	60	0	0	26	2125	1142.17	227.07	0	0	0	0	0.00	0.00	10
		Total Intertidal			66	0	22	2513	450.24	126.24	15	0	0	447	80.09	42.36	30
		Total Upstream			0	0	26	2125	1142.17	227.07	0	0	0	0	0.00	0.00	10
495	Chimevisky Lagoon	4-14-89															
			2.1	20	0	0	1	394	211.77	209.98	0	0	0	76	40.85	39.66	10
			2.7	30	2	0	0	573	307.98	235.03	0	0	0	30	16.12	9.61	10
			3.4	40	463	1	11	84	45.15	41.65	8	0	0	0	0.00	0.00	10
			13.5	50	0	0	130	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			6.1	60	0	0	0	0			0	0	0	0			0
		Total Intertidal			465	1	12	1051	188.30	104.22	8	0	0	106	18.99	13.49	30
		Total Upstream			0	0	130	0	0.00	0.00	0	0	0	0	0.00	0.00	10
506	Loomis Creek	4-15-89															
			2.1	20	1	0	0	4	2.15	1.64	0	0	0	0	0.00	0.00	10
			2.7	30	10	0	0	473	254.23	112.52	0	0	0	0	0.00	0.00	10
			3.4	40	568	0	4	1307	702.50	229.13	14	0	0	0	0.00	0.00	10
			6.1	60	342	0	42	628	337.54	231.73	0	0	0	0	0.00	0.00	10
		Total Intertidal			579	0	4	1784	319.63	98.15	14	0	0	0	0.00	0.00	30
		Total Upstream			342	0	42	628	337.54	231.73	0	0	0	0	0.00	0.00	10

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
604	Erb Creek	4-16-89	2.1	20	0	0	0	20	10.75	6.26	0	0	0	0	0.00	0.00	10
			2.7	30	8	0	0	1245	669.17	261.53	15	0	0	28	15.05	15.05	10
			3.4	40	112	0	112	2041	1097.02	316.22	2	0	0	0	0.00	0.00	10
			6.1	60	31	0	32	5532	2973.39	548.63	0	0	0	0	0.00	0.00	10
		Total Intertidal			120	0	112	3306	592.31	155.91	17	0	0	28	5.02	5.02	30
		Total Upstream			31	0	32	5532	2973.39	548.63	0	0	0	0	0.00	0.00	10
618	Chenega SE	4-19-89															
			2.1	20	1	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			2.7	30	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			3.4	40	0	0	0	0	0.00	0.00	1	0	0	0	0.00	0.00	9
			6.1	60	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	9
		Total Intertidal			1	0	0	0	0.00	0.00	1	0	0	0	0.00	0.00	29
		Total Upstream			0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	9
621	Totemoff Creek	4-16-89															
			2.1	20	29	0	1	224	120.40	56.72	0	0	0	0	0.00	0.00	10
			2.7	30	94	0	4	1544	829.88	303.20	0	0	0	0	0.00	0.00	10
			3.4	40	63	0	14	1777	955.12	270.64	0	0	0	0	0.00	0.00	10
			6.1	60	423	0	154	1683	904.60	360.30	0	0	0	0	0.00	0.00	10
		Total Intertidal			186	0	19	3545	635.13	148.59	0	0	0	0	0.00	0.00	30
		Total Upstream			423	0	154	1683	904.60	360.30	0	0	0	0	0.00	0.00	10
628	Chenega NE	4-19-89															
			2.1	20	0	0	0	21	11.29	10.70	0	0	0	0	0.00	0.00	10
			2.7	30	0	0	0	38	20.42	19.83	0	0	0	0	0.00	0.00	10
			3.4	40	61	0	5	746	400.97	211.77	6	0	0	0	0.00	0.00	10
			6.1	60	437	0	0	195	104.81	50.03	0	0	0	0	0.00	0.00	10
		Total Intertidal			61	0	5	805	144.23	76.35	6	0	0	0	0.00	0.00	30
		Total Upstream			437	0	0	195	104.81	50.03	0	0	0	0	0.00	0.00	10

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
630	Bainbridge Creek	4-16-89															
			2.1	20	0	0	0	1	0.54	0.54	0	0	0	0	0.00	0.00	10
			2.7	30	2	0	0	60	32.25	15.96	0	0	0	0	0.00	0.00	10
			3.4	40	241	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			6.1	60	30	0	1000	0	0.00	0.00	0	0	0	0	0.00	0.00	10
		Total Intertidal			243	0	0	61	10.93	5.85	0	0	0	0	0.00	0.00	30
		Total Upstream			30	0	1000	0	0.00	0.00	0	0	0	0	0.00	0.00	10
632	Claw Creek	4-17-89															
			2.1	20	0	0	2	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			2.7	30	6	0	3	37	19.89	11.10	0	0	0	0	0.00	0.00	10
			3.4	40	0	0	8	684	367.64	139.21	0	0	0	0	0.00	0.00	10
			6.1	60	0	0	0	0			0	0	0	0			0
		Total Intertidal			6	0	13	721	129.18	54.77	0	0	0	0	0.00	0.00	30
		Total Upstream															0
637	Pt. Countess	4-17-89															
			2.1	20	7	0	10	1402	753.56	185.97	0	0	0	0	0.00	0.00	10
			2.7	30	74	0	39	1939	1042.19	347.03	0	0	0	0	0.00	0.00	10
			3.4	40	3	0	25	576	619.19	603.15	0	0	0	0	0.00	0.00	5
			3.4	43	0	0	1	304	326.79	324.11	0	0	0	0	0.00	0.00	5
			6.1	60	0	0	5	456	490.19	413.28	0	0	0	0	0.00	0.00	5
			6.1	63	0	0	0	261	280.57	139.54	0	0	0	0	0.00	0.00	5
		Total Intertidal			84	0	75	4221	756.25	170.06	0	0	0	0	0.00	0.00	30
		Total Upstream			0	0	5	717	385.38	208.58	0	0	0	0	0.00	0.00	10

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
653	Hogg Creek	4-17-89	2.1	20	0	0	0	7	3.76	3.21	0	0	0	0	0.00	0.00	10
			2.7	30	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			3.4	40	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			6.1	60	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			Total Intertidal		0	0	0	7	1.25	1.08	0	0	0	0	0.00	0.00	30
			Total Upstream		0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
663	Shelter Bay	4-18-89															
			2.1	20	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			2.7	30	0	0	0	297	159.63	152.54	0	0	0	0	0.00	0.00	10
			3.4	40	0	0	0	12	6.45	5.88	0	0	0	0	0.00	0.00	10
			6.1	60	35	0	6	317	170.38	119.30	0	0	0	0	0.00	0.00	10
			Total Intertidal		0	0	0	309	55.36	50.97	0	0	0	0	0.00	0.00	30
			Total Upstream		35	0	6	317	170.38	119.30	0	0	0	0	0.00	0.00	10
673	Falls Creek	4-18-89															
			2.1	20	0	0	1	526	282.72	125.23	0	0	0	0	0.00	0.00	10
			2.7	30	14	0	6	2823	1517.33	491.13	0	0	0	0	0.00	0.00	10
			3.4	40	45	0	0	101	54.29	27.25	0	0	0	0	0.00	0.00	10
			6.1	60	145	0	5	1206	648.21	310.94	0	0	0	0	0.00	0.00	10
			Total Intertidal		59	0	7	3450	618.11	202.22	0	0	0	0	0.00	0.00	30
			Total Upstream		145	0	5	1206	648.21	310.94	0	0	0	0	0.00	0.00	10
677	Hayden Creek	4-18-89															
			2.1	20	17	0	2	1145	615.43	329.85	0	0	0	0	0.00	0.00	10
			2.7	30	21	0	3	1920	1031.98	401.26	0	0	0	0	0.00	0.00	10
			3.4	40	20	0	8	1045	561.68	212.81	0	0	0	0	0.00	0.00	10
			6.1	60	18	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			Total Intertidal		58	0	13	4110	736.36	184.72	0	0	0	0	0.00	0.00	30
			Total Upstream		18	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
678	Sleepy Bay	4-18-89	2.1	20	0	0	0	2	1.34	0.88	0	0	0	0	0.00	0.00	8
			2.7	30	0	0	0	2	1.34	0.88	0	0	0	0	0.00	0.00	8
			3.4	40	8	0	0	325	174.68	170.51	0	0	0	0	0.00	0.00	10
			6.1	60	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
		Total Intertidal			8	0	0	329	68.01	65.65	0	0	0	0	0.00	0.00	26
		Total Upstream			0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
680	Mummy Bay	4-20-89															
			2.1	20	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	8
			2.7	30	0	0	3	0	0.00	0.00	0	0	0	0	0.00	0.00	8
			3.4	40	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	8
			6.1	60	20	0	85	5	2.69	1.44	0	0	0	0	0.00	0.00	10
		Total Intertidal			0	0	3	0	0.00	0.00	0	0	0	0	0.00	0.00	24
		Total Upstream			20	0	85	5	2.69	1.44	0	0	0	0	0.00	0.00	10
681	Hogan Bay	4-21-89															
			2.1	20	2	0	1	229	123.09	105.42	0	0	0	0	0.00	0.00	10
			2.7	30	3	0	0	79	42.46	36.56	0	0	0	0	0.00	0.00	10
			3.4	40	25	0	0	0	0.00	0.00	2	0	0	0	0.00	0.00	10
			6.1	60	101	0	315	0	0.00	0.00	0	0	0	0	0.00	0.00	10
		Total Intertidal			30	0	1	308	55.18	37.12	2	0	0	0	0.00	0.00	30
		Total Upstream			101	0	315	0	0.00	0.00	0	0	0	0	0.00	0.00	10
682	Snug Harbor	4-21-89															
			2.1	20	56	0	0	3	1.61	1.15	0	0	0	0	0.00	0.00	10
			2.7	30	113	0	5	2853	1394.05	365.49	0	0	0	0	0.00	0.00	11
			3.4	40	189	0	141	4439	2385.92	898.95	2	0	0	0	0.00	0.00	10
			6.1	60	724	0	104	3830	2058.59	586.72	0	0	0	0	0.00	0.00	10
		Total Intertidal			358	0	146	7295	1264.84	353.38	2	0	0	0	0.00	0.00	31
		Total Upstream			724	0	104	3830	2058.59	586.72	0	0	0	0	0.00	0.00	10

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
692	Herring Bay	4-19-89	2.1	20	0	0	0	481	258.53	255.56	0	0	0	0	0.00	0.00	10
			2.7	30	1	0	0	20	10.75	10.17	0	0	0	0	0.00	0.00	10
			3.4	40	0	0	1	156	83.85	82.66	0	0	0	0	0.00	0.00	10
			6.1	60	9	0	2	259	139.21	70.27	1	0	0	0	0.00	0.00	10
		Total Intertidal			1	0	1	657	117.71	88.58	0	0	0	0	0.00	0.00	30
		Total Upstream			9	0	2	259	139.21	70.27	1	0	0	0	0.00	0.00	10
695	Port Audrey	4-20-89															
			2.1	20	0	0	0	1	0.54	0.54	0	0	0	0	0.00	0.00	10
			2.7	30	0	0	0	317	170.38	88.92	0	0	0	0	0.00	0.00	10
			3.4	40	1	0	8	1510	811.61	671.38	1	0	0	0	0.00	0.00	10
			6.1	60	100	0	7	371	199.41	173.43	0	0	0	0	0.00	0.00	10
		Total Intertidal			1	0	8	1828	327.51	227.27	1	0	0	0	0.00	0.00	30
		Total Upstream			100	0	7	371	199.41	173.43	0	0	0	0	0.00	0.00	10
699	Cathead Bay	4-20-89															
			2.1	20	0	0	0	1	0.54	0.54	0	0	0	0	0.00	0.00	10
			2.7	30	53	0	0	201	108.04	45.29	0	0	0	0	0.00	0.00	10
			3.4	40	193	0	4	797	428.38	238.32	0	0	0	0	0.00	0.00	10
			6.1	60	1	0	0	13	6.99	5.84	0	0	0	0	0.00	0.00	10
		Total Intertidal			246	0	4	999	178.98	85.01	0	0	0	0	0.00	0.00	30
		Total Upstream			1	0	0	13	6.99	5.84	0	0	0	0	0.00	0.00	10
740	Kelez Creek	4-21-89															
			2.1	20	0	0	0	5	2.69	2.16	0	0	0	0	0.00	0.00	10
			2.7	30	9	0	1	239	128.46	108.79	0	0	0	0	0.00	0.00	10
			3.4	40	145	0	0	563	302.61	234.30	0	0	0	0	0.00	0.00	10
			6.1	60	6	0	0	114	61.27	44.18	0	0	0	0	0.00	0.00	10
		Total Intertidal			154	0	1	807	144.58	86.17	0	0	0	0	0.00	0.00	30
		Total Upstream			6	0	0	114	61.27	44.18	0	0	0	0	0.00	0.00	10

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
749	Shad Creek	4-22-89															
			2.1	20	1	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			2.7	30	18	0	0	11	5.91	2.33	0	0	0	0	0.00	0.00	10
			3.4	40	3	0	0	384	206.40	186.93	0	0	0	0	0.00	0.00	10
			6.1	90	0	0	0	64	34.40	32.65	0	0	0	0	0.00	0.00	10
			6.1	100	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			6.1	120	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
		Total Intertidal			22	0	0	395	70.77	62.71	0	0	0	0	0.00	0.00	30
		Total Upstream			0	0	0	64	11.47	10.92	0	0	0	0	0.00	0.00	30
759	Rocky Creek	4-22-89															
			2.1	20	0	0	0	0			0	0	0	0			0
			2.7	30	0	0	1	5	3.36	1.41	0	0	0	0	0.00	0.00	8
			3.4	40	9	0	19	1141	613.28	297.70	0	0	0	0	0.00	0.00	10
			6.1	60	35	0	4	477	256.38	146.70	0	0	0	0	0.00	0.00	10
		Total Intertidal			9	0	20	1146	342.20	177.40	0	0	0	0	0.00	0.00	18
		Total Upstream			35	0	4	477	256.38	146.70	0	0	0	0	0.00	0.00	10
788	Green Creek	4-22-89															
			2.1	20	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			2.7	30	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
			3.4	40	0	0	0	1	0.54	0.54	0	0	0	0	0.00	0.00	10
			6.1	60	467	0	0	1266	680.46	452.30	0	0	0	0	0.00	0.00	10
		Total Intertidal			0	0	0	1	0.18	0.18	0	0	0	0	0.00	0.00	30
		Total Upstream			467	0	0	1266	680.46	452.30	0	0	0	0	0.00	0.00	10

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
828	Cook Creek	4-23-89															
			2.7	30	198	0	0	1193	641.23	262.69	0	0	0	13	6.99	6.99	10
			3.4	40	525	0	1	486	261.22	142.06	62	0	0	7	3.76	3.76	10
			6.1	80	5	0	114	959	515.45	203.87	12	0	1	439	235.96	150.02	10
			6.1	90	187	0	72	346	185.97	109.18	316	0	1	339	182.21	121.43	10
			6.1	100	133	0	10	6	3.22	2.15	132	0	2	394	211.77	203.51	10
			6.1	120	6	0	0	79	42.46	35.87	23	0	0	428	230.05	132.74	10
		Total Intertidal			723	0	1	1679	451.22	151.74	62	0	0	20	5.37	3.88	20
		Total Upstream			331	0	196	1390	186.78	64.82	483	0	4	1600	215.00	74.61	40
861	Bernard Creek	4-23-89															
			2.1	20	0	0	2	262	140.82	93.55	0	0	0	0	0.00	0.00	10
			2.7	30	30	0	7	1676	900.83	342.04	2	0	0	0	0.00	0.00	10
			3.4	40	2	0	16	1850	994.36	342.22	0	0	0	0	0.00	0.00	10
			6.1	90	689	0	1	11	5.91	4.84	0	0	0	0	0.00	0.00	10
			6.1	100	579	0	0	19	10.21	9.08	0	0	0	0	0.00	0.00	10
			6.1	120	40	0	0	1	0.54	0.54	0	0	0	0	0.00	0.00	10
		Total Intertidal			32	0	25	3788	678.67	173.67	2	0	0	0	0.00	0.00	30
		Total Upstream			1308	0	1	31	5.55	3.39	0	0	0	0	0.00	0.00	30
Prince William Sound Summary																	
		Total Intertidal			4360	1	711	53905	330.00	26.78	1118	0	9	2817	17.25	29.00	878
		Total Upstream			5119	0	2011	22153	322.69	45.25	628	0	22	2336	34.03	48.25	369

Notes:

[a] Location code used to separate digs within tide zone.
[b] Number of fry per meter squared.

APPENDIX B.3

1990 Prince William Sound pink and chum salmon fry survey data summary

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
11	Humpy Creek	3-15-90															
			2.1	20	0	0	0	2	0.77	0.77	0	0	0	0	0.00	0.00	14
			2.7	30	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
			3.4	40	375	0	0	196	75.25	72.78	0	0	0	0	0.00	0.00	14
			6.1	60	2	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
			6.1	63	5	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
		Total Intertidal			375	0	0	198	25.34	24.30	0	0	0	0	0.00	0.00	42
		Total Upstream			7	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	24
35	Koppen Creek	4- 6-90															
			2.1	20	0	0	0	0			0	0	0	0			0
			2.7	30	53	0	0	740	284.10	131.34	7	0	0	382	146.66	93.86	14
			3.4	40	427	0	5	2245	861.90	200.68	38	0	0	126	48.37	33.83	14
			6.1	60	1040	0	13	1545	593.16	197.65	140	0	0	163	62.58	60.52	14
			6.1	100	1246	0	1	211	81.01	52.17	0	0	0	0	0.00	0.00	14
		Total Intertidal			480	0	5	2985	573.00	130.15	45	0	0	508	97.52	49.86	28
		Total Upstream			2286	0	14	1756	337.08	111.75	140	0	0	163	31.29	30.30	28
52	Control Creek	4- 5-90															
			2.1	20	1	0	0	1	0.38	0.38	0	0	0	0	0.00	0.00	14
			2.7	30	103	0	0	409	157.02	51.85	0	0	0	0	0.00	0.00	14
			2.7	33	41	0	0	100	44.79	30.52	0	0	0	0	0.00	0.00	12
			3.4	40	1227	0	3	1055	405.04	105.13	41	0	0	59	22.65	13.78	14
			6.1	60	569	0	83	1356	520.60	126.65	7	0	0	0	0.00	0.00	14
		Total Intertidal			1372	0	3	1565	155.77	37.29	41	0	0	59	5.87	3.73	54
		Total Upstream			569	0	83	1356	520.60	126.65	7	0	0	0	0.00	0.00	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
80	Whalen Creek	4- 5-90															
			2.1	20	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
			2.7	30	466	0	3	122	46.84	26.48	0	0	0	0	0.00	0.00	14
			3.4	40	631	0	1	4	1.54	0.88	0	0	0	0	0.00	0.00	14
			6.1	60	581	0	0	16	6.14	1.68	1	0	0	1	0.38	0.38	14
		Total Intertidal			1097	0	4	126	16.12	9.26	0	0	0	0	0.00	0.00	42
		Total Upstream			581	0	0	16	6.14	1.68	1	0	0	1	0.38	0.38	14
89	Fish Creek	4- 5-90															
			2.1	20	31	0	0	86	33.02	15.55	0	0	0	1	0.38	0.38	14
			2.7	30	69	0	0	351	134.76	48.96	29	0	0	97	37.24	21.39	14
			3.4	40	10	0	1	161	61.81	33.90	0	0	0	102	39.16	29.97	14
			6.1	60	376	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
		Total Intertidal			110	0	1	598	76.53	21.10	29	0	0	200	25.59	12.29	42
		Total Upstream			376	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
117	Indian Creek	4- 4-90															
			2.1	20	14	0	0	2	0.77	0.52	0	0	0	0	0.00	0.00	14
			2.7	30	1386	0	304	27	10.37	4.59	14	0	0	0	0.00	0.00	14
			3.4	40	64	0	10	2425	931.01	273.35	22	0	3	743	285.25	158.22	14
			6.1	60	160	0	235	913	350.52	140.75	9	0	154	369	141.67	80.46	14
		Total Intertidal			1464	0	314	2454	314.05	111.99	36	0	3	743	95.08	55.56	42
		Total Upstream			160	0	235	913	350.52	140.75	9	0	154	369	141.67	80.46	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
123	Gregorieff Creek	4- 4-90															
			2.1	20	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
			2.7	30	22	0	0	481	184.67	83.14	5	0	0	33	12.67	7.49	14
			3.4	40	28	0	15	58	22.27	15.19	0	0	0	0	0.00	0.00	14
			6.1	61	5	0	47	2099	1611.70	706.42	0	0	0	56	43.00	30.88	7
			6.1	62	1	0	6	753	289.09	121.55	0	0	0	22	8.45	8.04	14
		Total Intertidal			50	0	15	539	68.98	30.33	5	0	0	33	4.22	2.61	42
		Total Upstream			6	0	53	2852	729.96	275.21	0	0	0	78	19.96	11.69	21
153	Stellar Creek	4- 3-90															
			2.1	20	308	0	1	833	319.81	128.47	110	0	0	487	186.97	96.10	14
			2.7	30	13	0	24	1177	451.88	135.34	1	0	0	85	32.63	20.28	14
			3.4	40	75	0	4	1443	554.00	286.06	0	0	0	10	3.84	2.84	14
			6.1	60	123	0	496	420	161.25	108.67	0	0	0	0	0.00	0.00	14
		Total Intertidal			396	0	29	3453	441.89	112.04	111	0	0	582	74.48	34.32	42
		Total Upstream			123	0	496	420	161.25	108.67	0	0	0	0	0.00	0.00	14
265	Unakwik Creek	4- 3-90															
			2.1	20	0	0	0	1	0.38	0.38	0	0	0	0	0.00	0.00	14
			2.7	31	0	0	0	467	358.58	347.86	0	0	0	0	0.00	0.00	7
			2.7	32	1	0	0	836	641.92	384.43	0	0	0	0	0.00	0.00	7
			3.4	41	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	7
			3.4	42	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	7
			6.1	61	0	0	0	0			0	0	0	0			0
			6.1	62	0	0	0	0			0	0	0	0			0
		Total Intertidal			1	0	0	1304	166.88	89.86	0	0	0	0	0.00	0.00	42
		Total Upstream															0

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
276	Black Bear Creek	4- 2-90															
			2.1	20	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
			2.7	30	34	0	0	206	79.09	35.58	0	0	0	0	0.00	0.00	14
			3.4	40	778	0	1	1089	418.09	155.74	85	0	0	209	80.24	47.31	14
			6.1	60	0	0	0	12	9.21	6.71	0	0	0	0	0.00	0.00	7
			6.1	63	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	7
		Total Intertidal			812	0	1	1295	165.73	59.16	85	0	0	209	26.75	16.48	42
		Total Upstream			0	0	0	12	4.61	3.47	0	0	0	0	0.00	0.00	14
322	Coghill River	4- 2-90															
			1.5	10	8	0	2	60	23.04	13.59	0	0	0	0	0.00	0.00	14
			6.1	120	15	0	1	267	71.75	37.83	0	0	0	0	0.00	0.00	20
			6.1	123	325	0	72	3823	1027.41	170.65	0	0	0	0	0.00	0.00	20
			6.1	124	286	0	44	6793	1825.58	266.44	0	0	0	0	0.00	0.00	20
		Total Intertidal			8	0	2	60	23.04	13.59	0	0	0	0	0.00	0.00	14
		Total Upstream			626	0	117	10883	974.92	140.04	0	0	0	0	0.00	0.00	60
421	Mill Creek	4- 1-90															
			2.1	20	0	0	0	0	0.00	0.00	0	0	0	54	20.73	13.75	14
			2.7	30	0	0	0	0	0.00	0.00	0	0	0	1	0.38	0.38	14
			3.4	40	2	0	2	810	310.98	114.11	0	0	5	263	100.97	54.73	14
			6.1	60	0	0	700	34	13.05	8.02	0	0	0	83	31.87	23.79	14
		Total Intertidal			2	0	2	810	103.66	43.59	0	0	5	318	40.70	19.56	42
		Total Upstream			0	0	700	34	13.05	8.02	0	0	0	83	31.87	23.79	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
430	Meacham Creek	4- 1-90															
			2.1	20	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
			2.7	30	59	0	0	81	31.10	20.32	0	0	0	0	0.00	0.00	14
			3.4	40	161	0	0	820	314.82	141.24	165	0	0	300	115.18	98.35	14
			6.1	60	362	0	6	1675	643.07	197.92	0	0	0	0	0.00	0.00	14
		Total Intertidal			220	0	0	901	115.30	51.39	165	0	0	300	38.39	33.08	42
		Total Upstream			362	0	6	1675	643.07	197.92	0	0	0	0	0.00	0.00	14
455	Paulson Creek	4- 1-90															
			2.1	20	0	0	0	51	19.58	18.76	0	0	0	1	0.38	0.38	14
			2.7	30	0	0	0	3	1.15	0.61	0	0	0	0	0.00	0.00	14
			3.4	40	9	0	2	243	186.59	61.59	9	0	0	302	231.89	103.41	7
			3.4	43	7	0	1	11	8.45	3.49	0	0	1	5	3.84	3.84	7
			6.1	60	119	0	1	1177	451.88	171.81	1	0	0	104	39.93	24.96	14
		Total Intertidal			16	0	3	308	39.42	15.40	9	0	1	308	39.42	21.02	42
		Total Upstream			119	0	1	1177	451.88	171.81	1	0	0	104	39.93	24.96	14
480	Mink Creek	3-31-90															
			2.1	20	71	0	0	16	6.14	4.64	6	0	0	82	31.48	26.76	14
			2.7	30	1	0	0	0	0.00	0.00	48	0	0	0	0.00	0.00	14
			3.4	40	0	0	3	519	199.26	82.30	0	0	0	245	94.06	41.13	14
			6.1	60	2	0	0	0	0.00	0.00	0	0	0	2	0.77	0.77	14
		Total Intertidal			72	0	3	535	68.47	30.45	54	0	0	327	41.85	17.08	42
		Total Upstream			2	0	0	0	0.00	0.00	0	0	0	2	0.77	0.77	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
485	W. Finger Creek	3-31-90															
			2.1	20	0	0	0	0	0.00	0.00	0	0	0	142	54.52	41.16	14
			2.7	30	22	0	0	4	1.54	1.19	6	0	0	223	85.61	80.30	14
			3.4	40	143	0	1	311	119.40	77.83	24	0	0	188	72.18	46.34	14
			6.1	60	4	0	1	1014	389.30	130.10	0	0	0	0	0.00	0.00	14
		Total Intertidal			165	0	1	315	40.31	26.77	30	0	0	553	70.77	33.04	42
		Total Upstream			4	0	1	1014	389.30	130.10	0	0	0	0	0.00	0.00	14
498	McClure Creek	5- 5-90															
			2.1	20	14	0	0	238	91.37	43.79	0	0	0	0	0.00	0.00	14
			2.7	30	483	0	0	931	357.43	113.92	0	0	0	0	0.00	0.00	14
			3.4	40	15	0	8	2682	1029.68	235.13	0	0	0	0	0.00	0.00	14
			6.1	60	2	0	0	5	1.92	1.92	0	0	0	0	0.00	0.00	14
		Total Intertidal			512	0	8	3851	492.83	105.92	0	0	0	0	0.00	0.00	42
		Total Upstream			2	0	0	5	1.92	1.92	0	0	0	0	0.00	0.00	14
506	Loomis Creek	3-30-90															
			2.1	20	408	0	3	297	114.02	47.53	35	0	0	30	11.52	7.95	14
			2.7	30	556	0	2	732	281.03	80.18	32	0	0	0	0.00	0.00	14
			3.4	40	689	0	6	1146	439.97	136.79	5	0	0	0	0.00	0.00	14
			6.1	60	57	0	1	28	21.50	14.41	0	0	0	38	29.18	28.29	7
		Total Intertidal			1653	0	11	2175	278.34	57.69	72	0	0	30	3.84	2.72	42
		Total Upstream			57	0	1	28	21.50	14.41	0	0	0	38	29.18	28.29	7

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
604	Erb Creek	3-22-90															
			2.1	20	0	0	0	4	1.54	0.88	0	0	0	0	0.00	0.00	14
			2.7	30	0	0	0	2	0.77	0.52	0	0	0	0	0.00	0.00	14
			3.4	40	0	0	2	25	9.60	7.58	0	0	0	0	0.00	0.00	14
			6.1	60	133	0	0	5	1.92	1.33	0	0	0	0	0.00	0.00	14
		Total Intertidal			0	0	2	31	3.97	2.56	0	0	0	0	0.00	0.00	42
		Total Upstream			133	0	0	5	1.92	1.33	0	0	0	0	0.00	0.00	14
618	Chenega SE	3-29-90															
			2.1	20	22	0	0	116	51.96	50.98	0	0	0	0	0.00	0.00	12
			2.7	30	14	0	3	656	293.83	179.44	0	0	0	0	0.00	0.00	12
			3.4	40	72	0	1	79	35.38	20.98	0	0	0	0	0.00	0.00	12
			6.1	60	31	0	0	6	2.69	1.24	0	0	0	0	0.00	0.00	12
		Total Intertidal			108	0	4	851	127.06	63.96	0	0	0	0	0.00	0.00	36
		Total Upstream			31	0	0	6	2.69	1.24	0	0	0	0	0.00	0.00	12
621	Totemoff Creek	3-22-90															
			2.1	20	68	0	0	401	153.95	79.72	0	0	0	0	0.00	0.00	14
			2.7	30	134	0	0	1429	548.62	175.20	0	0	0	0	0.00	0.00	14
			3.4	40	147	0	2	1174	450.72	137.06	0	0	0	0	0.00	0.00	14
			6.1	60	5	0	0	76	29.18	23.88	0	0	0	0	0.00	0.00	14
		Total Intertidal			349	0	2	3004	384.43	81.17	0	0	0	0	0.00	0.00	42
		Total Upstream			5	0	0	76	29.18	23.88	0	0	0	0	0.00	0.00	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
623	Brizgaloff Creek	4-11-90															
			2.1	20	1	0	0	4	1.54	0.88	0	0	0	1	0.38	0.38	14
			2.7	30	34	0	0	545	209.24	119.74	5	0	0	39	14.97	14.97	14
			3.4	40	414	0	0	854	327.87	162.05	0	0	0	0	0.00	0.00	14
			6.1	60	766	0	2	988	379.31	198.65	0	0	0	0	0.00	0.00	14
		Total Intertidal			449	0	0	1403	179.55	68.81	5	0	0	40	5.12	4.99	42
		Total Upstream			766	0	2	988	379.31	198.65	0	0	0	0	0.00	0.00	14
628	Chenega NE	3-29-90															
			2.1	20	9	0	0	27	10.37	5.39	0	0	0	0	0.00	0.00	14
			2.7	30	14	0	4	570	218.84	106.76	0	0	0	0	0.00	0.00	14
			3.4	40	20	6	2	816	313.28	165.99	0	0	0	0	0.00	0.00	14
			6.1	60	16	3	0	121	46.45	29.69	0	0	0	0	0.00	0.00	14
			6.1	63	408	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
		Total Intertidal			43	6	6	1413	180.83	67.16	0	0	0	0	0.00	0.00	42
		Total Upstream			424	3	0	121	23.23	15.24	0	0	0	0	0.00	0.00	28
630	Bainbridge Creek	4-11-90															
			2.1	20	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
			2.7	30	2	0	0	5	1.92	0.91	0	0	0	0	0.00	0.00	14
			3.4	40	49	0	0	2831	1086.88	237.50	0	0	0	0	0.00	0.00	14
			6.1	60	553	0	109	2364	907.59	266.87	0	0	0	0	0.00	0.00	14
		Total Intertidal			51	0	0	2836	362.93	111.14	0	0	0	0	0.00	0.00	42
		Total Upstream			553	0	109	2364	907.59	266.87	0	0	0	0	0.00	0.00	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
632	Claw Creek	3-28-90															
			2.1	20	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
			2.7	30	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
			2.7	33	37	0	0	671	300.55	109.16	0	0	0	0	0.00	0.00	12
			3.4	40	10	0	4	687	263.75	105.30	0	0	0	0	0.00	0.00	14
			6.1	60	21	0	1	131	50.29	41.33	0	0	0	0	0.00	0.00	14
		Total Intertidal			47	0	4	1358	135.17	40.36	0	0	0	0	0.00	0.00	54
		Total Upstream			21	0	1	131	50.29	41.33	0	0	0	0	0.00	0.00	14
637	Pt. Countess	3-21-90															
			2.1	20	69	0	0	2	0.77	0.52	0	0	0	0	0.00	0.00	14
			2.7	30	29	0	1	1088	417.71	219.42	0	0	0	0	0.00	0.00	14
			3.4	41	197	0	1	604	463.78	210.63	0	0	0	0	0.00	0.00	7
			3.4	42	410	0	0	627	481.44	274.20	0	0	0	0	0.00	0.00	7
			6.1	61	136	0	0	905	694.90	339.54	0	0	0	0	0.00	0.00	7
			6.1	62	79	0	0	7	5.37	2.35	0	0	0	0	0.00	0.00	7
		Total Intertidal			705	0	2	2321	297.03	95.33	0	0	0	0	0.00	0.00	42
		Total Upstream			215	0	0	912	350.14	189.07	0	0	0	0	0.00	0.00	14
653	Hogg Creek	3-21-90															
			2.1	20	3	0	0	170	65.27	44.62	0	0	0	0	0.00	0.00	14
			2.7	31	0	0	0	1	0.77	0.77	0	0	0	0	0.00	0.00	7
			2.7	32	0	0	2	398	305.60	215.43	0	0	0	0	0.00	0.00	7
			3.4	40	0	0	0	20	7.68	6.47	0	0	0	0	0.00	0.00	14
			6.1	60	38	0	0	798	306.37	165.41	0	0	0	0	0.00	0.00	14
		Total Intertidal			3	0	2	589	75.38	40.29	0	0	0	0	0.00	0.00	42
		Total Upstream			38	0	0	798	306.37	165.41	0	0	0	0	0.00	0.00	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
656	Halverson Creek	4-26-90															
			2.1	20	19	0	0	59	22.65	14.52	0	0	0	0	0.00	0.00	14
			2.7	30	68	0	0	498	191.19	82.42	0	0	0	0	0.00	0.00	14
			3.4	40	63	0	1	2786	1069.60	296.17	0	0	0	0	0.00	0.00	14
			6.1	60	995	0	0	1388	532.88	173.99	0	0	0	0	0.00	0.00	14
		Total Intertidal			150	0	1	3343	427.82	123.08	0	0	0	0	0.00	0.00	42
		Total Upstream			995	0	0	1388	532.88	173.99	0	0	0	0	0.00	0.00	14
663	Shelter Bay	3-27-90															
			2.1	20	0	0	0	42	16.12	13.84	0	0	0	0	0.00	0.00	14
			2.7	30	6	0	0	100	38.39	32.36	0	0	0	0	0.00	0.00	14
			3.4	40	412	0	8	3826	1468.88	433.69	0	0	0	0	0.00	0.00	14
			6.1	60	446	0	0	6	2.69	1.40	0	0	0	0	0.00	0.00	12
		Total Intertidal			418	0	8	3968	507.80	176.85	0	0	0	0	0.00	0.00	42
		Total Upstream			446	0	0	6	2.69	1.40	0	0	0	0	0.00	0.00	12
665	Bjorne Creek	3-20-90															
			2.1	20	2	0	0	2	0.77	0.52	0	0	0	0	0.00	0.00	14
			2.7	30	465	0	1	215	82.54	49.52	0	0	0	0	0.00	0.00	14
			3.4	41	288	0	0	4	3.07	3.07	0	0	0	0	0.00	0.00	7
			3.4	42	64	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	7
			3.4	43	2	0	0	28	12.54	11.58	0	0	0	0	0.00	0.00	12
			6.1	60	1523	0	0	60	23.04	22.21	0	0	0	0	0.00	0.00	14
		Total Intertidal			821	0	1	249	24.78	13.59	0	0	0	0	0.00	0.00	54
		Total Upstream			1523	0	0	60	23.04	22.21	0	0	0	0	0.00	0.00	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
666	O'Brien Creek	3-20-90															
			2.1	20	5	0	0	53	20.35	17.97	0	0	0	0	0.00	0.00	14
			2.1	23	2	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	12
			2.7	30	388	0	5	588	225.75	106.48	0	0	0	0	0.00	0.00	14
			3.4	40	528	0	2	1322	507.54	274.30	0	0	0	0	0.00	0.00	14
			6.1	60	333	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	7
			6.1	63	480	0	0	6	4.61	2.47	0	0	0	0	0.00	0.00	7
		Total Intertidal			923	0	7	1963	195.39	79.48	0	0	0	0	0.00	0.00	54
		Total Upstream			813	0	0	6	2.30	1.35	0	0	0	0	0.00	0.00	14
673	Falls Creek	3-20-90															
			2.1	21	0	0	0	4	3.07	1.60	0	0	0	0	0.00	0.00	7
			2.1	22	103	0	3	161	61.81	39.29	0	0	0	0	0.00	0.00	14
			2.7	30	52	0	4	2384	915.27	230.66	0	0	0	0	0.00	0.00	14
			3.4	40	22	0	19	366	140.52	97.16	0	0	0	0	0.00	0.00	14
			6.1	60	342	0	0	146	56.05	34.51	0	0	0	0	0.00	0.00	14
		Total Intertidal			177	0	26	2915	319.75	89.24	0	0	0	0	0.00	0.00	49
		Total Upstream			342	0	0	146	56.05	34.51	0	0	0	0	0.00	0.00	14
677	Hayden Creek	3-19-90															
			2.1	21	1	0	0	4	3.07	1.60	0	0	0	0	0.00	0.00	7
			2.1	22	16	0	0	122	93.68	28.92	0	0	0	0	0.00	0.00	7
			2.7	31	3	0	2	231	177.37	120.73	0	0	0	0	0.00	0.00	7
			2.7	32	7	0	5	282	216.53	97.92	0	0	0	0	0.00	0.00	7
			3.4	41	0	0	1	29	22.27	17.05	0	0	0	0	0.00	0.00	7
			3.4	42	6	0	3	283	217.30	135.70	0	0	0	0	0.00	0.00	7
			6.1	61	0	0	0	1	0.77	0.77	0	0	0	0	0.00	0.00	7
			6.1	62	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	7
		Total Intertidal			33	0	11	951	121.70	35.40	0	0	0	0	0.00	0.00	42
		Total Upstream			0	0	0	1	0.38	0.38	0	0	0	0	0.00	0.00	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
678	Sleepy Bay	3-19-90															
			2.1	20	1	0	0	4	1.79	1.01	0	0	0	0	0.00	0.00	12
			2.7	30	13	0	8	445	199.32	109.22	0	0	0	0	0.00	0.00	12
			3.4	40	23	0	2	60	26.87	11.44	0	0	0	0	0.00	0.00	12
			6.1	60	29	0	0	4	1.54	0.88	0	0	0	0	0.00	0.00	14
		Total Intertidal			37	0	10	509	76.00	38.52	0	0	0	0	0.00	0.00	36
		Total Upstream			29	0	0	4	1.54	0.88	0	0	0	0	0.00	0.00	14
681	Hogan Bay	3-27-90															
			2.1	20	143	0	0	296	113.64	46.47	0	0	0	0	0.00	0.00	14
			2.7	31	200	0	0	2	1.54	1.54	0	0	0	0	0.00	0.00	7
			2.7	32	226	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	7
			3.4	40	1232	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
			6.1	60	459	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
		Total Intertidal			1801	0	0	298	38.14	17.26	0	0	0	0	0.00	0.00	42
		Total Upstream			459	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
682	Snug Harbor	3-19-90															
			2.1	20	46	0	0	115	44.15	21.68	0	0	0	0	0.00	0.00	14
			2.7	30	114	0	4	1181	453.41	217.49	0	0	0	0	0.00	0.00	14
			3.4	40	192	0	39	3153	1210.50	386.68	0	0	0	0	0.00	0.00	14
			6.1	60	38	0	27	2139	821.21	339.26	0	0	0	0	0.00	0.00	14
		Total Intertidal			352	0	43	4449	569.36	162.93	0	0	0	0	0.00	0.00	42
		Total Upstream			38	0	27	2139	821.21	339.26	0	0	0	0	0.00	0.00	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
692	Herring Bay	3-30-90															
			2.1	20	4	0	1	64	24.57	16.48	0	0	0	0	0.00	0.00	14
			2.7	30	212	0	5	351	134.76	52.55	0	0	0	0	0.00	0.00	14
			3.4	40	700	0	9	1749	671.48	189.21	0	0	0	0	0.00	0.00	14
			6.1	60	183	0	16	2390	917.57	353.41	0	0	0	0	0.00	0.00	14
		Total Intertidal			916	0	15	2164	276.94	77.80	0	0	0	0	0.00	0.00	42
		Total Upstream			183	0	16	2390	917.57	353.41	0	0	0	0	0.00	0.00	14
695	Port Audrey	3-29-90															
			2.1	21	1	0	0	20	15.36	8.73	0	0	0	0	0.00	0.00	7
			2.1	22	51	0	0	523	401.58	240.19	0	0	0	0	0.00	0.00	7
			2.7	31	5	0	1	187	143.59	68.23	0	0	0	0	0.00	0.00	7
			2.7	32	1	0	0	118	90.61	60.55	0	0	0	0	0.00	0.00	7
			3.4	40	32	0	3	707	271.43	182.42	0	0	0	0	0.00	0.00	14
			6.1	60	129	0	0	535	205.40	151.14	0	0	0	0	0.00	0.00	14
		Total Intertidal			90	0	4	1555	199.00	74.40	0	0	0	0	0.00	0.00	42
		Total Upstream			129	0	0	535	205.40	151.14	0	0	0	0	0.00	0.00	14
699	Cathead Bay	3-30-90															
			2.1	20	0	0	0	21	8.06	4.94	0	0	0	0	0.00	0.00	14
			2.7	30	30	0	0	469	180.06	95.28	0	0	0	0	0.00	0.00	14
			3.4	40	11	0	0	474	181.98	61.04	0	0	0	0	0.00	0.00	14
			6.1	60	232	0	1	512	196.57	185.57	0	0	0	0	0.00	0.00	14
		Total Intertidal			41	0	0	964	123.37	38.96	0	0	0	0	0.00	0.00	42
		Total Upstream			232	0	1	512	196.57	185.57	0	0	0	0	0.00	0.00	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
740	Kelez Creek	3-18-90															
			2.1	20	1	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
			2.7	30	64	0	2	917	352.06	179.74	0	0	0	0	0.00	0.00	14
			3.4	40	75	0	2	37	14.21	13.40	0	0	0	0	0.00	0.00	14
			6.1	60	69	0	17	23	8.83	6.14	0	0	0	0	0.00	0.00	14
		Total Intertidal			140	0	4	954	122.09	63.87	0	0	0	0	0.00	0.00	42
		Total Upstream			69	0	17	23	8.83	6.14	0	0	0	0	0.00	0.00	14
744	Wilby Creek	3-18-90															
			2.1	20	27	0	0	2	0.77	0.77	0	0	0	0	0.00	0.00	14
			2.7	30	1	0	0	47	18.04	11.16	0	0	0	0	0.00	0.00	14
			3.4	40	1	0	0	102	78.32	72.13	0	0	0	0	0.00	0.00	7
			3.4	43	1	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	7
			6.1	60	2	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
		Total Intertidal			30	0	0	151	19.32	12.59	0	0	0	0	0.00	0.00	42
		Total Upstream			2	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
747	Cabin Creek	3-18-90															
			2.1	20	17	0	1	10	3.84	1.43	0	0	0	0	0.00	0.00	14
			2.7	30	313	0	2	362	138.98	38.84	0	0	0	0	0.00	0.00	14
			3.4	40	1353	0	66	387	148.58	71.86	0	0	0	0	0.00	0.00	14
			6.1	60	134	0	61	126	48.37	23.12	0	0	0	0	0.00	0.00	14
		Total Intertidal			1683	0	69	759	97.13	28.49	0	0	0	0	0.00	0.00	42
		Total Upstream			134	0	61	126	48.37	23.12	0	0	0	0	0.00	0.00	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
749	Shad Creek	3-17-90															
			2.1	20	1	0	1	298	114.41	79.96	0	0	0	0	0.00	0.00	14
			2.7	30	117	0	0	123	47.22	47.22	0	0	0	0	0.00	0.00	14
			3.4	40	0	0	1	2	0.77	0.52	0	0	0	0	0.00	0.00	14
			6.1	60	381	0	8	543	208.47	113.29	0	0	0	0	0.00	0.00	14
		Total Intertidal			118	0	2	423	54.13	31.06	0	0	0	0	0.00	0.00	42
		Total Upstream			381	0	8	543	208.47	113.29	0	0	0	0	0.00	0.00	14
775	Pautzke Creek	3-17-90															
			2.1	20	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
			2.7	30	1	0	0	1	0.38	0.38	0	0	0	0	0.00	0.00	14
			3.4	40	6	0	190	155	59.51	27.83	0	0	0	0	0.00	0.00	14
			6.1	60	15	0	5	1660	637.31	279.66	0	0	0	0	0.00	0.00	14
		Total Intertidal			7	0	190	156	19.96	10.05	0	0	0	0	0.00	0.00	42
		Total Upstream			15	0	5	1660	637.31	279.66	0	0	0	0	0.00	0.00	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
815	Constantine Creek	3-23-90															
			2.1	20	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
			2.4	23	62	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
			2.7	30	64	0	0	165	63.35	58.88	4	0	0	15	5.76	4.99	14
			3.0	33	149	0	0	2	0.77	0.77	47	0	1	99	38.01	19.09	14
			3.4	40	261	0	0	2	0.77	0.52	0	0	0	0	0.00	0.00	14
			6.1	80	160	0	0	712	273.35	122.92	0	0	0	0	0.00	0.00	14
			6.1	90	19	0	0	112	43.00	40.95	0	0	0	0	0.00	0.00	14
			6.1	100	100	0	0	678	260.30	106.95	0	0	0	0	0.00	0.00	14
			6.1	120	42	0	0	50	19.20	19.20	0	0	0	0	0.00	0.00	14
		Total Intertidal			536	0	0	169	12.98	11.83	51	0	1	114	8.75	4.22	70
		Total Upstream			321	0	0	1552	148.96	44.09	0	0	0	0	0.00	0.00	56
828	Cook Creek	4- 9-90															
			2.1	20	0	0	0	1	0.38	0.38	0	0	0	0	0.00	0.00	14
			2.7	30	273	0	0	520	199.64	90.10	0	0	0	0	0.00	0.00	14
			3.4	41	0	0	0	20	15.36	6.58	0	0	0	1	0.77	0.77	7
			3.4	42	1	0	0	31	23.80	13.47	0	0	0	0	0.00	0.00	7
			3.4	43	24	0	0	74	66.29	65.22	0	0	0	0	0.00	0.00	6
			6.1	60	390	0	0	178	68.34	43.55	0	0	7	0	0.00	0.00	14
			6.1	100	68	0	4	1033	396.59	179.93	0	0	0	50	19.20	16.52	14
		Total Intertidal			298	0	0	646	72.34	29.43	0	0	0	1	0.11	0.11	48
		Total Upstream			458	0	4	1211	232.46	96.17	0	0	7	50	9.60	8.31	28
850	Canoe Creek	3-16-90															
			2.1	20	7	0	1	5	1.92	1.21	0	0	0	0	0.00	0.00	14
			2.7	30	87	0	1	354	135.91	83.98	0	0	0	0	0.00	0.00	14
			3.4	40	657	0	2	1151	441.89	165.44	0	0	0	0	0.00	0.00	14
			6.1	60	256	0	16	2844	1091.87	446.26	0	0	0	0	0.00	0.00	14
		Total Intertidal			751	0	4	1510	193.24	66.82	0	0	0	0	0.00	0.00	42
		Total Upstream			256	0	16	2844	1091.87	446.26	0	0	0	0	0.00	0.00	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
861	Bernard Creek	3-16-90															
			2.1	20	0	0	1	1	0.38	0.38	0	0	0	0	0.00	0.00	14
			2.7	30	77	0	0	475	182.36	90.89	0	0	0	0	0.00	0.00	14
			3.4	40	194	0	7	1550	595.08	180.12	0	0	0	0	0.00	0.00	14
			6.1	60	780	0	34	1280	491.42	132.04	0	0	0	0	0.00	0.00	14
		Total Intertidal			271	0	8	2026	259.27	76.24	0	0	0	0	0.00	0.00	42
		Total Upstream			780	0	34	1280	491.42	132.04	0	0	0	0	0.00	0.00	14
Prince William Sound Summary																	
		Total Intertidal			20153	6	827	67400	176.72	10.72	738	0	10	4325	11.34	11.40	2050
		Total Upstream			15071	3	2008	43968	297.64	24.85	158	0	161	888	6.01	27.00	794

Notes:

[a] Location code used to separate digs within tide zone.
[b] Number of fry per meter squared.

APPENDIX B.4

1991 Prince William Sound pink and chum salmon fry survey data summary

Appendix B.4 1991 Prince William Sound pink and chum salmon fry survey data summary.

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
11	Humpy Creek	3-14-91															
			2.1	20	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
			2.7	30	1	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
			3.4	40	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
			6.1	60	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
		Total Intertidal			1	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	42
		Total Upstream			0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
35	Koppen Creek	4- 7-91															
			2.1	20	0	0	0	0			0	0	0	0			0
			2.7	30	243	0	27	3344	1283.83	242.99	16	0	0	59	22.65	13.41	14
			3.4	40	420	0	31	3669	1408.61	242.52	5	0	0	23	8.83	6.80	14
			6.1	60	1404	0	0	34	13.05	13.05	66	0	0	0	0.00	0.00	14
		Total Intertidal			663	0	58	7013	1346.22	168.87	21	0	0	82	15.74	7.49	28
		Total Upstream			1404	0	0	34	13.05	13.05	66	0	0	0	0.00	0.00	14
52	Control Creek	3-15-91															
			2.1	20	12	0	0	10	3.84	1.64	0	0	0	0	0.00	0.00	14
			2.7	30	947	0	1	94	36.09	19.36	0	0	0	1	0.38	0.38	14
			3.4	40	158	0	0	449	172.38	109.99	0	0	0	2	0.77	0.52	14
			6.1	60	1302	0	100	586	224.98	61.96	4	0	0	4	1.54	1.54	14
		Total Intertidal			1117	0	1	553	70.77	38.06	0	0	0	3	0.38	0.22	42
		Total Upstream			1302	0	100	586	224.98	61.96	4	0	0	4	1.54	1.54	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
80	Whalen Creek	3-27-91															
			2.1	20	168	0	0	176	67.57	25.55	0	0	0	0	0.00	0.00	14
			2.7	30	154	0	0	74	28.41	9.14	0	0	0	0	0.00	0.00	14
			3.4	40	2436	0	0	61	23.42	12.83	52	0	0	0	0.00	0.00	14
			6.1	60	619	0	0	1	0.38	0.38	272	0	0	0	0.00	0.00	14
		Total Intertidal			2758	0	0	311	39.80	10.23	52	0	0	0	0.00	0.00	42
		Total Upstream			619	0	0	1	0.38	0.38	272	0	0	0	0.00	0.00	14
89	Fish Creek	3-26-91															
			2.1	20	13	0	0	191	73.33	36.71	0	0	0	0	0.00	0.00	14
			2.7	30	356	0	2	540	207.32	59.33	15	0	0	179	68.72	51.50	14
			3.4	40	424	0	0	61	23.42	12.93	27	0	0	5	1.92	1.92	14
			6.1	60	109	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
		Total Intertidal			793	0	2	792	101.36	26.06	42	0	0	184	23.55	17.48	42
		Total Upstream			109	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
117	Indian Creek	4-23-91															
			2.1	20	6	0	0	3	1.15	0.61	0	0	0	3	1.15	0.83	14
			2.7	30	31	0	0	1688	648.06	374.27	4	0	0	260	99.82	75.66	14
			3.4	40	254	0	0	71	27.26	20.33	19	0	0	2	0.77	0.52	14
			6.1	60	13	0	0	533	204.63	98.69	54	0	0	650	249.55	102.76	14
		Total Intertidal			291	0	0	1762	225.49	130.50	23	0	0	265	33.91	25.65	42
		Total Upstream			13	0	0	533	204.63	98.69	54	0	0	650	249.55	102.76	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
123	Gregorieff Creek	3-27-91															
			2.1	21	9	0	0	61	23.42	13.70	1	0	0	0	0.00	0.00	14
			2.7	31	118	0	0	0	0.00	0.00	5	0	0	0	0.00	0.00	14
			3.4	41	371	0	58	201	77.17	44.24	0	0	0	53	20.35	10.86	14
			6.1	61	38	0	2	1062	407.72	189.14	6	0	2	525	201.56	88.25	14
		Total Intertidal			498	0	58	262	33.53	15.88	6	0	0	53	6.78	3.83	42
		Total Upstream			38	0	2	1062	407.72	189.14	6	0	2	525	201.56	88.25	14
153	Stellar Creek	3-28-91															
			2.1	20	29	0	0	42	16.12	6.59	0	0	0	1	0.38	0.38	14
			2.7	30	46	0	0	261	100.20	66.36	20	0	0	17	6.53	5.72	14
			3.4	40	19	0	0	1186	455.33	181.02	51	0	0	1248	479.13	245.18	14
			3.4	43	118	0	1	357	137.06	34.01	283	0	24	927	355.90	92.53	14
			6.1	60	7	0	10	457	175.45	38.51	0	0	25	440	168.93	47.46	14
		Total Intertidal			212	0	1	1846	177.18	52.64	354	0	24	2193	210.48	69.81	56
		Total Upstream			7	0	10	457	175.45	38.51	0	0	25	440	168.93	47.46	14
265	Unakwik Creek	3-28-91															
			2.1	20	0	0	0	1255	481.82	166.84	0	0	0	0	0.00	0.00	14
			2.7	31	9	0	0	402	308.67	249.80	0	0	0	0	0.00	0.00	7
			2.7	32	4	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	7
			3.4	41	0	0	0	0			0	0	0	0			0
			3.4	42	43	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	2
			6.1	61	0	0	0	0			0	0	0	0			0
			6.1	62	0	0	0	0			0	0	0	0			0
		Total Intertidal			56	0	0	1657	296.87	101.48	0	0	0	0	0.00	0.00	30
		Total Upstream															0

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
276	Black Bear Creek	3-29-91															
			2.1	20	0	0	0	1	0.38	0.38	0	0	0	0	0.00	0.00	14
			2.7	30	398	0	0	324	124.39	36.16	12	0	0	52	19.96	19.96	14
			3.4	40	882	0	0	1267	486.43	111.74	129	0	0	34	13.05	9.05	14
			6.1	60	4	0	1	971	372.79	169.53	0	0	0	483	185.43	138.55	14
		Total Intertidal			1280	0	0	1592	203.73	49.95	141	0	0	86	11.01	7.24	42
		Total Upstream			4	0	1	971	372.79	169.53	0	0	0	483	185.43	138.55	14
322	Coghill River	3-30-91															
			1.5	10	0	0	0	0	0.00	0.00	0	0	0	16	6.14	4.94	14
		Total Intertidal			0	0	0	0	0.00	0.00	0	0	0	16	6.14	4.94	14
		Total Upstream															0
421	Mill Creek	3-29-91															
			2.1	20	0	0	0	109	41.85	41.85	0	0	0	0	0.00	0.00	14
			2.7	30	51	0	0	497	190.81	79.23	1	0	0	277	106.35	94.63	14
			3.4	40	0	0	0	401	153.95	78.31	0	0	0	479	183.90	62.28	14
			6.1	60	1	0	3	3	1.15	0.83	0	0	0	0	0.00	0.00	14
		Total Intertidal			51	0	0	1007	128.87	39.93	1	0	0	756	96.75	38.66	42
		Total Upstream			1	0	3	3	1.15	0.83	0	0	0	0	0.00	0.00	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
430	Meacham Creek	3-30-91															
			2.1	20	6	0	0	74	28.41	19.14	0	0	0	0	0.00	0.00	14
			2.7	30	748	0	0	136	52.21	49.34	1	0	0	0	0.00	0.00	14
			3.4	40	212	0	0	3018	1158.67	174.74	0	0	0	6	2.30	2.30	14
			6.1	60	437	0	0	893	342.84	103.62	0	0	0	0	0.00	0.00	14
		Total Intertidal			966	0	0	3228	413.10	101.51	1	0	0	6	0.77	0.77	42
		Total Upstream			437	0	0	893	342.84	103.62	0	0	0	0	0.00	0.00	14
455	Paulson Creek	3-31-91															
			2.1	20	1	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
			2.7	30	0	0	0	218	83.69	51.13	0	0	0	206	79.09	46.31	14
			3.4	40	6	0	0	435	334.01	72.28	0	0	0	76	58.36	54.86	7
			3.4	43	0	0	0	0			0	0	0	0			0
			6.1	60	50	0	0	558	214.23	119.95	2	0	0	261	100.20	99.38	14
		Total Intertidal			7	0	0	653	100.28	32.05	0	0	0	282	43.31	21.74	35
		Total Upstream			50	0	0	558	214.23	119.95	2	0	0	261	100.20	99.38	14
480	Mink Creek	3-22-91															
			2.1	20	462	0	0	422	162.01	44.55	5	0	0	15	5.76	5.76	14
			2.7	30	369	0	1	501	192.34	97.75	19	0	0	58	22.27	20.63	14
			3.4	40	20	0	0	12	4.61	1.68	0	0	0	0	0.00	0.00	14
			6.1	60	21	0	0	1	0.38	0.38	0	0	0	0	0.00	0.00	14
		Total Intertidal			851	0	1	935	119.66	37.22	24	0	0	73	9.34	7.12	42
		Total Upstream			21	0	0	1	0.38	0.38	0	0	0	0	0.00	0.00	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
485	W. Finger Creek	3-22-91															
			2.1	20	2	0	0	98	37.62	20.55	0	0	0	8	3.07	1.76	14
			2.7	30	79	0	7	1862	714.86	277.50	5	0	13	106	40.70	27.52	14
			3.4	40	20	0	0	753	289.09	78.14	485	0	0	0	0.00	0.00	14
			6.1	60	0	0	0	1397	536.34	212.72	0	0	0	33	12.67	10.77	14
		Total Intertidal			101	0	7	2713	347.19	103.61	490	0	13	114	14.59	9.42	42
		Total Upstream			0	0	0	1397	536.34	212.72	0	0	0	33	12.67	10.77	14
498	McClure Creek	4-30-91															
			2.1	20	76	0	1	256	98.28	43.43	0	0	0	0	0.00	0.00	14
			2.7	30	639	0	2	1348	517.53	249.33	0	0	0	0	0.00	0.00	14
			3.4	40	417	0	0	3341	1282.68	296.30	0	0	0	0	0.00	0.00	14
			6.1	60	18	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
		Total Intertidal			1132	0	3	4945	632.83	148.03	0	0	0	0	0.00	0.00	42
		Total Upstream			18	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
506	Loomis Creek	3-22-91															
			2.1	20	119	0	0	256	98.28	51.32	0	0	0	0	0.00	0.00	14
			2.7	30	906	0	22	1014	389.30	76.96	9	0	0	0	0.00	0.00	14
			3.4	40	1077	0	1	122	46.84	22.16	0	0	0	0	0.00	0.00	14
			6.1	60	1513	0	1	55	21.12	7.27	0	0	0	0	0.00	0.00	14
		Total Intertidal			2102	0	23	1392	178.14	38.87	9	0	0	0	0.00	0.00	42
		Total Upstream			1513	0	1	55	21.12	7.27	0	0	0	0	0.00	0.00	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
604	Erb Creek	4- 1-91															
			2.1	20	139	0	0	72	55.28	27.20	0	0	0	0	0.00	0.00	7
			2.1	23	17	0	0	42	32.25	14.51	0	0	0	0	0.00	0.00	7
			2.7	30	66	0	0	247	94.83	69.00	0	0	0	0	0.00	0.00	14
			3.4	40	0	0	0	33	12.67	4.28	0	0	0	0	0.00	0.00	14
			6.1	60	61	0	0	4	1.54	1.19	0	0	0	0	0.00	0.00	14
		Total Intertidal			222	0	0	394	50.42	23.61	0	0	0	0	0.00	0.00	42
		Total Upstream			61	0	0	4	1.54	1.19	0	0	0	0	0.00	0.00	14
618	Junction Creek	3-20-91															
			2.1	20	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	12
			2.7	30	35	0	0	38	17.02	10.87	0	0	0	0	0.00	0.00	12
			3.4	40	62	0	0	868	388.78	195.45	0	0	0	0	0.00	0.00	12
			6.1	60	26	0	0	71	31.80	21.29	0	0	0	0	0.00	0.00	12
		Total Intertidal			97	0	0	906	135.27	70.24	0	0	0	0	0.00	0.00	36
		Total Upstream			26	0	0	71	31.80	21.29	0	0	0	0	0.00	0.00	12
621	Totemoff Creek	3-21-91															
			2.1	20	138	0	0	216	82.93	37.97	0	0	0	0	0.00	0.00	14
			2.7	30	75	0	1	1077	413.48	157.14	0	0	0	0	0.00	0.00	14
			3.4	40	649	0	80	4040	1551.04	294.10	0	0	0	0	0.00	0.00	14
			6.1	60	407	0	0	4	1.54	1.19	0	0	0	0	0.00	0.00	14
		Total Intertidal			862	0	81	5333	682.48	146.79	0	0	0	0	0.00	0.00	42
		Total Upstream			407	0	0	4	1.54	1.19	0	0	0	0	0.00	0.00	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
623	Brizgaloff Creek	4-17-91															
			2.1	20	400	0	0	79	30.33	13.28	0	0	0	0	0.00	0.00	14
			2.7	30	469	0	0	541	207.70	74.31	0	0	0	0	0.00	0.00	14
			3.4	40	805	0	0	1256	482.21	142.57	0	0	0	0	0.00	0.00	14
			6.1	60	5415	0	1	367	140.90	49.32	0	0	0	0	0.00	0.00	14
		Total Intertidal			1674	0	0	1876	240.08	59.95	0	0	0	0	0.00	0.00	42
		Total Upstream			5415	0	1	367	140.90	49.32	0	0	0	0	0.00	0.00	14
628	Chenega Creek	3-19-91															
			2.1	20	18	0	0	8	3.07	2.30	0	0	0	0	0.00	0.00	14
			2.7	30	133	0	1	988	379.31	185.92	0	0	0	0	0.00	0.00	14
			3.4	40	121	2	5	422	162.01	73.94	0	0	0	0	0.00	0.00	14
			6.1	60	1759	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
		Total Intertidal			272	2	6	1418	181.47	69.37	0	0	0	0	0.00	0.00	42
		Total Upstream			1759	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
630	Bainbridge Creek	4- 1-91															
			2.1	20	56	0	0	35	13.44	10.29	0	0	0	0	0.00	0.00	14
			2.7	30	310	0	0	427	163.93	62.63	0	0	0	0	0.00	0.00	14
			3.4	40	1137	0	28	295	113.26	54.25	0	0	0	0	0.00	0.00	14
			6.1	60	616	0	36	3982	1528.77	316.73	0	0	0	0	0.00	0.00	14
		Total Intertidal			1503	0	28	757	96.88	28.85	0	0	0	0	0.00	0.00	42
		Total Upstream			616	0	36	3982	1528.77	316.73	0	0	0	0	0.00	0.00	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
632	Claw Creek	4-11-91															
			2.1	20	4	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
			2.7	30	118	0	7	2354	903.75	414.64	3	0	0	0	0.00	0.00	14
			3.4	40	163	0	15	3203	1229.70	257.93	0	0	0	0	0.00	0.00	14
			6.1	60	161	0	0	92	70.64	47.24	0	0	0	0	0.00	0.00	7
		Total Intertidal			285	0	22	5557	711.15	178.33	3	0	0	0	0.00	0.00	42
		Total Upstream			161	0	0	92	70.64	47.24	0	0	0	0	0.00	0.00	7
637	Pt. Countess	3-19-91															
			2.1	20	34	0	0	12	4.61	2.69	0	0	0	0	0.00	0.00	14
			2.7	30	68	0	0	1490	572.04	184.22	0	0	0	0	0.00	0.00	14
			3.4	41	584	0	0	1216	466.85	162.98	0	0	0	0	0.00	0.00	14
			6.1	61	304	0	0	2	1.54	1.54	0	0	0	0	0.00	0.00	7
			6.1	62	375	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	7
		Total Intertidal			686	0	0	2718	347.83	88.75	0	0	0	0	0.00	0.00	42
		Total Upstream			679	0	0	2	0.77	0.77	0	0	0	0	0.00	0.00	14
653	Hogg Creek	4-10-91															
			2.1	20	22	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
			2.7	31	16	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	7
			2.7	32	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	7
			3.4	40	107	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
			6.1	60	427	0	2	431	165.47	151.17	0	0	0	0	0.00	0.00	14
		Total Intertidal			145	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	42
		Total Upstream			427	0	2	431	165.47	151.17	0	0	0	0	0.00	0.00	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
656	Halverson Creek	4-10-91															
			2.1	20	14	0	0	246	94.44	78.36	0	0	0	0	0.00	0.00	14
			2.7	30	28	0	0	607	233.04	110.77	0	0	0	0	0.00	0.00	14
			3.4	40	167	0	12	2790	1071.14	370.79	0	0	0	0	0.00	0.00	14
			6.1	60	1287	0	0	1330	510.62	200.65	0	0	0	0	0.00	0.00	14
		Total Intertidal			209	0	12	3643	466.21	144.98	0	0	0	0	0.00	0.00	42
		Total Upstream			1287	0	0	1330	510.62	200.65	0	0	0	0	0.00	0.00	14
663	Shelter Bay	3-19-91															
			2.1	20	0	0	0	10	4.48	4.48	0	0	0	0	0.00	0.00	12
			2.7	30	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	12
			3.4	40	230	0	2	128	57.33	46.06	0	0	0	0	0.00	0.00	12
			6.1	60	177	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	12
		Total Intertidal			230	0	2	138	20.60	15.61	0	0	0	0	0.00	0.00	36
		Total Upstream			177	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	12
665	Bjorne Creek	3-18-91															
			2.1	20	5	0	0	4	1.54	0.88	0	0	0	0	0.00	0.00	14
			2.7	30	351	0	0	37	14.21	9.99	0	0	0	0	0.00	0.00	14
			3.4	40	240	0	0	1	0.38	0.38	0	0	0	0	0.00	0.00	14
			6.1	60	904	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
		Total Intertidal			596	0	0	42	5.37	3.41	0	0	0	0	0.00	0.00	42
		Total Upstream			904	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
666	O'Brien Creek	3-19-91															
			2.1	20	5	1	0	3	1.15	0.83	0	0	0	0	0.00	0.00	14
			2.7	30	1	1	0	836	320.96	121.96	0	0	0	0	0.00	0.00	14
			3.4	40	90	0	1	34	13.05	12.24	0	0	0	0	0.00	0.00	14
			6.1	60	350	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
		Total Intertidal			96	2	1	873	111.72	46.07	0	0	0	0	0.00	0.00	42
		Total Upstream			350	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
673	Falls Creek	3-18-91															
			2.1	20	3	0	0	143	54.90	22.36	0	0	0	0	0.00	0.00	14
			2.7	30	34	0	1	1941	745.19	152.30	0	0	0	0	0.00	0.00	14
			3.4	40	301	0	0	1359	521.75	209.51	0	0	0	0	0.00	0.00	14
			6.1	60	63	0	0	3	1.15	0.83	0	0	0	0	0.00	0.00	14
		Total Intertidal			338	0	1	3443	440.61	95.71	0	0	0	0	0.00	0.00	42
		Total Upstream			63	0	0	3	1.15	0.83	0	0	0	0	0.00	0.00	14
677	Hayden Creek	3-18-91															
			2.1	21	19	0	1	591	453.80	130.83	0	0	0	0	0.00	0.00	7
			2.1	22	2	0	0	61	46.84	46.84	0	0	0	0	0.00	0.00	7
			2.7	31	0	0	0	542	416.17	177.37	0	0	0	0	0.00	0.00	7
			2.7	32	17	198	0	526	403.89	107.60	0	0	0	0	0.00	0.00	7
			3.4	41	2	7	0	103	79.09	39.46	0	0	0	0	0.00	0.00	7
			3.4	42	39	0	7	1068	820.06	338.49	0	0	0	0	0.00	0.00	7
			6.1	61	162	0	0	172	132.07	105.57	0	0	0	0	0.00	0.00	7
			6.1	62	15	0	0	1	0.77	0.77	0	0	0	0	0.00	0.00	7
		Total Intertidal			79	205	8	2891	369.97	77.38	0	0	0	0	0.00	0.00	42
		Total Upstream			177	0	0	173	66.42	53.89	0	0	0	0	0.00	0.00	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
678	Sleepy Bay	3-17-91															
			2.1	20	3	0	0	42	18.81	12.15	0	0	0	0	0.00	0.00	12
			2.7	30	2	0	0	70	31.35	21.78	0	0	0	0	0.00	0.00	12
			3.4	40	109	0	0	42	18.81	12.01	0	0	0	0	0.00	0.00	12
			6.1	60	50	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
		Total Intertidal			114	0	0	154	22.99	9.02	0	0	0	0	0.00	0.00	36
		Total Upstream			50	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
681	Hogan Bay	3-17-91															
			2.1	20	0	0	1	7	2.69	1.09	0	0	0	0	0.00	0.00	14
			2.7	30	2	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
			3.4	40	50	0	0	0	0.00	0.00	5	0	0	0	0.00	0.00	14
			6.1	60	314	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
		Total Intertidal			52	0	1	7	0.90	0.41	5	0	0	0	0.00	0.00	42
		Total Upstream			314	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
682	Snug Harbor	3-16-91															
			2.1	20	151	0	0	288	110.57	37.66	0	0	0	0	0.00	0.00	14
			2.7	30	812	0	6	1288	494.49	193.60	0	0	0	0	0.00	0.00	14
			3.4	40	212	0	8	2022	776.29	257.42	0	0	0	0	0.00	0.00	14
			6.1	60	3	0	1	2413	926.40	322.80	0	0	0	0	0.00	0.00	14
		Total Intertidal			1175	0	14	3598	460.45	113.71	0	0	0	0	0.00	0.00	42
		Total Upstream			3	0	1	2413	926.40	322.80	0	0	0	0	0.00	0.00	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
692	Herring Bay	3-21-91															
			2.1	20	18	0	0	913	350.52	132.14	0	0	0	0	0.00	0.00	14
			2.7	30	42	1	2	913	350.52	172.08	0	0	0	0	0.00	0.00	14
			3.4	40	204	0	0	346	132.84	90.86	0	0	0	0	0.00	0.00	14
			6.1	60	258	0	27	1202	461.47	117.71	0	0	0	0	0.00	0.00	14
		Total Intertidal			264	1	2	2172	277.96	78.13	0	0	0	0	0.00	0.00	42
		Total Upstream			258	0	27	1202	461.47	117.71	0	0	0	0	0.00	0.00	14
695	Port Audrey	4-11-91															
			2.1	21	0	0	0	48	36.86	35.97	0	0	0	0	0.00	0.00	7
			2.1	22	0	0	0	108	82.93	28.46	0	0	0	0	0.00	0.00	7
			2.7	30	286	0	0	641	246.09	82.49	0	0	0	0	0.00	0.00	14
			3.4	40	52	0	8	616	236.50	161.99	0	0	0	0	0.00	0.00	14
			6.1	60	45	0	2	537	206.17	161.66	0	0	0	0	0.00	0.00	14
		Total Intertidal			338	0	8	1413	180.83	61.05	0	0	0	0	0.00	0.00	42
		Total Upstream			45	0	2	537	206.17	161.66	0	0	0	0	0.00	0.00	14
699	Cathead Bay	3-31-91															
			2.1	20	124	0	0	164	62.96	23.86	0	0	0	0	0.00	0.00	14
			2.7	30	108	0	0	1179	452.64	201.27	0	0	0	0	0.00	0.00	14
			3.4	40	5	0	3	1500	575.88	134.66	0	0	0	0	0.00	0.00	14
			6.1	60	11	0	0	248	95.21	65.44	0	0	0	0	0.00	0.00	14
		Total Intertidal			237	0	3	2843	363.83	86.16	0	0	0	0	0.00	0.00	42
		Total Upstream			11	0	0	248	95.21	65.44	0	0	0	0	0.00	0.00	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
740	Kelez Creek	4- 2-91															
			2.1	20	45	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
			2.7	30	6	0	0	326	125.16	58.86	0	0	0	0	0.00	0.00	14
			3.4	40	116	0	0	177	67.95	46.70	0	0	0	0	0.00	0.00	14
			6.1	60	301	0	0	582	223.44	130.04	0	0	0	0	0.00	0.00	14
		Total Intertidal			167	0	0	503	64.37	25.70	0	0	0	0	0.00	0.00	42
		Total Upstream			301	0	0	582	223.44	130.04	0	0	0	0	0.00	0.00	14
744	Wilby Creek	4- 2-91															
			2.1	20	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
			2.7	31	1	0	0	162	62.20	27.64	0	0	0	0	0.00	0.00	14
			3.4	40	27	0	0	160	61.43	52.25	0	0	0	0	0.00	0.00	14
			6.1	60	5	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
		Total Intertidal			28	0	0	322	41.21	19.75	0	0	0	0	0.00	0.00	42
		Total Upstream			5	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
747	Cabin Creek	4- 3-91															
			2.1	20	9	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
			2.7	30	444	0	0	166	63.73	30.57	0	0	0	0	0.00	0.00	14
			3.4	40	1525	0	35	515	197.72	70.94	0	35	0	0	0.00	0.00	14
			6.1	60	455	0	7	249	95.60	32.17	0	0	0	0	0.00	0.00	14
		Total Intertidal			1978	0	35	681	87.15	28.22	0	35	0	0	0.00	0.00	42
		Total Upstream			455	0	7	249	95.60	32.17	0	0	0	0	0.00	0.00	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
749	Shad Creek	3-23-91															
			2.1	20	32	0	0	163	62.58	39.16	0	0	0	0	0.00	0.00	14
			2.7	30	82	0	0	61	23.42	21.41	0	0	0	0	0.00	0.00	14
			3.4	40	137	0	0	2	0.77	0.52	0	0	0	0	0.00	0.00	14
			6.1	60	622	0	48	2846	1092.64	261.53	0	0	0	0	0.00	0.00	14
		Total Intertidal			251	0	0	226	28.92	15.05	0	0	0	0	0.00	0.00	42
		Total Upstream			622	0	48	2846	1092.64	261.53	0	0	0	0	0.00	0.00	14
775	Pautzke Creek	4- 3-91															
			2.1	20	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
			2.7	30	2	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
			3.4	40	0	0	0	2	0.77	0.77	0	0	0	0	0.00	0.00	14
			6.1	60	0	0	0	704	270.28	183.45	0	0	0	0	0.00	0.00	14
		Total Intertidal			2	0	0	2	0.26	0.26	0	0	0	0	0.00	0.00	42
		Total Upstream			0	0	0	704	270.28	183.45	0	0	0	0	0.00	0.00	14
815	Constantine Creek	4- 4-91															
			2.1	20	80	0	0	100	38.39	25.58	0	0	0	0	0.00	0.00	14
			2.4	23	51	0	0	452	173.53	122.51	0	0	0	1	0.38	0.38	14
			2.7	30	35	0	1	401	153.95	53.38	0	0	0	0	0.00	0.00	14
			3.0	33	101	0	6	232	89.07	28.40	32	0	0	144	55.28	47.55	14
			3.4	40	358	0	0	3	1.15	0.61	0	0	0	0	0.00	0.00	14
			6.1	80	0	0	0	14	5.37	5.37	27	0	1	338	129.77	82.50	14
			6.1	90	0	0	7	0	0.00	0.00	2	0	0	0	0.00	0.00	14
			6.1	100	21	0	0	0	0.00	0.00	8	0	0	26	9.98	9.58	14
			6.1	120	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
		Total Intertidal			625	0	7	1188	91.22	28.12	32	0	0	145	11.13	9.61	70
		Total Upstream			21	0	7	14	1.34	1.34	37	0	1	364	34.94	21.50	56

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
828	Cook Creek	4-18-91	2.1	20	0	0	0	1	0.38	0.38	0	0	0	0	0.00	0.00	14
			2.7	30	328	0	0	361	138.60	50.63	0	0	0	0	0.00	0.00	14
			3.4	41	0	0	0	1	0.77	0.77	0	0	0	0	0.00	0.00	7
			3.4	42	57	0	0	1	0.77	0.77	0	0	0	0	0.00	0.00	7
			6.1	60	442	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
		Total Intertidal			385	0	0	364	46.58	19.35	0	0	0	0	0.00	0.00	42
		Total Upstream			442	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
850	Canoe Creek	4- 8-91	2.1	20	65	0	1	580	222.67	95.77	0	0	0	0	0.00	0.00	14
			2.7	30	1492	0	14	1925	739.05	189.31	0	0	0	0	0.00	0.00	14
			3.4	40	2392	0	1	1476	566.67	110.63	0	0	0	0	0.00	0.00	14
			6.1	60	850	0	3	264	101.36	66.52	0	0	0	0	0.00	0.00	14
		Total Intertidal			3949	0	16	3981	509.46	84.70	0	0	0	0	0.00	0.00	42
		Total Upstream			850	0	3	264	101.36	66.52	0	0	0	0	0.00	0.00	14
861	Bernard Creek	3-14-91	2.1	20	117	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
			2.7	30	807	0	3	144	55.28	38.88	0	0	0	0	0.00	0.00	14
			3.4	40	125	0	0	6	2.30	1.22	0	0	0	0	0.00	0.00	14
			6.1	60	103	0	20	295	113.26	107.12	0	0	0	0	0.00	0.00	14
		Total Intertidal			1049	0	3	150	19.20	13.26	0	0	0	0	0.00	0.00	42
		Total Upstream			103	0	20	295	113.26	107.12	0	0	0	0	0.00	0.00	14
Prince William Sound Summary																	
		Total Intertidal			30787	210	404	78254	212.54	11.95	1204	35	37	4258	11.56	12.87	1979
		Total Upstream			21525	0	271	22364	178.08	20.20	441	0	28	2760	21.98	21.32	675

Notes:

[1] Location code used to separate digs within tide zone.
[2] Number of fry per meter squared.

APPENDIX B.5

1992 Prince William Sound pink and chum salmon fry survey data summary

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
11	Humpy Creek	3-13-92															
			2.1	20	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
			2.7	30	0	2	0	19	7.29	7.29	0	0	0	0	0.00	0.00	14
			3.4	40	4	1	0	111	42.62	19.39	0	0	0	0	0.00	0.00	14
			6.1	60	16	0	0	893	342.84	164.45	0	0	0	0	0.00	0.00	14
			6.1	61	13	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	10
		Total Intertidal			4	3	0	130	16.64	7.34	0	0	0	0	0.00	0.00	42
		Total Upstream			29	0	0	893	199.99	100.79	0	0	0	0	0.00	0.00	24
35	Koppen Creek	3-16-92															
			2.7	30	528	0	24	1242	476.83	149.18	1	0	0	0	0.00	0.00	14
			3.4	40	74	0	35	3246	1246.21	384.62	11	0	0	265	101.74	67.61	14
			6.1	60	1971	0	9	870	334.01	189.26	0	0	0	0	0.00	0.00	14
		Total Intertidal			602	0	59	4488	861.52	215.53	12	0	0	265	50.87	34.59	28
		Total Upstream			1971	0	9	870	334.01	189.26	0	0	0	0	0.00	0.00	14
52	Control Creek	3-17-92															
			2.1	20	268	0	0	186	71.41	61.18	0	0	0	0	0.00	0.00	14
			2.7	30	1550	0	0	19	7.29	3.27	0	0	0	1	0.38	0.38	14
			3.4	40	2554	0	5	569	218.45	79.36	0	0	0	4	1.54	0.88	14
			6.1	60	3586	0	12	3691	1417.05	408.84	0	0	0	350	134.37	133.96	14
		Total Intertidal			4372	0	5	774	99.05	35.40	0	0	0	5	0.64	0.33	42
		Total Upstream			3586	0	12	3691	1417.05	408.84	0	0	0	350	134.37	133.96	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
80	Whalen Creek	3-17-92															
			2.1	20	1	0	0	2	0.77	0.77	0	0	0	0	0.00	0.00	14
			2.7	30	5	0	0	9	3.46	1.33	0	0	0	0	0.00	0.00	14
			3.4	40	1761	0	0	82	31.48	16.16	2	0	0	0	0.00	0.00	14
			6.1	60	1326	0	3	78	29.95	24.61	2	0	0	0	0.00	0.00	14
		Total Intertidal			1767	0	0	93	11.90	5.71	2	0	0	0	0.00	0.00	42
		Total Upstream			1326	0	3	78	29.95	24.61	2	0	0	0	0.00	0.00	14
89	Fish Creek	4- 5-92															
			2.1	20	4	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
			2.7	30	18	0	0	623	239.18	105.95	0	0	0	0	0.00	0.00	14
			3.4	40	198	0	0	574	220.37	105.95	12	0	0	1	0.38	0.38	14
			6.1	60	1408	0	0	7	2.69	1.35	0	0	0	0	0.00	0.00	14
		Total Intertidal			220	0	0	1197	153.18	51.58	12	0	0	1	0.13	0.13	42
		Total Upstream			1408	0	0	7	2.69	1.35	0	0	0	0	0.00	0.00	14
117	Indian Creek	3-18-92															
			2.1	20	370	0	4	514	197.34	71.93	1	0	0	25	9.60	7.31	14
			2.7	30	1017	0	4	913	350.52	101.80	15	0	0	313	120.17	111.16	14
			3.4	40	24	0	4	1464	562.06	199.24	8	0	0	328	125.93	57.04	14
			6.1	60	71	0	10	2419	928.71	259.55	8	0	0	646	248.01	164.71	14
		Total Intertidal			1411	0	12	2891	369.97	79.89	24	0	0	666	85.23	41.54	42
		Total Upstream			71	0	10	2419	928.71	259.55	8	0	0	646	248.01	164.71	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
123	Gregorieff Creek	3-19-92															
			2.1	21	0	0	0	17	6.53	6.13	0	0	0	0	0.00	0.00	14
			2.7	31	281	0	0	1260	483.74	164.93	0	0	0	0	0.00	0.00	14
			3.4	41	549	0	5	3573	1371.75	275.08	4	0	0	562	215.76	100.96	14
			6.1	61	512	0	43	8181	3140.86	610.90	1	0	1	927	355.90	178.79	14
		Total Intertidal			830	0	5	4850	620.67	136.68	4	0	0	562	71.92	36.46	42
		Total Upstream			512	0	43	8181	3140.86	610.90	1	0	1	927	355.90	178.79	14
153	Stellar Creek	3-18-92															
			2.1	20	79	0	0	16	6.14	4.17	0	0	0	0	0.00	0.00	14
			2.7	30	940	0	0	155	59.51	23.77	0	0	0	0	0.00	0.00	14
			3.4	40	599	0	2	2949	1132.18	436.15	20	0	1	153	58.74	58.74	14
			3.4	43	325	0	19	2643	1014.70	298.97	168	0	3	2635	1011.63	398.78	14
			6.1	60	206	0	14	3122	1198.60	502.92	2	0	0	10	3.84	2.84	14
		Total Intertidal			1943	0	21	5763	553.13	146.69	188	0	4	2788	267.59	113.87	56
		Total Upstream			206	0	14	3122	1198.60	502.92	2	0	0	10	3.84	2.84	14
265	Unakwik Creek	3-19-92															
			2.1	20	4	0	0	265	101.74	60.39	0	0	0	0	0.00	0.00	14
			2.7	31	0	0	0	420	322.49	206.53	0	0	0	0	0.00	0.00	7
			2.7	32	2	0	0	744	571.28	214.95	0	0	0	0	0.00	0.00	7
			3.4	41	0	0	0	6	4.61	3.20	0	0	0	0	0.00	0.00	7
			3.4	42	74	0	0	196	150.50	71.91	0	0	0	0	0.00	0.00	7
			6.1	61	0	0	0	0			0	0	0	0			0
			6.1	62	0	0	0	0			0	0	0	0			0
		Total Intertidal			80	0	0	1631	208.73	59.52	0	0	0	0	0.00	0.00	42
		Total Upstream															0

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
276	Black Bear Creek	3-20-92															
			2.1	20	1	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
			2.7	30	54	0	0	501	192.34	71.43	4	0	0	439	168.54	89.31	14
			3.4	40	203	0	1	145	55.67	27.53	45	0	0	62	23.80	13.20	14
			6.1	60	59	0	7	1094	420.01	213.03	3	0	5	612	234.96	111.11	14
		Total Intertidal			258	0	1	646	82.67	27.90	49	0	0	501	64.11	31.57	42
		Total Upstream			59	0	7	1094	420.01	213.03	3	0	5	612	234.96	111.11	14
322	Coghill River	3-20-92															
			6.1	60	5353	0	1197	17295	1549.31	180.94	0	0	0	0	0.00	0.00	60
		Total Intertidal															0
		Total Upstream			5353	0	1197	17295	1549.31	180.94	0	0	0	0	0.00	0.00	60
421	Mill Creek	3-21-92															
			2.1	20	1	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
			2.7	30	25	0	2	1233	473.38	276.08	18	0	0	748	287.17	122.10	14
			3.4	40	131	0	2	1393	534.80	193.62	19	0	0	954	366.26	179.67	14
			6.1	60	56	0	2	878	337.08	131.27	0	0	0	0	0.00	0.00	14
		Total Intertidal			157	0	4	2626	336.06	115.80	37	0	0	1702	217.81	74.78	42
		Total Upstream			56	0	2	878	337.08	131.27	0	0	0	0	0.00	0.00	14
430	Meacham Creek	3-21-92															
			2.1	20	71	0	2	701	269.13	136.80	0	0	0	0	0.00	0.00	14
			2.7	30	895	0	0	160	61.43	36.57	0	0	0	0	0.00	0.00	14
			3.4	40	229	0	1	3055	1172.88	288.95	6	0	0	205	78.70	69.62	14
			6.1	60	518	0	14	4864	1867.39	353.99	0	0	0	0	0.00	0.00	14
		Total Intertidal			1195	0	3	3916	501.15	128.93	6	0	0	205	26.23	23.36	42
		Total Upstream			518	0	14	4864	1867.39	353.99	0	0	0	0	0.00	0.00	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
455	Paulson Creek	3-22-92															
			2.1	20	57	0	0	5	1.92	0.91	0	0	0	1	0.38	0.38	14
			2.7	30	102	0	1	785	301.38	142.46	5	0	0	354	135.91	78.00	14
			3.4	40	4	0	0	77	59.12	30.65	1	0	0	0	0.00	0.00	7
			3.4	43	82	0	0	997	765.54	225.69	73	0	0	0	0.00	0.00	7
			6.1	60	286	36	0	5134	1971.05	461.38	0	0	0	1	0.38	0.38	14
		Total Intertidal			245	0	1	1864	238.54	71.82	79	0	0	355	45.43	27.26	42
		Total Upstream			286	36	0	5134	1971.05	461.38	0	0	0	1	0.38	0.38	14
480	Mink Creek	3-23-92															
			2.1	20	302	0	0	512	196.57	62.10	1	0	0	1	0.38	0.38	14
			2.7	30	102	0	1	1037	398.13	112.18	1	0	0	157	60.28	45.57	14
			3.4	40	8	0	0	952	365.49	121.95	2	0	0	9	3.46	2.36	14
			6.1	60	95	0	1	51	19.58	16.41	0	0	0	0	0.00	0.00	14
		Total Intertidal			412	0	1	2501	320.06	59.16	4	0	0	167	21.37	15.45	42
		Total Upstream			95	0	1	51	19.58	16.41	0	0	0	0	0.00	0.00	14
485	W. Finger Creek	3-22-92															
			2.1	20	0	0	0	0	0.00	0.00	1	0	0	0	0.00	0.00	14
			2.7	30	290	0	0	10	3.84	2.35	12	0	0	148	56.82	42.34	14
			3.4	40	93	0	2	2538	974.39	218.24	3	0	0	222	85.23	75.73	14
			6.1	60	14	0	1	3208	1231.62	344.13	0	0	0	0	0.00	0.00	14
		Total Intertidal			383	0	2	2548	326.08	100.80	16	0	0	370	47.35	28.74	42
		Total Upstream			14	0	1	3208	1231.62	344.13	0	0	0	0	0.00	0.00	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
498	McClure Creek	4-30-92															
			2.1	20	13	0	0	88	33.79	21.12	0	0	0	0	0.00	0.00	14
			2.7	30	769	0	0	1304	500.64	177.90	0	0	0	0	0.00	0.00	14
			3.4	40	182	0	0	2214	850.02	141.99	0	0	0	0	0.00	0.00	14
			6.1	60	101	0	0	5	1.92	1.07	0	0	0	0	0.00	0.00	14
		Total Intertidal			964	0	0	3606	461.48	90.83	0	0	0	0	0.00	0.00	14
		Total Upstream			101	0	0	5	1.92	1.07	0	0	0	0	0.00	0.00	14
506	Loomis Creek	4- 4-92															
			2.1	20	219	0	0	78	29.95	25.06	0	0	0	0	0.00	0.00	14
			2.7	30	1403	0	3	488	187.35	72.61	4	0	0	0	0.00	0.00	14
			3.4	40	1328	0	0	556	213.46	60.65	0	0	0	0	0.00	0.00	14
			6.1	60	1942	0	0	1372	526.74	277.20	0	0	0	0	0.00	0.00	14
		Total Intertidal			2950	0	3	1122	143.59	34.24	4	0	0	0	0.00	0.00	42
		Total Upstream			1942	0	0	1372	526.74	277.20	0	0	0	0	0.00	0.00	14
604	Erb Creek	4- 4-92															
			2.1	20	265	0	0	5	3.84	2.26	0	0	0	0	0.00	0.00	7
			2.1	23	24	0	1	258	198.10	89.84	0	0	0	0	0.00	0.00	7
			2.7	30	564	0	0	94	36.09	18.94	0	0	0	20	7.68	7.28	14
			3.4	40	103	0	11	2601	998.58	426.83	0	0	0	0	0.00	0.00	14
			6.1	60	125	0	213	181	69.49	43.93	0	0	0	0	0.00	0.00	14
		Total Intertidal			956	0	12	2958	378.55	155.80	0	0	0	20	2.56	2.43	42
		Total Upstream			125	0	213	181	69.49	43.93	0	0	0	0	0.00	0.00	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
618	Junction Creek	4- 3-92															
			2.1	20	0	0	0	1	0.45	0.45	0	0	0	0	0.00	0.00	12
			2.7	30	28	0	0	225	100.78	56.76	0	0	0	0	0.00	0.00	12
			3.4	40	46	0	1	1442	645.88	229.76	0	0	0	0	0.00	0.00	12
			6.1	60	170	0	184	1228	550.03	223.14	0	0	0	0	0.00	0.00	12
		Total Intertidal			74	0	1	1668	249.04	90.36	0	0	0	0	0.00	0.00	36
		Total Upstream			170	0	184	1228	550.03	223.14	0	0	0	0	0.00	0.00	12
621	Totemoff Creek	4- 4-92															
			2.1	20	857	0	0	124	47.61	15.52	0	0	0	0	0.00	0.00	14
			2.7	30	103	0	0	173	66.42	31.95	0	0	0	0	0.00	0.00	14
			3.4	40	1412	0	314	2518	966.71	291.05	0	0	0	0	0.00	0.00	14
			6.1	60	1861	0	0	186	71.41	52.64	0	0	0	0	0.00	0.00	14
		Total Intertidal			2372	0	314	2815	360.25	116.50	0	0	0	0	0.00	0.00	42
		Total Upstream			1861	0	0	186	71.41	52.64	0	0	0	0	0.00	0.00	14
623	Brizgaloff Creek	4- 9-92															
			2.1	20	65	0	0	77	29.56	18.16	0	0	0	0	0.00	0.00	14
			2.7	30	943	0	0	760	291.78	88.55	0	0	0	0	0.00	0.00	14
			3.4	40	1867	0	1	1017	390.45	159.73	0	0	0	0	0.00	0.00	14
			6.1	60	4325	0	336	1229	471.84	113.98	0	0	0	0	0.00	0.00	14
		Total Intertidal			2875	0	1	1854	237.26	64.23	0	0	0	0	0.00	0.00	42
		Total Upstream			4325	0	336	1229	471.84	113.98	0	0	0	0	0.00	0.00	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
628	Chenega Creek	4- 2-92															
			2.1	20	0	0	0	7	2.69	1.67	0	0	0	0	0.00	0.00	14
			2.7	30	334	0	0	750	287.94	70.24	0	0	0	0	0.00	0.00	14
			3.4	40	184	4	0	2603	999.35	228.54	0	0	0	0	0.00	0.00	14
			6.1	60	533	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
		Total Intertidal			518	4	0	3360	429.99	101.62	0	0	0	0	0.00	0.00	42
		Total Upstream			533	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
630	Bainbridge Creek	4- 2-92															
			2.1	20	324	0	0	452	173.53	96.73	0	0	0	0	0.00	0.00	14
			2.7	30	968	0	0	1193	458.02	123.69	0	0	0	0	0.00	0.00	14
			3.4	40	1006	0	272	3099	1189.77	277.55	0	0	0	0	0.00	0.00	14
			6.1	60	1183	0	647	3977	1526.86	464.00	15	0	1	53	20.35	14.82	14
		Total Intertidal			2298	0	272	4744	607.11	123.36	0	0	0	0	0.00	0.00	42
		Total Upstream			1183	0	647	3977	1526.86	464.00	15	0	1	53	20.35	14.82	14
632	Claw Creek	4-11-92															
			2.1	20	15	0	0	7	2.69	2.69	0	0	0	0	0.00	0.00	14
			2.7	30	8	0	1	1308	502.17	216.27	1	1	0	0	0.00	0.00	14
			3.4	40	109	0	1	2425	931.01	287.21	0	0	0	0	0.00	0.00	14
			6.1	60	11	0	1	67	51.45	46.22	0	0	0	0	0.00	0.00	7
		Total Intertidal			132	0	2	3740	478.62	131.04	1	1	0	0	0.00	0.00	42
		Total Upstream			11	0	1	67	51.45	46.22	0	0	0	0	0.00	0.00	7

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
637	Pt. Countess	4- 1-92															
			2.1	20	26	0	0	205	78.70	67.30	0	0	0	0	0.00	0.00	14
			2.7	30	50	0	0	785	301.38	93.28	0	0	0	0	0.00	0.00	14
			3.4	41	466	0	11	553	424.62	133.98	0	0	0	0	0.00	0.00	7
			3.4	42	64	0	0	101	77.55	55.19	0	0	0	0	0.00	0.00	7
			6.1	61	653	0	6	531	407.72	174.22	0	0	0	0	0.00	0.00	7
			6.1	62	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	7
		Total Intertidal			606	0	11	1644	210.39	48.76	0	0	0	0	0.00	0.00	42
		Total Upstream			653	0	6	531	203.86	101.00	0	0	0	0	0.00	0.00	14
653	Hogg Creek	4- 1-92															
			2.1	20	166	0	0	345	132.45	69.87	0	0	0	0	0.00	0.00	14
			2.7	31	10	0	5	83	63.73	35.55	0	0	4	52	39.93	39.93	7
			2.7	32	1	0	0	33	25.34	24.45	0	0	0	0	0.00	0.00	7
			3.4	40	7	0	15	180	69.11	28.23	0	0	0	0	0.00	0.00	14
			6.1	60	3	0	2	356	136.68	64.90	0	0	0	0	0.00	0.00	14
		Total Intertidal			184	0	20	641	82.03	26.12	0	0	4	52	6.65	6.65	42
		Total Upstream			3	0	2	356	136.68	64.90	0	0	0	0	0.00	0.00	14
656	Halverson Creek	4-10-92															
			2.1	20	3	0	2	356	136.68	64.90	0	0	0	0	0.00	0.00	14
			2.7	30	114	0	1	1349	517.91	135.63	0	0	0	0	0.00	0.00	14
			3.4	40	178	0	0	966	370.87	91.99	0	0	0	0	0.00	0.00	14
			6.1	60	258	0	220	1778	682.61	243.43	0	0	0	0	0.00	0.00	14
		Total Intertidal			295	0	3	2671	341.82	62.33	0	0	0	0	0.00	0.00	42
		Total Upstream			258	0	220	1778	682.61	243.43	0	0	0	0	0.00	0.00	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
663	Shelter Bay	4- 9-92															
			2.1	20	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	12
			2.7	30	0	0	0	195	87.34	72.78	0	0	0	0	0.00	0.00	12
			3.4	40	179	0	15	1927	863.12	194.71	0	0	0	0	0.00	0.00	12
			6.1	60	270	0	1	2	0.90	0.60	0	0	0	0	0.00	0.00	12
		Total Intertidal			179	0	15	2122	316.82	93.95	0	0	0	0	0.00	0.00	36
		Total Upstream			270	0	1	2	0.90	0.60	0	0	0	0	0.00	0.00	12
665	Bjorne Creek	3-30-92															
			2.1	20	2	0	0	76	29.18	29.18	0	0	0	0	0.00	0.00	14
			2.7	30	99	0	0	22	8.45	4.17	0	0	0	0	0.00	0.00	14
			3.4	40	3822	0	0	11	4.22	2.47	0	0	0	0	0.00	0.00	14
			6.1	60	307	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
		Total Intertidal			3923	0	0	109	13.95	9.77	0	0	0	0	0.00	0.00	42
		Total Upstream			307	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
666	O'Brien Creek	3-31-92															
			2.1	20	2	0	0	2	0.77	0.52	0	0	0	0	0.00	0.00	14
			2.7	30	369	0	0	731	280.65	103.68	0	0	0	0	0.00	0.00	14
			3.4	40	10	0	4	2018	774.75	438.68	0	0	0	0	0.00	0.00	14
			6.1	60	297	0	0	2	0.77	0.52	0	0	0	0	0.00	0.00	14
		Total Intertidal			381	0	4	2751	352.06	154.83	0	0	0	0	0.00	0.00	42
		Total Upstream			297	0	0	2	0.77	0.52	0	0	0	0	0.00	0.00	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
673	Falls Creek	3-31-92															
			2.1	20	362	0	0	30	11.52	3.60	0	0	0	0	0.00	0.00	14
			2.7	30	358	0	0	199	76.40	30.37	0	0	0	0	0.00	0.00	14
			3.4	40	1497	0	5	2959	1136.02	379.92	0	0	0	0	0.00	0.00	14
			6.1	60	1779	0	1	1132	434.60	147.21	0	0	0	0	0.00	0.00	14
		Total Intertidal			2217	0	5	3188	407.98	147.77	0	0	0	0	0.00	0.00	42
		Total Upstream			1779	0	1	1132	434.60	147.21	0	0	0	0	0.00	0.00	14
677	Hayden Creek	3-30-92															
			2.1	21	36	0	0	255	195.80	129.73	0	0	0	0	0.00	0.00	7
			2.1	22	1	0	0	13	9.98	9.98	0	0	0	0	0.00	0.00	7
			2.7	31	12	0	0	633	486.04	276.76	0	0	0	0	0.00	0.00	7
			2.7	32	359	0	0	1448	1111.84	381.05	0	0	0	0	0.00	0.00	7
			3.4	41	13	0	1	439	337.08	148.44	0	0	0	0	0.00	0.00	7
			3.4	42	242	0	3	631	484.51	103.67	0	0	0	0	0.00	0.00	7
			6.1	61	505	0	0	111	85.23	26.96	0	0	0	0	0.00	0.00	7
			6.1	62	96	0	0	79	60.66	28.89	0	0	0	0	0.00	0.00	7
		Total Intertidal			663	0	4	3419	437.54	97.52	0	0	0	0	0.00	0.00	42
		Total Upstream			601	0	0	190	72.95	19.29	0	0	0	0	0.00	0.00	14
678	Sleepy Bay	3-29-92															
			2.1	20	0	0	0	4	1.79	1.79	0	0	0	0	0.00	0.00	12
			2.7	30	220	0	0	1291	578.25	152.41	0	0	0	0	0.00	0.00	12
			3.4	40	142	0	0	1600	716.65	213.90	0	0	0	0	0.00	0.00	12
			6.1	60	1070	0	0	15	6.72	2.57	0	0	0	0	0.00	0.00	12
		Total Intertidal			362	0	0	2895	432.23	99.83	0	0	0	0	0.00	0.00	36
		Total Upstream			1070	0	0	15	6.72	2.57	0	0	0	0	0.00	0.00	12

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
681	Hogan Bay	3-29-92															
			2.1	20	12	0	0	1455	558.61	234.20	0	0	0	0	0.00	0.00	14
			2.7	30	20	0	0	41	15.74	8.12	0	0	0	0	0.00	0.00	14
			3.4	40	135	0	0	6	2.30	1.66	0	0	0	0	0.00	0.00	14
			6.1	60	377	0	496	0	0.00	0.00	0	0	0	0	0.00	0.00	14
		Total Intertidal			167	0	0	1502	192.22	86.27	0	0	0	0	0.00	0.00	42
		Total Upstream			377	0	496	0	0.00	0.00	0	0	0	0	0.00	0.00	14
682	Snug Harbor	4- 8-92															
			2.1	20	294	0	0	75	28.79	9.47	0	0	0	0	0.00	0.00	14
			2.7	30	778	0	0	1037	398.13	102.23	0	0	0	0	0.00	0.00	14
			3.4	40	203	0	2	2810	1078.82	302.01	0	0	0	0	0.00	0.00	14
			6.1	60	134	0	2	5462	2096.98	383.69	0	0	0	0	0.00	0.00	14
		Total Intertidal			1275	0	2	3922	501.91	123.97	0	0	0	0	0.00	0.00	42
		Total Upstream			134	0	2	5462	2096.98	383.69	0	0	0	0	0.00	0.00	14
692	Herring Bay	4- 5-92															
			2.1	20	149	0	0	5	1.92	0.91	0	0	0	0	0.00	0.00	14
			2.7	30	351	0	0	443	170.08	58.48	0	0	0	0	0.00	0.00	14
			3.4	40	506	0	0	641	246.09	175.84	0	0	0	0	0.00	0.00	14
			6.1	60	1076	0	20	2567	985.53	269.45	0	0	0	0	0.00	0.00	14
		Total Intertidal			1006	0	0	1089	139.36	62.32	0	0	0	0	0.00	0.00	42
		Total Upstream			1076	0	20	2567	985.53	269.45	0	0	0	0	0.00	0.00	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
695	Port Audrey	4- 3-92															
			2.1	21	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	7
			2.1	22	24	0	0	16	12.29	5.83	0	0	0	0	0.00	0.00	7
			2.7	30	72	0	0	533	204.63	94.72	0	0	0	0	0.00	0.00	14
			3.4	40	54	0	2	383	147.04	64.21	0	0	0	0	0.00	0.00	14
			6.1	60	170	0	0	179	68.72	57.40	0	0	0	0	0.00	0.00	14
		Total Intertidal			150	0	2	932	119.27	39.43	0	0	0	0	0.00	0.00	42
		Total Upstream			170	0	0	179	68.72	57.40	0	0	0	0	0.00	0.00	14
699	Cathead Bay	4- 2-92															
			2.1	20	290	0	0	4	1.54	1.19	0	0	0	0	0.00	0.00	14
			2.7	30	131	0	0	415	159.33	81.38	0	0	0	0	0.00	0.00	14
			3.4	40	32	0	0	285	109.42	77.03	0	0	0	0	0.00	0.00	14
			6.1	60	589	0	5	1062	407.72	150.72	0	0	0	0	0.00	0.00	14
		Total Intertidal			453	0	0	704	90.09	37.86	0	0	0	0	0.00	0.00	42
		Total Upstream			589	0	5	1062	407.72	150.72	0	0	0	0	0.00	0.00	14
740	Kelez Creek	3-28-92															
			2.1	20	160	0	0	2	0.77	0.52	0	0	0	0	0.00	0.00	14
			2.7	30	467	0	81	269	103.27	47.73	0	0	0	0	0.00	0.00	14
			3.4	40	456	0	0	594	228.05	98.76	0	0	0	0	0.00	0.00	14
			6.1	60	3	0	0	58	22.27	19.06	0	0	0	0	0.00	0.00	14
		Total Intertidal			1083	0	81	865	110.70	38.50	0	0	0	0	0.00	0.00	42
		Total Upstream			3	0	0	58	22.27	19.06	0	0	0	0	0.00	0.00	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
744	Wilby Creek	3-28-92															
			2.1	20	53	0	0	1	0.38	0.38	0	0	0	0	0.00	0.00	14
			2.7	31	35	0	0	325	124.77	50.51	0	0	0	0	0.00	0.00	14
			3.4	40	167	0	0	194	74.48	45.26	0	0	0	0	0.00	0.00	14
			6.1	60	39	0	0	36	13.82	10.85	0	0	0	0	0.00	0.00	14
		Total Intertidal			255	0	0	520	66.55	23.45	0	0	0	0	0.00	0.00	42
		Total Upstream			39	0	0	36	13.82	10.85	0	0	0	0	0.00	0.00	14
747	Cabin Creek	3-28-92															
			2.1	20	367	0	0	2	0.77	0.52	0	0	0	0	0.00	0.00	14
			2.7	30	1141	0	3	205	78.70	32.33	0	0	0	0	0.00	0.00	14
			3.4	40	445	0	139	1350	518.29	184.36	0	0	0	0	0.00	0.00	14
			6.1	60	481	0	70	807	309.82	111.80	0	0	0	0	0.00	0.00	14
		Total Intertidal			1953	0	142	1557	199.26	70.49	0	0	0	0	0.00	0.00	42
		Total Upstream			481	0	70	807	309.82	111.80	0	0	0	0	0.00	0.00	14
749	Shad Creek	3-29-92															
			2.1	20	341	0	0	28	10.75	7.30	0	0	0	0	0.00	0.00	14
			2.7	30	80	0	3	1242	476.83	236.49	0	0	0	0	0.00	0.00	14
			3.4	40	39	0	0	6	2.30	1.22	0	0	0	0	0.00	0.00	14
			6.1	60	34	0	3	1047	401.97	152.48	0	0	0	0	0.00	0.00	14
		Total Intertidal			460	0	3	1276	163.29	84.36	0	0	0	0	0.00	0.00	42
		Total Upstream			34	0	3	1047	401.97	152.48	0	0	0	0	0.00	0.00	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
775	Pautzke Creek	3-27-92															
			2.1	20	0	0	0	331	127.08	67.17	0	0	0	0	0.00	0.00	14
			2.7	30	3	0	0	388	148.96	106.17	0	0	0	0	0.00	0.00	14
			3.4	40	59	0	0	2634	1011.25	293.17	0	0	0	0	0.00	0.00	14
			6.1	60	145	0	50	3755	1441.62	326.19	0	0	0	0	0.00	0.00	14
		Total Intertidal			62	0	0	3353	429.10	122.01	0	0	0	0	0.00	0.00	42
		Total Upstream			145	0	50	3755	1441.62	326.19	0	0	0	0	0.00	0.00	14
815	Constantine Creek	3-27-92															
			2.1	20	0	0	0	123	47.22	32.32	0	0	0	0	0.00	0.00	14
			2.4	23	107	0	0	1011	388.14	144.14	0	0	0	0	0.00	0.00	14
			2.7	30	389	0	0	256	98.28	54.35	0	0	0	0	0.00	0.00	14
			3.0	33	190	0	2	863	331.32	129.56	0	76	0	3	1.15	0.83	14
			3.4	40	429	0	0	523	200.79	120.23	0	0	0	0	0.00	0.00	14
			6.1	80	140	0	0	454	174.30	146.11	17	0	0	183	70.26	58.33	14
			6.1	90	139	0	0	173	66.42	59.53	0	0	0	0	0.00	0.00	14
			6.1	100	42	0	17	315	120.94	68.19	0	0	0	0	0.00	0.00	14
			6.1	120	137	0	0	1079	414.25	131.88	0	0	0	0	0.00	0.00	14
		Total Intertidal			1115	0	2	2776	213.15	48.56	0	76	0	3	0.23	0.17	70
		Total Upstream			458	0	17	2021	193.98	55.62	17	0	0	183	17.56	14.76	56
828	Cook Creek	4- 8-92															
			2.1	20	1	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
			2.7	30	796	0	8	581	223.06	188.98	0	0	0	0	0.00	0.00	14
			3.4	41	112	0	0	627	481.44	276.55	0	0	0	1	0.77	0.77	7
			3.4	42	24	0	0	205	157.41	128.99	0	0	0	0	0.00	0.00	7
			6.1	60	226	0	0	195	74.86	39.74	0	0	0	0	0.00	0.00	14
		Total Intertidal			933	0	8	1413	180.83	81.83	0	0	0	1	0.13	0.13	42
		Total Upstream			226	0	0	195	74.86	39.74	0	0	0	0	0.00	0.00	14

Stream #	Stream Name	Date	Height in Tidal Zone(m)	Loc	Pink Salmon Eggs Dead	Pink Salmon Eggs Live	Pink Salmon Fry Dead	Pink Salmon Fry Live	Pink Salmon Fry Density	Pink Salmon Fry SE	Chum Salmon Eggs Dead	Chum Salmon Eggs Live	Chum Salmon Fry Dead	Chum Salmon Fry Live	Chum Salmon Fry Density	Chum Salmon Fry SE	No. of Digs
850	Canoe Creek	3-26-92															
			2.1	20	166	0	0	25	9.60	3.10	0	0	0	0	0.00	0.00	14
			2.7	30	891	0	0	97	37.24	11.99	0	0	0	0	0.00	0.00	14
			3.4	40	1511	0	0	151	57.97	30.28	0	0	0	0	0.00	0.00	14
			6.1	60	213	0	0	259	99.44	61.36	0	0	0	0	0.00	0.00	14
		Total Intertidal			2568	0	0	273	34.94	11.08	0	0	0	0	0.00	0.00	42
		Total Upstream			213	0	0	259	99.44	61.36	0	0	0	0	0.00	0.00	14
861	Bernard Creek	3-26-92															
			2.1	20	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	14
			2.7	30	771	0	0	31	11.90	5.01	0	0	0	0	0.00	0.00	14
			3.4	40	250	0	1	256	98.28	47.29	0	0	0	0	0.00	0.00	14
			6.1	60	136	0	2	2669	1024.69	320.64	0	0	0	0	0.00	0.00	14
		Total Intertidal			1021	0	1	287	36.73	16.91	0	0	0	0	0.00	0.00	42
		Total Upstream			136	0	2	2669	1024.69	320.64	0	0	0	0	0.00	0.00	14
Prince William Sound Summary																	
		Total Intertidal			48333	7	1022	102414	61.60	3.19	438	77	8	7663	4.61	3.47	1985
		Total Upstream			35056	36	3589	83433	134.44	9.27	48	0	7	2782	4.48	10.50	741

Notes:

[1] Location code used to separate digs within tide zone.
[2] Number of fry per meter squared.

APPENDIX C.1

Evaluation of data transformations
for the pink salmon embryo mortality study

Evaluation of data transformations
for the pink salmon embryo mortality study

This Appendix describes the transformations examined during our search for an appropriate transform of the embryo mortality estimates ($\hat{M}$) described on page 9. This estimate was the response variable in equation 5. The criteria used to evaluate the transforms were the assumptions inherent in the analysis of variance, namely, $\epsilon_i \sim N(0,\sigma^2)$. Normality and homogeneity of variance of the errors were visually assessed through residual plots (estimators of the ϵ's).

While the embryo mortality estimate is potentially normally distributed (large number of embryos examined), the errors from an analysis of the raw mortalities cannot reasonably be expected to originate from distributions with a constant variance ($V(M)=M(1-M)/N$). The residual plots in Figures C1.C, C4.C, and C7.C suggest this is the case. A weighted least squares analysis (weight=$N/[M(1-M)]$) improved the variance properties of the errors, (Figures C1.F, C4.F, and C7.F), but skewed their distributions in some cases (Figures C1.E and C7.E).

The logit transformation (Draper and Smith 1981) has attractive properties for this type of data, namely, (1) the predicted values are restricted to lie between 0 and 1, and (2) the logit scale leads to more interpretable effects (log odds ratios). The theoretical variances of the errors from a logit analysis are dependent upon the number of embryos examined in each group; thus, a weighted analysis appears warranted. After examination of both unweighted and weighted analyses of logits, it was apparent that the former was the more appropriate. Residuals from the unweighted analysis behaved well, while those from the weighted analysis showed signs of non-normality (Figures C2.E, C5.E, and C8.E).

Finally, the behavior of residuals from an analysis of the arcsin of the square root (Draper and Smith 1981) of the mortalities was examined. This unintuitive function was developed as a variance stabilizing transformation for situations where M_i is variable across the i populations while the number examined in each population (N_i) is constant. The variance of the errors from an analysis of such transformed data is $1/(4N)$, and theoretically, better residual behavior should be obtained from a weighted analysis. Note that while the variance of the weighted transformation, $\sqrt{N}\ \arcsin(\sqrt{\hat{M}})$, is independent of N (1/4), the function is undesirable in that the dependent variable is now a function of not only mortality, but also sample size. Behavior of residuals from the unweighted analysis did indeed display evidence that error variances were heterogeneous (Figures C2.C, C6.C, and C9.C). Weighting appears to have corrected this to some extent (Figures C3.F and C6.F).

Given the apparent undesirable properties of the errors from the weighted and unweighted analyses of raw mortalities, the complex and unintuitve nature of the arcsin square-root scale, and the seemingly good behavior of the errors from the unweighted logit model, it was decided that the latter transformation was the most appropriate.

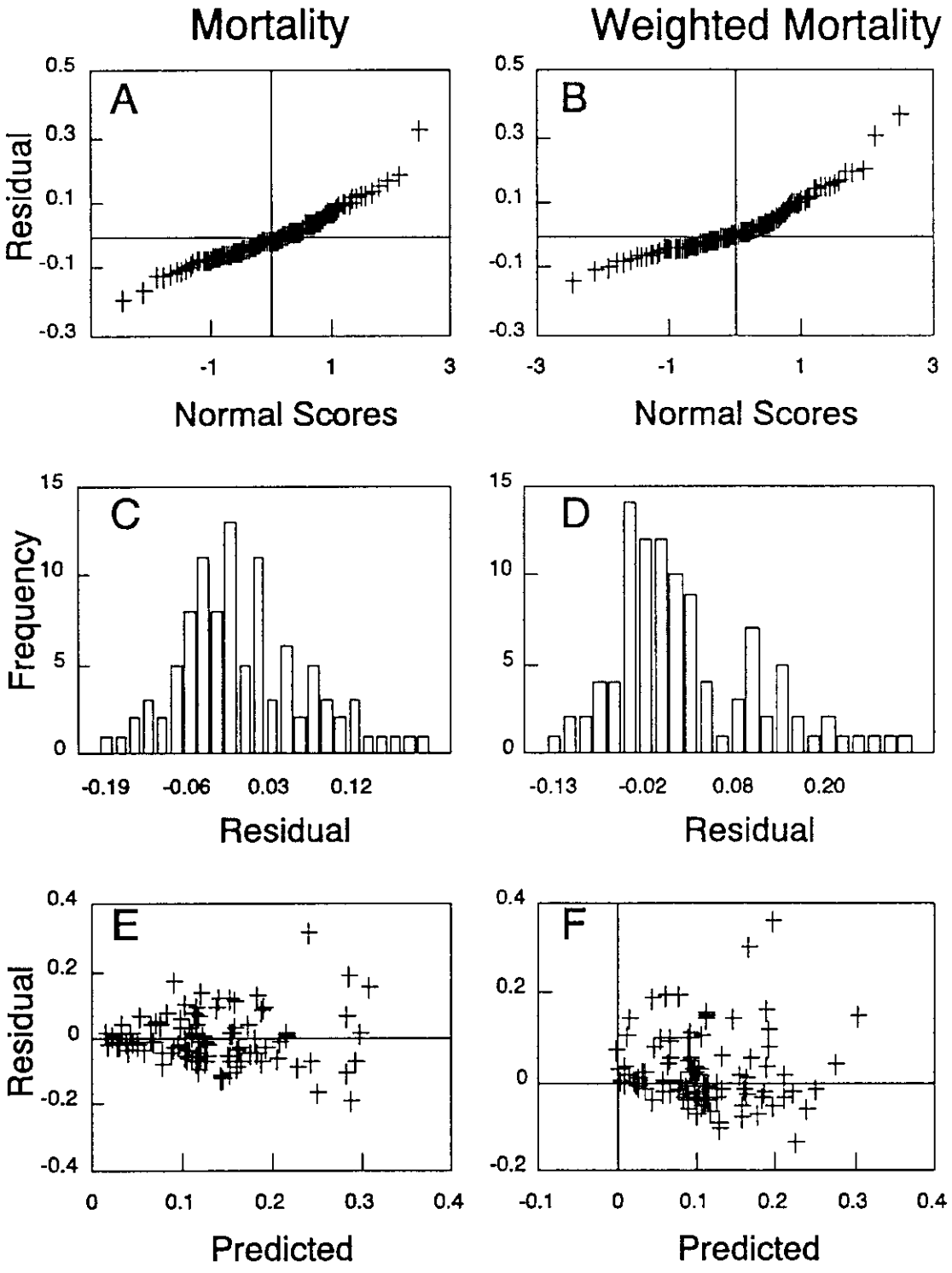

Figure C1. Normal score and residual plots of pink salmon embryo mortality and weighted embryo mortality, 1989 data.

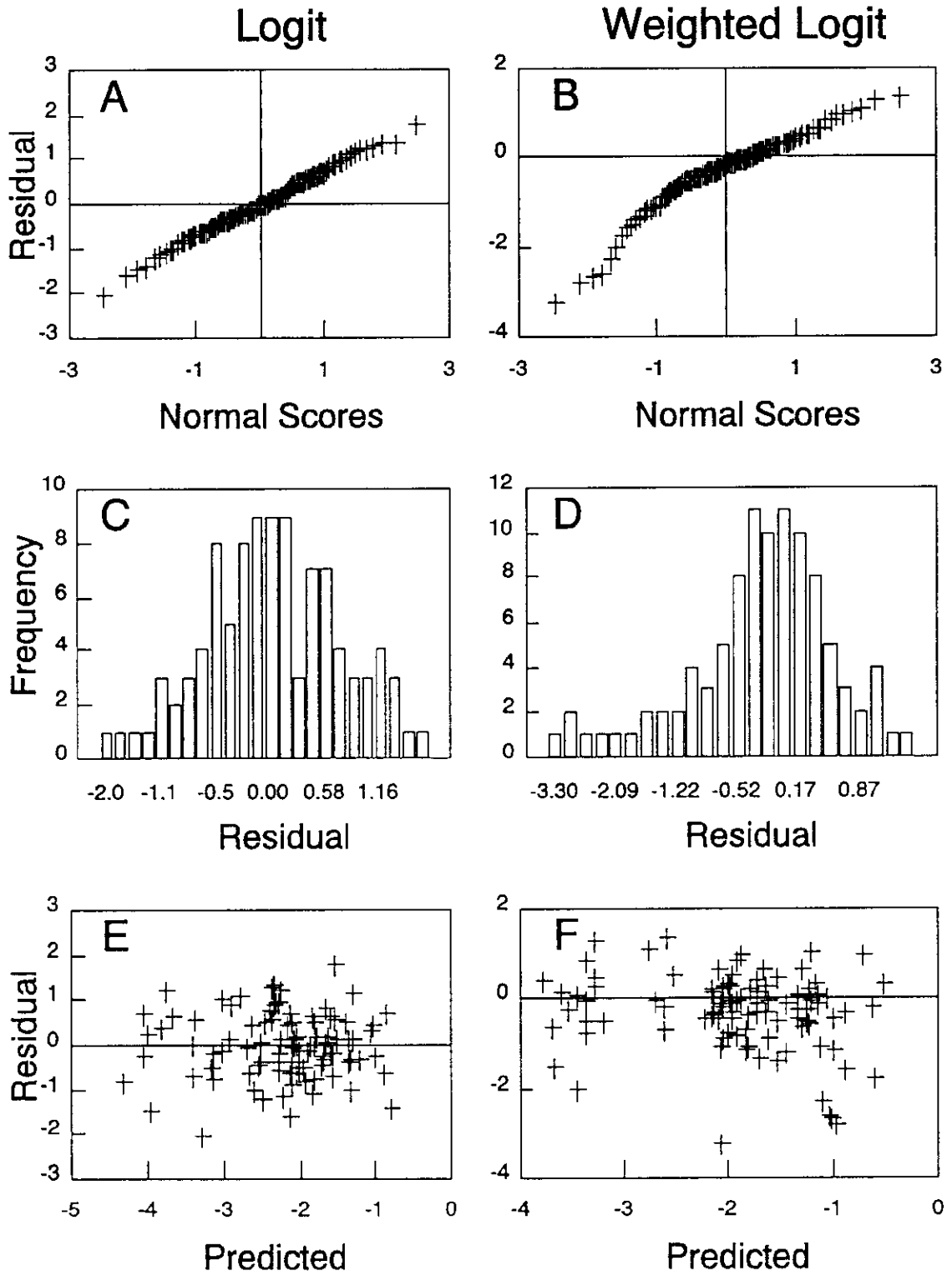

Figure C2. Normal score and residual plots of logit transformed pink salmon embryo mortality and weighted logit transform of embryo mortality, 1989 data.

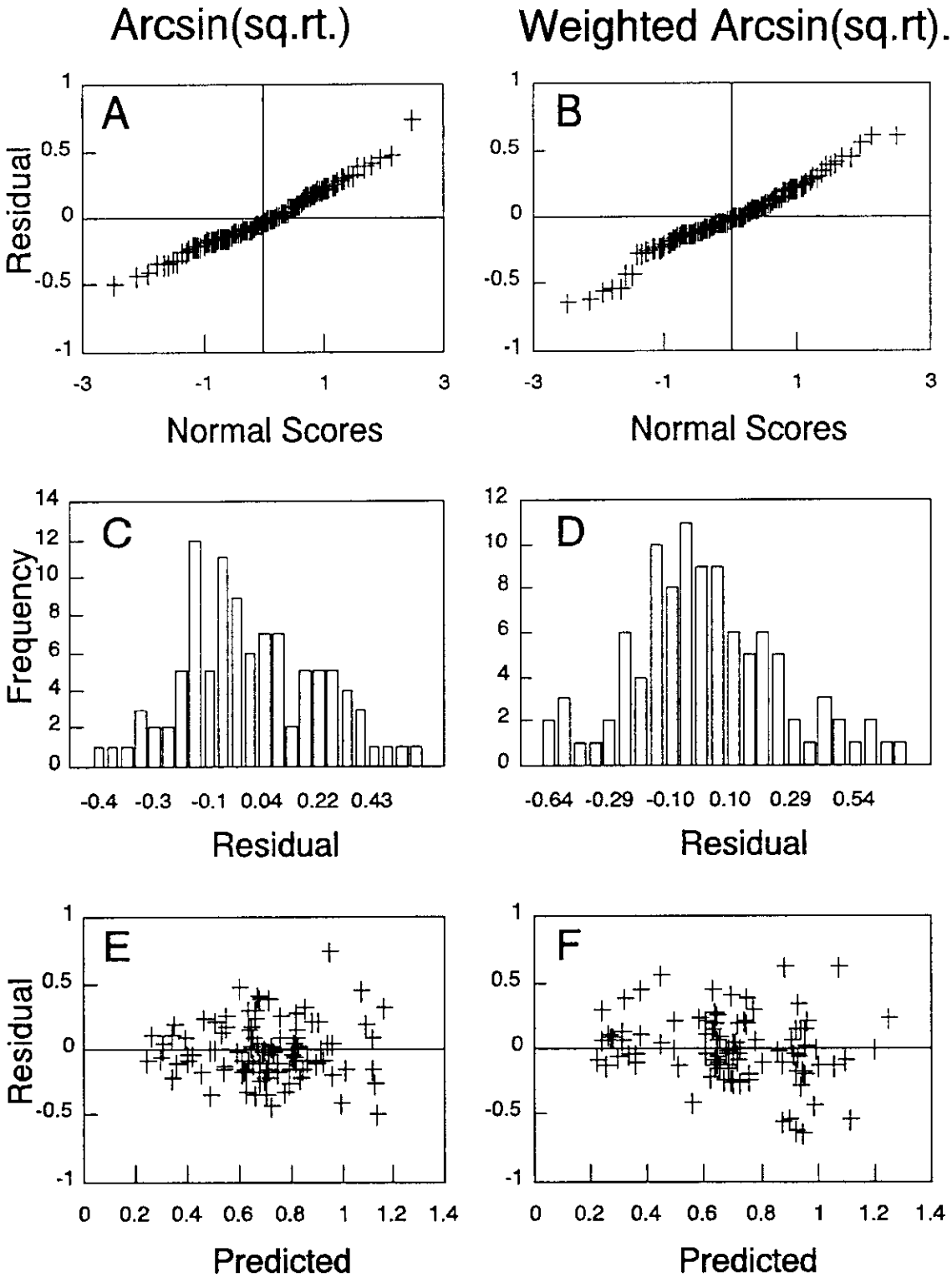

Figure C3. Normal score and residual plots of arcsin square root transformed pink salmon embryo mortality and weighted arcsin square root transformed embryo mortality, 1989 data.

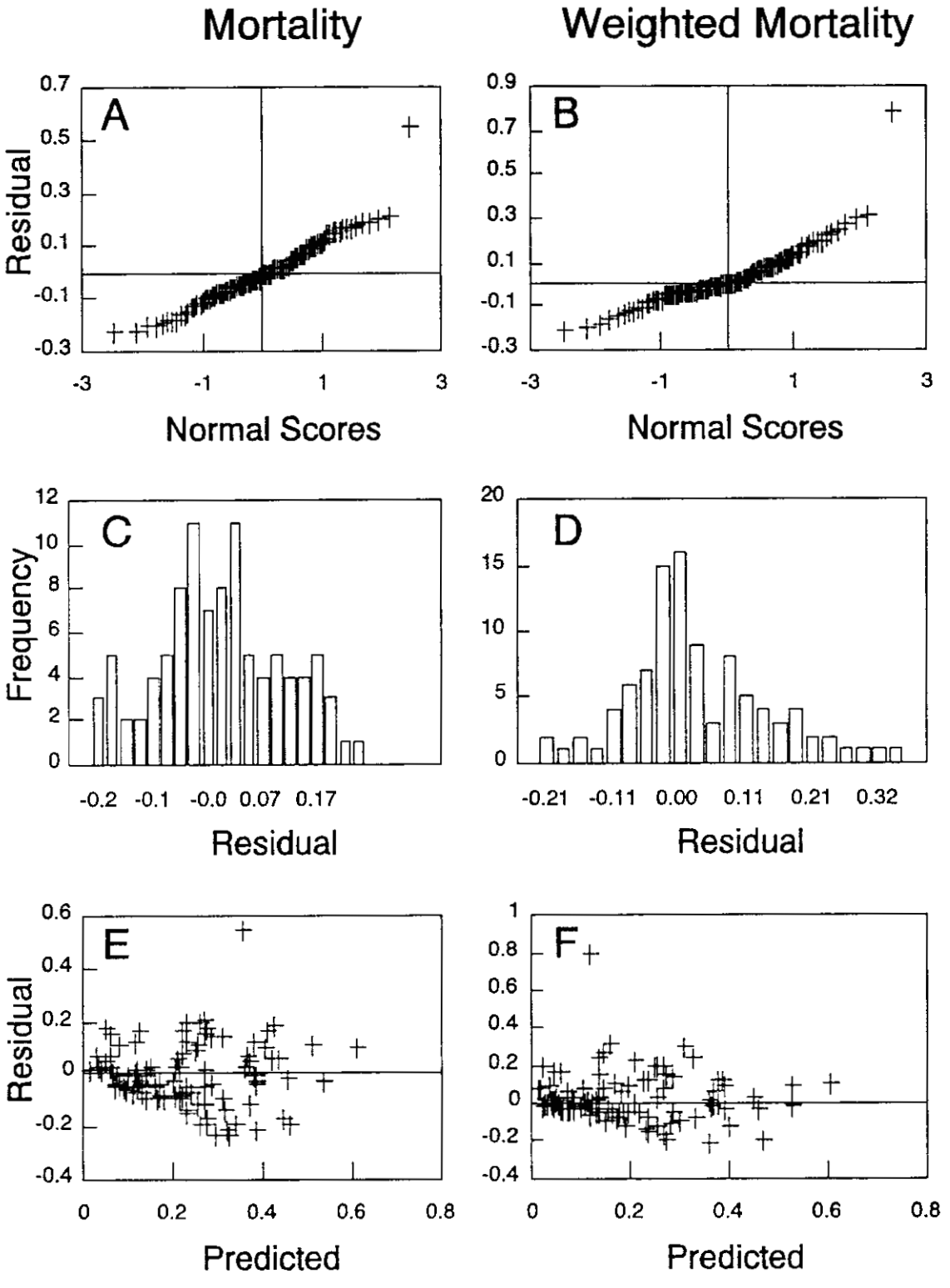

Figure C4. Normal score and residual plots of pink salmon embryo mortality and weighted embryo mortality, 1990 data.

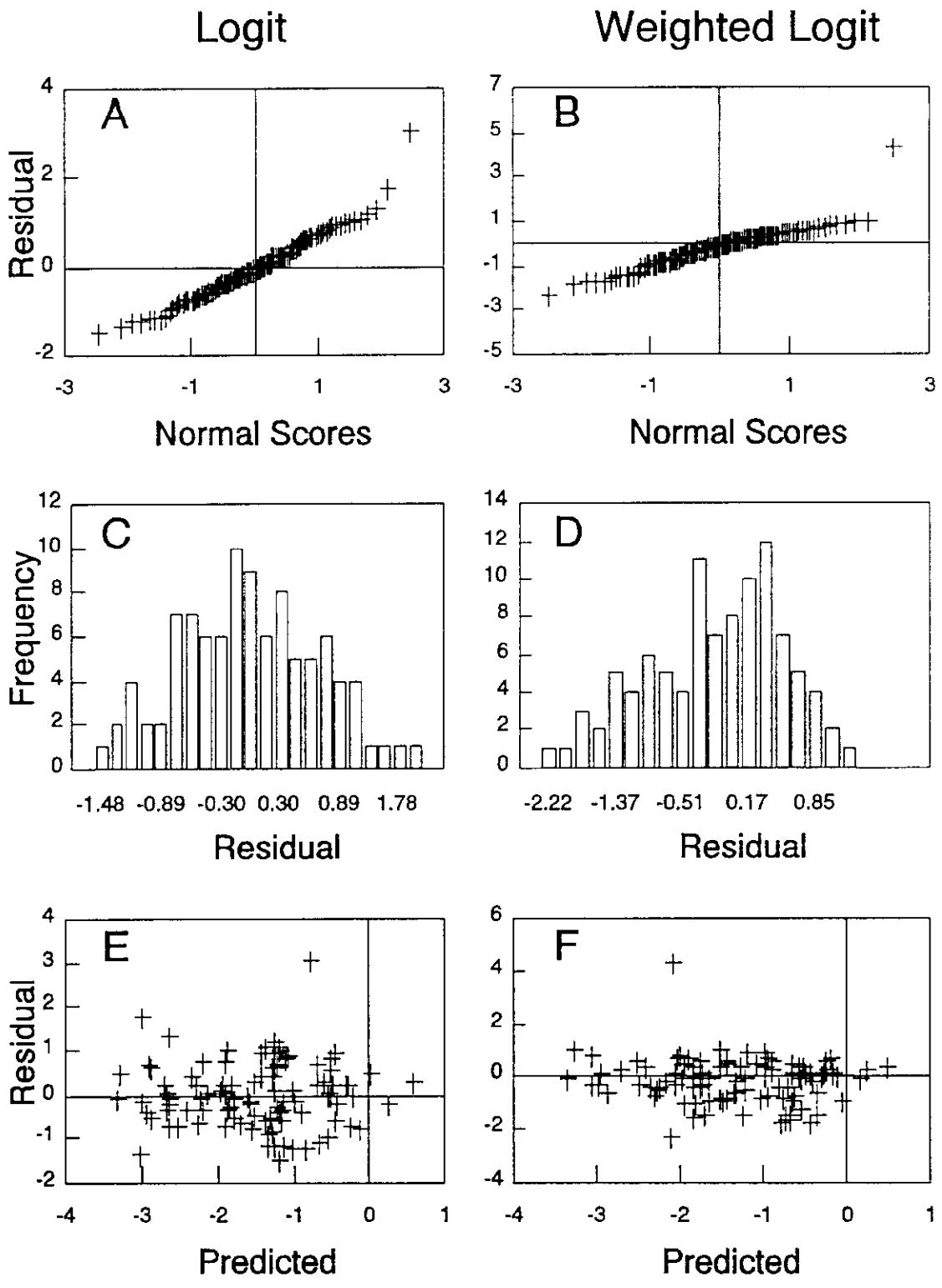

Figure C5. Normal score and residual plots of logit transformed pink salmon embryo mortality and weighted logit transformed embryo mortality, 1990 data.

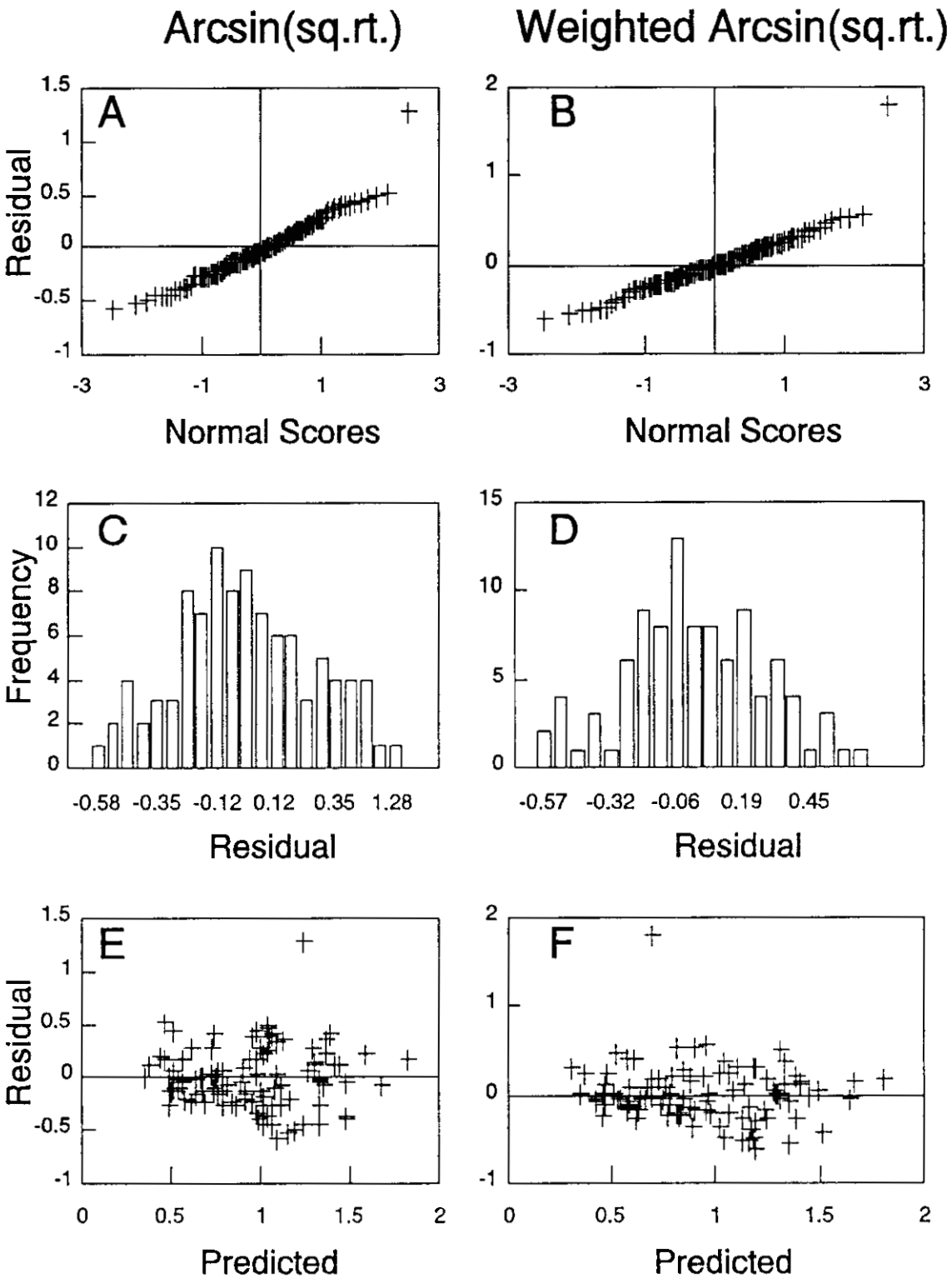

Figure C6. Normal score and residual plots of arcsin square root transformed pink salmon embryo mortality and weighted arcsin square root transformed embryo mortality, 1990 data.

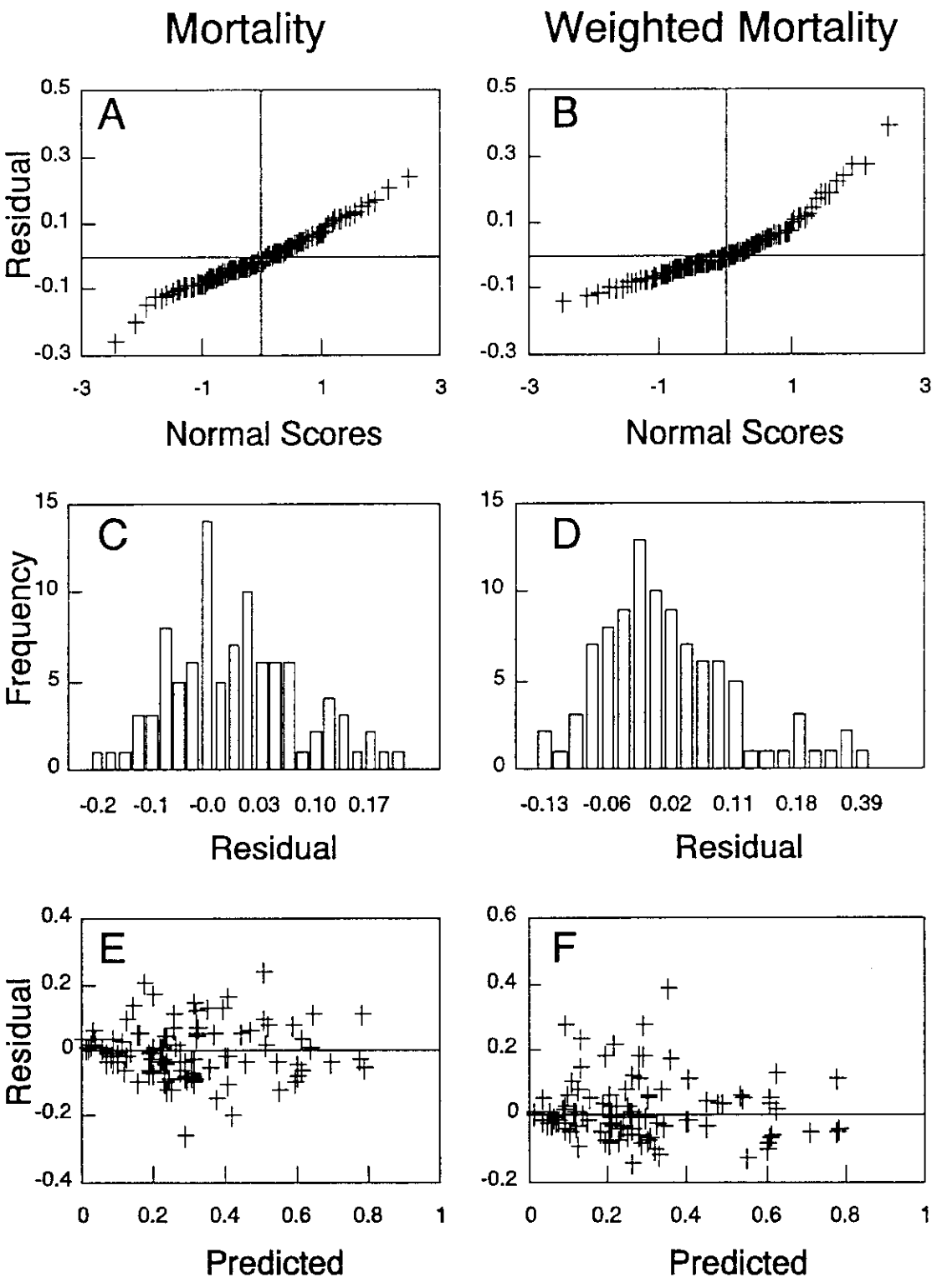

Figure C7. Normal score and residual plots of pink salmon embryo mortality and weighted embryo mortality, 1991 data.

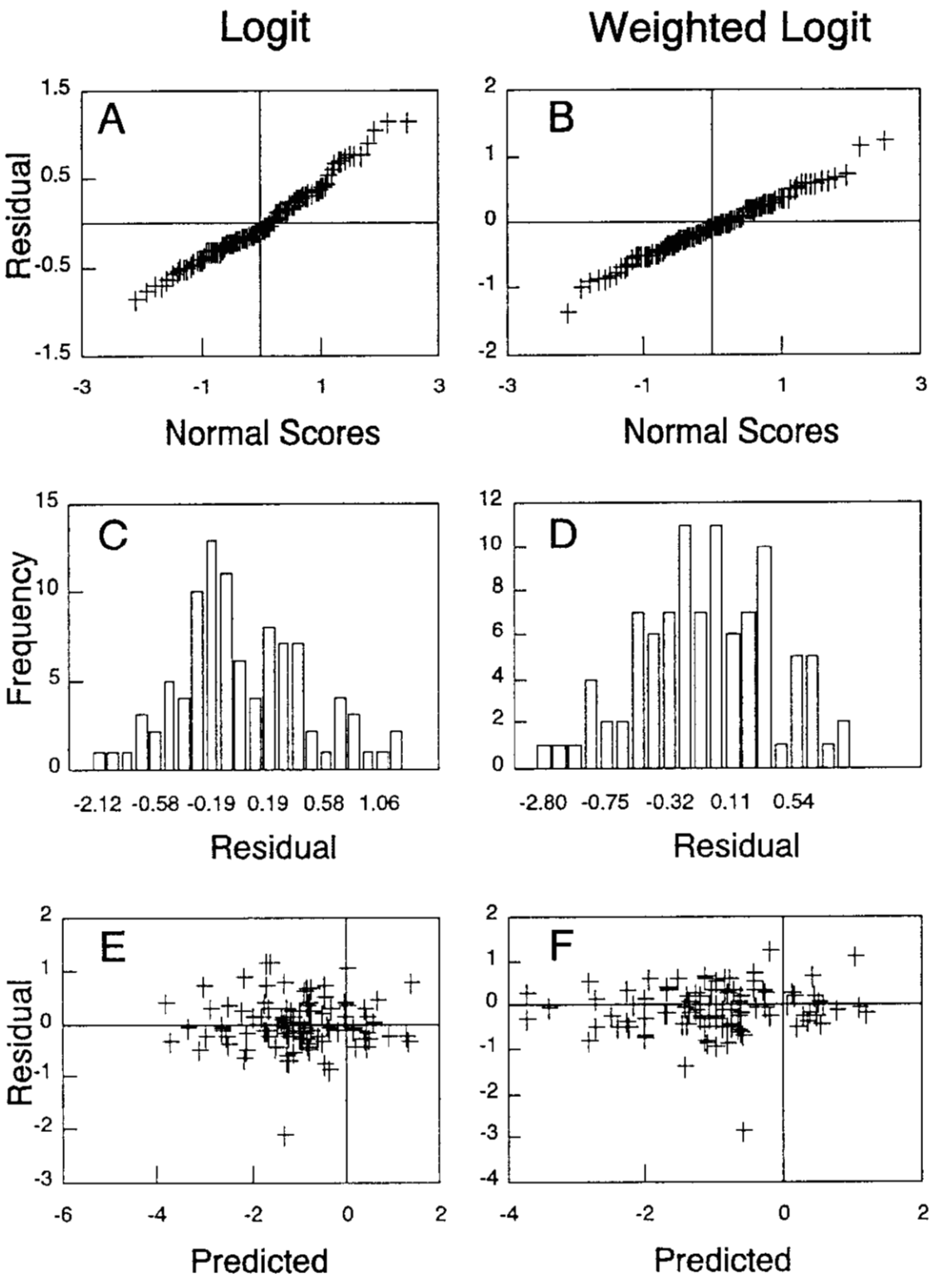

Figure C8. Normal score and residual plots of logit transformed pink salmon embryo mortality and weighted logit transformed embryo mortality, 1991 data.

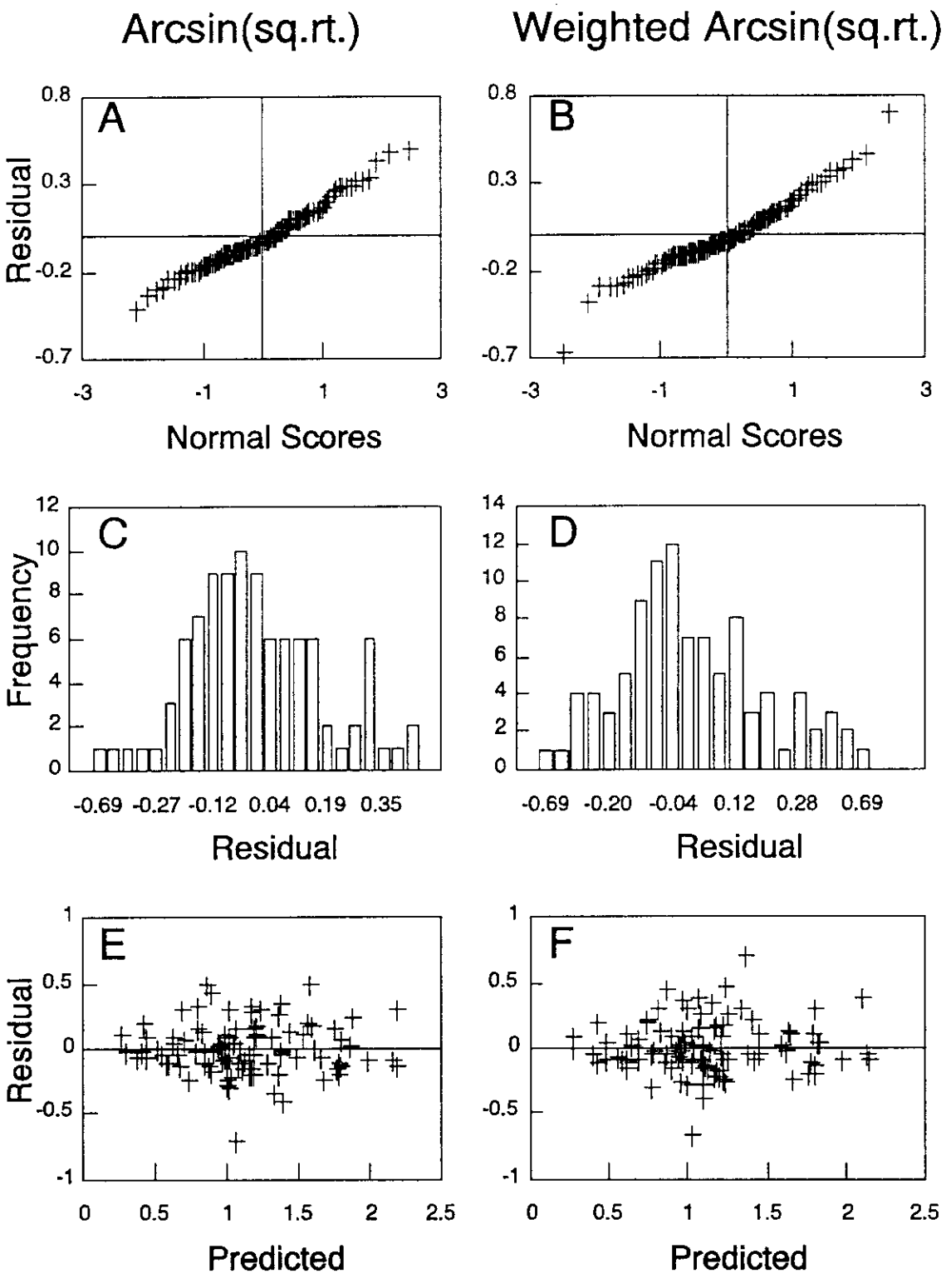

Figure C9. Normal score and residual plots of arcsin square root transformed pink salmon embryo mortality and weighted arcsin square root transformed embryo mortality, 1991 data.

APPENDIX D.1

Mixed-function oxidase data for Prince William Sound pink salmon fry

WOODS HOLE OCEANOGRAPHIC INSTITUTION
1930

Feb 3, 1992

Steve Moffitt
Fisheries Biologist II
Dept. of Fish and Game
P. O. Box 880
Water Street
Cordova, Alaska 99574

Dear Mr. Moffitt,

Enclosed are the results of immunochemical staining for induction of P4501A done on various samples received from you last year. Sample no. 91-879A-3b showed neg/mild staining of the hepatocytes and the collecting duct epithelium. Sample no. 91-882A-2b showed neg/mild staining of the collecting duct epithelium. The above two samples, while not totally negative, were not significantly positive. All other samples examined were negative for induction as indicated.

Repeat staining was done on sample numbers 91-879A 91-880A, 91-885A, and 91-892A because original slides did not contain enough organs to evaluate possible induction adequately. Results from the second staining in those animals are listed in parentheses behind results from the first staining.

Please feel free to contact me if you have any questions.

Sincerely,

Roxanna Smolowitz

Roxanna Smolowitz, D.V.M.

Woods Hole, Massachusetts 02543—Phone 508-548-1400—Telex 951679

Key to interpretation of the results:

Occurrance (Occ.) of staining: 0, none; 1, rare; 2, multifocal; 3 diffuse

Intensity (Int.) of staining: blank, no staining; 1, neg/mild; 2, mild; 3, moderate; 4, strong; 5, very strong.

When a cell type in question was not present on the sections, an "x" was entered into the space.

Sample No. A-3-90	1-a		1-b		2-a		2-b		3-a		3-b	
(WHOI No. 91-879A)	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.
Gill												
pillar cells		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)
epithelium		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)
endothelium of gill arches		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)
gill buds		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)
Pharyngeal epithelium		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)
Heart												
atrial endothelium		x (0)		x (x)		x (x)		x (x)		x (x)		0 (0)
ventricular endothelium		x (0)		x (x)		x (x)		x (x)		x (x)		0 (0)
bulbus endothelium		x (x)		x (x)		x (x)		x (x)		x (x)		x (x)
aorta endothelium		x (x)		x (x)		x (x)		x (x)		x (x)		x (x)
Liver											(3)	0 (1)
hepatocytes		x (x)		x (x)		x (x)		x (x)		x (x)		[illegible]
bile ducts		x (x)		x (x)		x (x)		x (x)		x (x)		x (x)
sinusoidal endothelium		x (x)		x (x)		x (x)		x (x)		x (x)		0 (0)
central veins		x (x)		x (x)		x (x)		x (x)		x (x)		0 (0)
portal veins		x (x)		x (x)		x (x)		x (x)		x (x)		x (x)
hepatic arteries		x (x)		x (x)		x (x)		x (x)		x (x)		x (x)
Pancreas												
acinar cells		x (0)		x (x)		x (x)		x (x)		x (x)		x (x)
ductule cells		x (0)		x (x)		x (x)		x (x)		x (x)		x (x)
Kidney											(1)	0 (1)
collecting duct epithelium		0 (0)		x (0)		x (0)		x (0)		0 (0)		[illegible]
sinusoidal endothelium		0 (0)		x (0)		x (0)		x (0)		0 (0)		0 (0)
tubular epithelium		x (0)		x (0)		x (0)		x (0)		0 (0)		x (0)
glomerular endothelium		x (0)		x (0)		x (0)		x (0)		0 (0)		x (0)
vascular endothelium		0 (0)		x (0)		x (0)		x (0)		0 (0)		x (0)
pronephros epithelium		x (x)		x (x)		x (x)		x (x)		x (x)		x (x)
Gastrointestinal Tract												
gastric epithelium		x (0)		x (x)		x (x)		x (x)		x (x)		x (x)
cecal epithelium		x (x)		x (x)		x (x)		x (x)		x (x)		x (0)
anterior intestinal epithelium		x (0)		x (0)		x (x)		x (x)		x (x)		x (x)
posterior intestinal epithelium		0 (x)		0 (0)		x (0)		x (0)		0 (0)		0 (0)
colonic epithelium		0 (x)		0 (0)		x (0)		x (x)		x (x)		x (x)
gastric peripit endothelium		x (x)		x (x)		x (x)		x (x)		x (x)		x (x)
Yolk sac vascular endothelium		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)
Main bile duct		x (x)		x (x)		x (x)		x (x)		x (x)		x (x)
Sample No. A-4-90	1-a		1-b		2-a		2-b		3-a		3-b	
(WHOI No. 91-880A)	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.
Gill												
pillar cells		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)
epithelium		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)
endothelium of gill arches		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)
gill buds		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)

Pharyngeal epithelium		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)
Heart											
atrial endothelium		0 (0)		x (0)		x (x)		x (x)		x (x)		x (0)
ventricular endothelium		x (0)		x (0)		x (x)		x (x)		x (x)		x (0)
bulbus endothelium		x (x)		x (x)		x (x)		x (x)		x (x)		x (x)
aorta endothelium		x (x)		x (x)		x (x)		x (x)		x (x)		x (x)
Liver											
hepatocytes		x (x)		x (x)		x (x)		x (x)		x (x)		x (x)
bile ducts		x (x)		x (x)		x (x)		x (x)		x (x)		x (x)
sinusoidal endothelium		x (x)		x (x)		x (x)		x (x)		x (x)		x (x)
central veins		x (x)		x (x)		x (x)		x (x)		x (x)		x (x)
portal veins		x (x)		x (x)		x (x)		x (x)		x (x)		x (x)
hepatic arteries		x (x)		x (x)		x (x)		x (x)		x (x)		x (x)
Pancreas											
acinar cells		x (x)		x (0)		x (x)		x (x)		x (x)		x (x)
ductule cells		x (x)		x (0)		x (x)		x (x)		x (x)		x (x)
Kidney											
collecting duct epithelium		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)
sinusoidal endothelium		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)
tubular epithelium		x (x)		0 (0)		0 (0)		x (0)		x (x)		x (0)
glomerular endothelium		x (x)		0 (0)		0 (0)		x (0)		x (x)		x (0)
vascular endothelium		x (x)		0 (0)		0 (0)		x (0)		x (x)		x (0)
pronephros epithelium		x (x)		x (x)		x (x)		x (x)		x (x)		x (x)
Gastrointestinal Tract											
gastric epithelium		x (x)		0 (0)		x (0)		0 (0)		x (x)		x (x)
cecal epithelium		x (x)		x (0)		x (x)		x (x)		x (x)		x (x)
anterior intestinal epithelium		x (x)		x (0)		x (x)		x (x)		x (x)		x (x)
posterior intestinal epithelium		x (0)		x (x)		x (x)		x (x)		x (x)		x (0)
colonic epithelium		0 (x)		x (x)		x (x)		x (x)		x (x)		x (x)
gastric peripit endothelium		x (x)		0 (0)		x (x)		0 (0)		x (x)		x (x)
Yolk sac vascular endothelium		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)
Main bile duct		x (x)		x (x)		x (x)		x (x)		x (x)		x (x)
Sample No. B-3-90	1-a		1-b		2-a		2-b		3-a		3-b	
(WHOI No. 91-881A)	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.
Gill												
pillar cells		0		0		0		0		0		0
epithelium		0		0		0		0		0		0
endothelium of gill arches		0		0		0		0		0		0
gill buds		0		0		0		0		0		0
Pharyngeal epithelium		0		0		0		0		0		0
Heart												
atrial endothelium		x		x		x		x		0		x
ventricular endothelium		x		x		x		x		x		x
bulbus endothelium		x		x		x		x		x		x
aorta endothelium		x		x		x		x		x		x

Liver												
hepatocytes		0		0		x		x		0		0
bile ducts		x		x		x		x		x		x
sinusoidal endothelium		0		0		x		x		0		0
central veins		0		0		x		x		0		0
portal veins		x		x		x		x		x		x
hepatic arteries		x		x		x		x		x		x
Pancreas												
acinar cells		x		x		x		x		x		0
ductule cells		x		x		x		x		x		0
Kidney												
collecting duct epithelium		x		x		0		0		0		0
sinusoidal endothelium		x		x		0		0		0		0
tubular epithelium		x		x		0		x		0		x
glomerular endothelium		x		x		0		x		0		x
vascular endothelium		x		x		0		0		0		x
pronephros epithelium		x		x		0		x		x		x
Gastrointestinal Tract												
gastric epithelium		x		x		x		x		0		0
cecal epithelium		x		x		x		x		0		0
anterior intestinal epithelium		x		0		0		x		x		0
posterior intestinal epithelium		x		0		0		x		0		x
colonic epithelium		x		x		x		x		x		x
gastric peripit endothelium		x		x		x		x		0		0
Yolk sac vascular endothelium		0		0		0		0		0		0
Main bile duct		x		x		x		x		0		x
Sample No. B-4-90	1-a		1-b		2-a		2-b		3-a		3-b	
(WHOI No. 91-882A)	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.
Gill												
pillar cells		0		0		0		0		0		0
epithelium		0		0		0		0		0		0
endothelium of gill arches		0		0		0		0		0		0
gill buds		0		0		0		0		0		0
Pharyngeal epithelium		0		0		0		0		0		0
Heart												
atrial endothelium		0		x		x		x		x		x
ventricular endothelium		0		x		x		x		x		x
bulbus endothelium		x		x		x		x		x		x
aorta endothelium		x		x		x		x		x		x
Liver												
hepatocytes		x		x		0		0		x		0
bile ducts		x		x		x		x		x		0
sinusoidal endothelium		x		x		0		0		x		0
central veins		x		x		0		0		x		0
portal veins		x		x		x		x		x		x
hepatic arteries		x		x		x		x		x		x

Pancreas												
acinar cells		0		x		0		0		0		0
ductule cells		0		x		0		0		0		0
Kidney												
collecting duct epithelium		0		x		0		[redacted]		0		0
sinusoidal endothelium		0		x		0		0		0		0
tubular epithelium		0		x		0		0		0		0
glomerular endothelium		0		x		0		0		0		0
vascular endothelium		0		x		0		0		0		0
pronephros epithelium		x		x		0		x		x		x
Gastrointestinal Tract												
gastric epithelium		0		x		0		0		0		x
cecal epithelium		x		x		0		0		0		x
anterior intestinal epithelium		0		x		0		0		0		0
posterior intestinal epithelium		x		x		x		x		x		x
colonic epithelium		x		x		x		x		x		x
gastric peripit endothelium		0		x		0		0		0		x
Yolk sac vascular endothelium		0		0		0		0		0		0
Main bile duct		x		x		x		x		x		x
Sample No. C-3-90	1-a		1-b		2-a		2-b		3-a		3-b	
(WHOI No. 91-883A)	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.
Gill												
pillar cells		0		0		0		0		0		0
epithelium		0		0		0		0		0		0
endothelium of gill arches		0		0		0		0		0		0
gill buds		0		0		0		0		0		0
Pharyngeal epithelium		0		0		0		0		0		0
Heart												
atrial endothelium		0		x		0		0		x		x
ventricular endothelium		0		x		0		0		x		x
bulbus endothelium		0		x		x		x		x		x
aorta endothelium		x		x		x		x		x		x
Liver												
hepatocytes		0		x		x		0		0		x
bile ducts		x		x		x		x		x		x
sinusoidal endothelium		0		x		x		0		0		x
central veins		0		x		x		0		x		x
portal veins		x		x		x		x		x		x
hepatic arteries		x		x		x		x		x		x
Pancreas												
acinar cells		0		x		x		0		x		x
ductule cells		0		x		x		0		x		x
Kidney												
collecting duct epithelium		0		0		0		0		0		0

sinusoidal endothelium		0		0		0		0		0		0
tubular epithelium		0		0		0		x		0		x
glomerular endothelium		0		0		0		x		0		x
vascular endothelium		0		x		0		0		0		x
pronephros epithelium		x		x		x		x		x		x
Gastrointestinal Tract												
gastric epithelium		0		x		x		0		x		x
cecal epithelium		0		x		x		0		x		x
anterior intestinal epithelium		0		x		x		x		x		x
posterior intestinal epithelium		x		x		x		x		0		x
colonic epithelium		x		x		x		x		0		x
gastric peripit endothelium		0		x		x		x		x		x
Yolk sac vascular endothelium		0		0		0		0		0		0
Main bile duct		x		x		x		x		x		x
Sample No. C-4-90	1-a		1-b		2-a		2-b		3-a		3-b	
(WHCI No. 91-884A)	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.
Gill												
pillar cells		0		0		0		0		x		0
epithelium		0		0		0		0		x		0
endothelium of gill arches		0		0		x		0		x		0
gill buds		0		0		0		0		0		0
Pharyngeal epithelium		0		0		0		0		x		0
Heart												
atrial endothelium		0		x		0		0		x		x
ventricular endothelium		0		x		0		x		x		x
bulbus endothelium		x		x		0		x		x		x
aorta endothelium		x		x		x		x		x		x
Liver												
hepatocytes		x		x		x		x		x		x
bile ducts		x		x		x		x		x		x
sinusoidal endothelium		x		x		x		x		x		x
central veins		x		x		x		x		x		x
portal veins		x		x		x		x		x		x
hepatic arteries		x		x		x		x		x		x
Pancreas												
acinar cells		x		x		x		x		x		x
ductule cells		x		x		x		x		x		x
Kidney												
collecting duct epithelium		0		0		0		0		0		0
sinusoidal endothelium		0		0		0		0		0		0
tubular epithelium		0		0		0		0		0		x
glomerular endothelium		x		0		0		0		0		x
vascular endothelium		0		0		0		0		0		x
pronephros epithelium		x		x		x		x		x		x
Gastrointestinal Tract		x										

gastric epithelium		x		0		x		x		0		x
cecal epithelium		x		x		x		x		0		x
anterior intestinal epithelium		x		x		x		x		x		x
posterior intestinal epithelium		x		x		0		x		x		x
colonic epithelium		x		x		x		x		x		x
gastric peripit endothelium		x		0		x		x		x		x
Yolk sac vascular endothelium		0		x		0		0		0		0
Main bile duct		x		x		x		x		x		x
Sample No. D-3-90	1-a		1-b		2-a		2-b		3-a		3-b	
(WHOI No. 91-885A)	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.
Gill												
pillar cells		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)
epithelium		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)
endothelium of gill arches		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)
gill buds		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)
Pharyngeal epithelium		0 (0)		0 (0)		0 (0)		0 (0)		x (0)		0 (0)
Heart												
atrial endothelium		0 (x)		x (0)		x (0)		x (0)		x (x)		x (x)
ventricular endothelium		0 (x)		x (0)		x (x)		x (x)		x (x)		x (x)
bulbus endothelium		x (x)		x (0)		x (x)		x (x)		x (x)		x (x)
aorta endothelium		x (x)		x (x)		x (x)		x (x)		x (x)		x (x)
Liver												
hepatocytes		0 (x)		x (0)		x (x)		x (0)		x (x)		x (x)
bile ducts		x (x)		x (x)		x (x)		x (x)		x (x)		x (x)
sinusoidal endothelium		0 (x)		x (0)		x (x)		x (0)		x (x)		x (x)
central veins		0 (x)		x (0)		x (x)		x (0)		x (x)		x (x)
portal veins		x (x)		x (x)		x (x)		x (x)		x (x)		x (x)
hepatic arteries		x (x)		x (x)		x (x)		x (x)		x (x)		x (x)
Pancreas												
acinar cells		0 (x)		x (0)		0 (x)		x (x)		x (x)		x (x)
ductule cells		0 (x)		x (0)		0 (x)		x (x)		x (x)		x (x)
Kidney												
collecting duct epithelium		0 (0)		x (0)		0 (0)		x (0)		0 (0)		0 (0)
sinusoidal endothelium		0 (0)		x (0)		0 (0)		0 (0)		0 (0)		0 (0)
tubular epithelium		0 (0)		x (0)		0 (0)		x (0)		x (0)		x (0)
glomerular endothelium		0 (0)		x (0)		0 (0)		x (0)		x (0)		x (0)
vascular endothelium		0 (0)		x (0)		0 (0)		x (0)		x (0)		x (0)
pronephros epithelium		x (x)		x (x)		x (x)		x (x)		x (x)		x (x)
Gastrointestinal Tract												
gastric epithelium		0 (x)		x (0)		x (0)		x (0)		x (0)		x (x)
cecal epithelium		0 (x)		x (0)		x (x)		x (x)		x (x)		x (x)
anterior intestinal epithelium		x (x)		x (0)		x (x)		x (x)		x (x)		x (x)
posterior intestinal epithelium		x (x)		x (0)		x (0)		x (0)		x (x)		x (x)
colonic epithelium		x (x)		x (x)		x (x)		x (x)		x (x)		x (x)
gastric peripit endothelium		0 (x)		x (0)		x (x)		x (0)		x (0)		x (x)

Yolk sac vascular endothelium		0 (x)		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)
Main bile duct		x (x)		x (x)		x (x)		x (x)		x (x)		x (x)
Sample No. D-4-90	1-a		1-b		2-a		2-b		3-a		3-b	
(WHOI No. 91-886A)	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.
Gill												
pillar cells		0		0		0		0		0		0
epithelium		0		0		0		0		0		0
endothellum of gill arches		0		0		0		0		0		0
gill buds		0		0		0		0		0		0
Pharyngeal epithelium		0		0		0		0		0		0
Heart												
atrial endothelium		x		x		x		x		0		x
ventricular endothelium		x		x		x		x		0		x
bulbus endothelium		0		x		x		x		x		x
aorta endothellum		x		x		x		x		x		x
Liver												
hepatocytes		x		x		0		0		0		x
bile ducts		x		x		x		x		x		x
sinusoidal endothelium		x		x		0		0		0		x
central veins		x		x		0		0		0		x
portal veins		x		x		x		x		x		x
hepatic arteries		x		x		x		x		x		x
Pancreas												
acinar cells		x		x		0		0		0		x
ductule cells		x		x		0		0		0		x
Kidney												
collecting duct epithelium		0		0		0		0		0		0
sinusoidal endothellum		0		0		0		0		0		0
tubular epithellum		0		0		0		0		0		x
glomerular endothelium		0		0		0		0		0		x
vascular endothelium		0		0		0		0		0		x
pronephros epithelium		0		x		x		x		x		x
Gastrointestinal Tract												
gastric epithelium		x		x		x		x		0		x
cecal epithelium		x		x		x		0		0		x
anterior intestinal epithelium		x		x		0		0		0		x
posterior intestinal epithelium		0		0		x		x		0		x
colonic epithelium		x		x		x		x		x		x
gastric peripit endothelium		x		x		x		x		0		x
Yolk sac vascular endothelium		0		0		0		0		0		0
Main bile duct		x		x		x		x		x		x
Sample No. E-3-90	1-a		1-b		2-a		2-b		3-a		3-b	
(WHOI No.91-887A)	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.

Gill												
pillar cells		0		0		0		0		0		0
epithelium		0		0		0		0		0		0
endothelium of gill arches		0		0		0		0		0		0
gill buds		0		0		0		0		0		0
Pharyngeal epithelium		0		0		0		x		0		0
Heart												
atrial endothelium		x		0		x		x		0		x
ventricular endothelium		x		x		x		x		x		x
bulbus endothelium		x		x		x		x		x		x
aorta endothelium		x		x		x		x		x		x
Liver												
hepatocytes		x		x		x		x		0		0
bile ducts		x		x		x		x		x		x
sinusoidal endothelium		x		x		x		x		0		0
central veins		x		x		x		x		0		0
portal veins		x		x		x		x		x		x
hepatic arteries		x		x		x		x		x		x
Pancreas												
acinar cells		x		x		0		x		0		0
ductule cells		x		x		0		x		0		0
Kidney												
collecting duct epithelium		0		0		0		0		0		0
sinusoidal endothelium		0		0		0		0		0		0
tubular epithelium		0		0		0		x		0		0
glomerular endothelium		0		0		0		x		0		0
vascular endothelium		0		0		0		x		0		0
pronephros epithelium		x		x		x		x		x		x
Gastrointestinal Tract												
gastric epithelium		x		x		x		x		0		x
cecal epithelium		x		x		x		x		0		0
anterior intestinal epithelium		x		x		x		x		0		0
posterior intestinal epithelium		x		0		0		x		x		x
colonic epithelium		x		x		x		x		x		x
gastric peripit endothelium		x		x		x		x		0		x
Yolk sac vascular endothelium		0		0		0		0		0		0
Main bile duct		x		x		x		x		x		x
Sample No. E-4-90	1-a		1-b		2-a		2-b		3-a		3-b	
(WHOI No. 91-888A)	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.
Gill												
pillar cells		0		0		0		0		0		0
epithelium		0		0		0		0		0		0
endothelium of gill arches		0		0		0		0		0		0
gill buds		0		0		0		0		0		0
Pharyngeal epithelium		0		0		0		0		0		0

Kidney												
collecting duct epithelium		0		0		0		0		0		0
sinusoidal endothelium		0		0		0		0		0		0
tubular epithelium		0		0		0		0		0		x
glomerular endothelium		0		0		0		0		0		x
vascular endothelium		0		0		0		0		0		x
pronephros epithelium		0		x		x		x		x		x
Gastrointestinal Tract												
gastric epithelium		x		x		x		x		0		x
cecal epithelium		x		x		x		0		0		x
anterior intestinal epithelium		x		x		0		0		0		x
posterior intestinal epithelium		0		0		x		x		0		x
colonic epithelium		x		x		x		x		x		x
gastric peripit endothelium		x		x		x		x		0		x
Yolk sac vascular endothelium		0		0		0		0		0		0
Main bile duct		x		x		x		x		x		x
Sample No. E-3 90	1-a		1-b		2-a		2-b		3-a		3-b	
(WHOI No.91-887A)	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.
Gill												
pillar cells		0		0		0		0		0		0
epithelium		0		0		0		0		0		0
endothelium of gill arches		0		0		0		0		0		0
gill buds		0		0		0		0		0		0
Pharyngeal epithelium		0		0		0		x		0		0
Heart												
atrial endothelium		x		0		x		x		0		x
ventricular endothelium		x		x		x		x		x		x
bulbus endothelium		x		x		x		x		x		x
aorta endothelium		x		x		x		x		x		x
Liver												
hepatocytes		x		x		x		x		0		0
bile ducts		x		x		x		x		x		x
sinusoidal endothelium		x		x		x		x		0		0
central veins		x		x		x		x		0		0
portal veins		x		x		x		x		x		x
hepatic arteries		x		x		x		x		x		x

Pancreas												
acinar cells		x		x		0		x		0		0
ductule cells		x		x		0		x		0		0
Kidney												
collecting duct epithelium		0		0		0		0		0		0
sinusoidal endothelium		0		0		0		0		0		0
tubular epithelium		0		0		0		x		0		0
glomerular endothelium		0		0		0		x		0		0
vascular endothelium		0		0		0		x		0		0
pronephros epithelium		x		x		x		x		x		x
Gastrointestinal Tract												
gastric epithelium		x		x		x		x		0		x
cecal epithelium		x		x		x		x		0		0
anterior intestinal epithelium		x		x		x		x		0		0
posterior intestinal epithelium		x		0		0		x		x		x
colonic epithelium		x		x		x		x		x		x
gastric periph endothelium		x		x		x		x		0		x
Yolk sac vascular endothelium		0		0		0		0		0		0
Main bile duct		x		x		x		x		x		x
Sample No. E-4-90	1-a		1-b		2-a		2-b		3-a		3-b	
(WHOI No. 91-888A)	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.
Gill												
pillar cells		0		0		0		0		0		0
epithelium		0		0		0		0		0		0
endothelium of gill arches		0		0		0		0		0		0
gill buds		0		0		0		0		0		0
Pharyngeal epithelium		0		0		0		0		0		0
Heart												
atrial endothelium		0		x		x		0		0		0
ventricular endothelium		x		x		x		0		0		0
bulbus endothelium		x		x		x		x		x		x
aorta endothelium		x		x		x		x		x		x
Liver												
hepatocytes		x		x		x		x		0		x
bile ducts		x		x		x		x		x		x
sinusoidal endothelium		x		x		x		x		0		x
central veins		x		x		x		x		0		x

portal veins		x		x		x		x		x		x
hepatic arteries		x		x		x		x		x		x
Pancreas												
acinar cells		x		x		x		x		0		x
ductule cells		x		x		x		x		0		x
Kidney												
collecting duct epithelium		0		0		0		0		0		0
sinusoidal endothelium		0		0		0		0		0		0
tubular epithelium		0		0		0		x		0		0
glomerular endothelium		0		0		0		x		0		0
vascular endothelium		0		0		0		x		0		0
pronephros epithelium		x		x		x		x		x		0
Gastrointestinal Tract												
gastric epithelium		x		x		x		x		x		0
cecal epithelium		x		x		x		x		0		x
anterior intestinal epithelium		x		x		x		x		0		x
posterior intestinal epithelium		0		x		0		x		0		x
colonic epithelium		0		x		x		x		x		x
gastric periph endothelium		x		x		x		x		x		x
Yolk sac vascular endothelium		0		0		0		0		0		0
Main bile duct		x		x		x		x		x		x
Sample No. F-3-90	1-a		1-b		2-a		2-b		3-a		3-b	
(WHOI No. 91-889A)	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.
GI												
pillar cells		0		0		0		0		0		0
epithelium		0		0		0		0		0		0
endothelium of gill arches		0		0		0		0		0		0
gill buds		0		0		0		0		0		0
Pharyngeal epithelium		0		0		0		0		0		0
Heart												
atrial endothelium		x		x		x		x		x		x
ventricular endothelium		x		x		x		x		x		x
bulbus endothelium		x		x		x		x		x		x
aorta endothelium		x		x		x		x		x		x
Liver												
hepatocytes		0		0		0		0		x		x

bile ducts		x		x		x		x		x		x
sinusoidal endothelium		0		0		0		0		x		x
central veins		0		0		0		x		x		x
portal veins		x		x		x		x		x		x
hepatic arteries		x		x		x		x		x		x
Pancreas												
acinar cells		0		0		0		x		x		x
ductule cells		0		0		0		x		x		x
Kidney												
collecting duct epithelium		0		0		0		x		0		0
sinusoidal endothelium		0		0		0		x		0		0
tubular epithelium		x		x		x		x		0		x
glomerular endothelium		x		x		x		x		0		x
vascular endothelium		x		x		x		x		0		x
pronephros epithelium		x		x		x		x		0		x
Gastrointestinal Tract												
gastric epithelium		x		x		0		x		x		x
cecal epithelium		x		0		x		x		x		x
anterior intestinal epithelium		0		0		0		0		x		x
posterior intestinal epithelium		x		x		x		0		x		0
colonic epithelium		x		x		x		x		x		x
gastric periph endothelium		x		x		0		x		x		x
Yolk sac vascular endothelium		0		0		0		0		0		0
Main bile duct		x		x		x		x		x		x
Sample No. F-4 90	1-a		1-b		2-a		2-b		3-a		3-b	
(WHOI No. 91-890A)	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.
Gill												
pillar cells		0		0		0		0		0		0
epithelium		0		0		0		0		0		0
endothelium of gill arches		0		0		0		0		0		0
gill buds		0		0		0		0		0		0
Pharyngeal epithelium		0		0		0		0		0		0
Heart												
atrial endothelium		x		x		0		0		x		0
ventricular endothelium		x		x		0		x		x		0
bulbus endothelium		x		x		x		x		x		x
aorta endothelium		x		x		x		x		x		x

Liver												
hepatocytes		x		x		0		x		x		x
bile ducts		x		x		0		x		x		x
sinusoidal endothelium		x		x		0		x		x		x
central veins		x		x		0		x		x		x
portal veins		x		x		x		x		x		x
hepatic arteries		x		x		x		x		x		x
Pancreas												
acinar cells		x		x		0		x		x		x
ductule cells		x		x		0		x		x		x
Kidney												
collecting duct epithelium		0		0		0		0		0	1	1
sinusoidal endothelium		0		0		0		0		0		0
tubular epithelium		0		0		0		0		0		0
glomerular endothelium		0		x		0		0		0		0
vascular endothelium		0		0		0		0		0		0
pronephros epithelium		0		x		x		x		x		x
Gastrointestinal Tract												
gastric epithelium		x		x		x		0		x		x
cecal epithelium		x		x		0		x		x		x
anterior intestinal epithelium		x		x		0		0		x		x
posterior intestinal epithelium		0		x		x		0		0		x
colonic epithelium		x		x		x		x		x		x
gastric periph endothelium		x		x		x		0		x		x
Yolk sac vascular endothelium		0		0		0		0		0		0
Main bile duct		x		x		x		x		x		x
Sample No. G-3 90	1-a		1-b		2-a		2-b		3-a		3-b	
(WHOI No. 91-891A)	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.
Gill								0				
pillar cells		0		0		0		0		0		0
epithelium		0		0		0		0		0		0
endothelium of gill arches		0		0		0		0		0		0
gill buds		0		0		0		0		0		0
Pharyngeal epithelium		0		0		0		0		0		0
Heart												
atrial endothelium		x		x		0		x		0		x

ventricular endothelium		x		x		0		x		0		x	
bulbus endothelium		x		x		x		x		x		x	
aorta endothelium		x		x		x		x		x		x	
Liver													
hepatocytes		0		x		x		x		x		0	
bile ducts		x		x		x		x		x		x	
sinusoidal endothelium		0		x		x		x		x		0	
central veins		0		x		x		x		x		0	
portal veins		x		x		x		x		x		x	
hepatic arteries		x		x		x		x		x		x	
Pancreas													
acinar cells		0		x		x		x		x		0	
ductulo cells		0		x		x		x		x		0	
Kidney													
collecting duct epithelium		0		0		0		0		0		0	
sinusoidal endothelium		0		0		0		0		0		0	
tubular epithelium		0		x		0		x		0		0	
glomerular endothelium		0		x		0		x		0		0	
vascular endothelium		0		x		0		x		0		x	
pronephros epithelium		x		x		x		x		x		x	
Gastrointestinal Tract													
gastric epithelium		0		x		x		x		0		0	
cecal epithelium		0		x		x		x		0		0	
anterior intestinal epithelium		0		x		x		x		x		0	
posterior intestinal epithelium		x		x		0		x		x		x	
colonic epithelium		x		x		x		x		x		x	
gastric peripil endothelium		x		x		x		x		0		0	
Yolk sac vascular endothelium		0		0		0		0		0		0	
Main bile duct		x		x		x		x		x		x	
Sample No. G-4-90	1-a		1-b		2-a		2-b		3-a		3-b		
(WHOI No. 91 892A)	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.	Int.	Occ.	
Gill													
pillar cells		0 (0)		x (0)		0 (0)		0 (0)		0 (0)		0 (0)	
epithelium		0 (0)		x (0)		0 (0)		0 (0)		0 (0)		0 (0)	
endothelium of gill arches		0 (0)		x (0)		0 (0)		0 (0)		0 (0)		0 (0)	
gill buds		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)	
Pharyngeal epithelium		0 (0)		x (0)		0 (0)		0 (0)		0 (0)		0 (0)	

Heart												
atrial endothelium	x (x)		x (x)		x (0)		x (0)		0 (0)		x (0)	
ventricular endothelium	x (x)		x (x)		x (0)		x (0)		0 (x)		x (x)	
bulbus endothelium	x (x)		x (x)		x (x)		x (x)		x (x)		x (x)	
aorta endothelium	x (x)		x (x)		x (x)		x (x)		x (x)		x (x)	
Liver												
hepatocytes	x (0)		0 (x)		x (x)		x (x)		x (x)		x (x)	
bile ducts	x (x)		x (x)		x (x)		x (x)		x (x)		x (x)	
sinusoidal endothelium	x (0)		0 (x)		x (x)		x (x)		x (x)		x (x)	
central veins	x (0)		0 (x)		x (x)		x (x)		x (x)		x (x)	
portal veins	x (x)		x (x)		x (x)		x (x)		x (x)		x (x)	
hepatic arteries	x (x)		x (x)		x (x)		x (x)		x (x)		x (x)	
Pancreas												
acinar cells	x (0)		x (0)		x (0)		x (0)		x (x)		x (x)	
ductule cells	x (0)		x (0)		x (0)		x (0)		x (x)		x (x)	
Kidney												
collecting duct epithelium	0 (0)		x (0)		0 (0)		x (0)		x (0)		x (0)	
sinusoidal endothelium	0 (0)		x (0)		0 (0)		x (0)		x (0)		x (0)	
tubular epithelium	0 (0)		x (0)		x (0)		x (0)		x (0)		x (0)	
glomerular endothelium	0 (0)		x (0)		x (0)		x (0)		x (0)		x (0)	
vascular endothelium	0 (0)		x (0)		x (0)		x (0)		x (0)		x (0)	
pronephros epithelium	x (x)		x (x)		x (x)		x (x)		x (x)		x (x)	
Gastro-intestinal Tract												
gastric epithelium	0 (x)		x (x)		x (0)		x (x)		x (0)		x (x)	
cecal epithelium	0 (x)		x (x)		x (x)		x (x)		x (x)		x (x)	
anterior intestinal epithelium	0 (0)		x (0)		x (x)		x (x)		x (x)		x (x)	
posterior intestinal epithelium	x (x)		x (x)		x (0)		x (0)		0 (0)		x (x)	
colonic epithelium	x (x)		x (x)		x (x)		x (x)		x (x)		x (x)	
gastric peripit endothelium	0 (x)		x (x)		x (0)		x (x)		x (x)		x (x)	
Yolk sac vascular endothelium	0 (0)		0 (0)		0 (0)		0 (0)		0 (0)		0 (0)	
Main bile duct	x (x)		x (x)		x (x)		x (x)		x (x)		x (x)	

APPENDIX E.1

Histopathology data for Prince William Sound pink salmon fry

EXXON VALDEZ OIL SPILL

FISH HISTOPATHOLOGY PROJECT

Progress Report: May 4, 1992

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XIII. Final Report - 1989 Pink Salmon Larvae, four sites only

PATHOLOGIST - Gary D. Marty, DVM

Filenames: **89PSL4.PRN** or **89PSL4.WK1**

METHODS

Pathology -

A box containing 1003 pink salmon larvae that were sampled from 23 different sites in 1989 was received in our laboratory on September 15, 1991. Random numbers were generated for 32 fish from each site ("Proc. #" in Table 10), for a total of 732 assigned random numbers. According to Ken Chalk, Oil Spill Studies coordinator, Commercial Fisheries, Alaska Dept. of Fish and Game, the larvae had been fixed in Bouin's and were transferred to 10% neutral bufferred formalin just before shipment to Davis (i.e., the larvae were in Bouin's for about 2.5 years). Morphologic detail is often lost when tissues are left in Bouin's for more than two weeks (ideal fixation in Bouin's is $\leq$24 hours), so we were concerned that the larvae would not be suitable for histopathology or MFO analysis. Therefore, a test run of larvae from four sites--two oiled and two control/clean--was conducted. Thirty-two larvae were randomly selected from sample number **7** (stream # 630, Whale Bay, clean), **12** (stream # 678, Sleepy Bay, oiled), **13** (stream # 663, Shelter Bay, oiled), and **16** (stream # 695, Port Audrey, clean). Each larva was measured (total length) and then embedded in lateral recumbency with the left side down. For histopathologic analysis, four to seven step sections were cut at intervals through each larva. Near the center of each larvae, five sections were saved and sent to Woods Hole Oceanographic Institute for MFO analysis (one H&E and four unstained sections per larva; sent 4-10-92).

Slides were read in numerical order, using the "Proc. #" listed in Table 10, so that all slides were read blindly. However, one group of larvae had obviously smaller yolk stores, and sections from this group were readily identified during "blind" examination; therefore, reading was not entirely without potential bias.

For histologic examination, each larval section, particularly the intestinal tract, was examined for extent of autolysis: 1) minimum (min), all cell membranes were intact; 2) mild, a few cells on the tips of the villi were affected; 3) moderate (mod), at least one section of intestine had transmural autolysis; and 4) severe (sev), for more than focal transmural autolysis. Next, sectioning artifact was ranked as none, mild, mod, or sev. All sections had at least mild sectioning artifact (as expected with paraffin embedding), and other rankings were based on the extent that artifacts made interpretation of tissue sections difficult.

Each larva was first scanned at low power (4x objective) for major organs: gonad, retina, brain, heart, gill, skin, skeletal muscle, kidney, gastrointestinal tract, yolk, liver, and spleen. For each larva, the presence or absence of each organ was recorded on a scoring sheet similar to Appendix 5 in the 10-28-92 progress report. The gonad, when present, was

further classified as undifferentiated (or unable to classify), male (testis), or female (ovary). Although immature ova are fairly easy to identify, testes have no active spermatogenesis at the life stage of these larvae; hence, gonads not clearly identified as ovaries were classified as undifferentiated in these 1989 pink salmon larvae.

The extent of liver glycogen was ranked and scored as *minimum* (no obvious hepatocellular vacuoles, score = 1), moderate (volume of hepatocellular vacuoles less than nuclear volume, score = 2), or abundant (volume of hepatocellular vacuoles greater than nuclear volume, score = 3). Yolk stores were ranked as abundant/eosinophilic (score = 3), minimal (score = 2, for yolks with about equal amounts of eosinophilic protein and pale peripheral tissues), pale (score = 1, when only the pale peripheral yolk-sac tissues remained), or absent (score = 0, for no yolk sac in the sections). Lesions, other comments, pathologist's initials, and date(s) examined were also recorded.

Lesions were ranked and scored as none (0), mild (1), mod (2), or sev (3) in relation to other similar lesions. As potential lesions, epidermal atrophy, individual hepatocellular necrosis, and vacuolar degeneration of gastric glands were included on the data sheet because they had been observed in other groups of pink salmon larvae. However, none of the larvae in this group had any of these lesions. Myodegeneration and necrosis was as previously described. Three new categories, not previously described in other groups, were added in this group. First, epidermal cell necrosis, degeneration, and/or inflammation (ECN) occurred exclusively on the ventral epidermis near the midline and usually just anterior to the anus. Characteristic ECN features included cytoplasmic vacuolation, nuclear pyknosis, occasional intracytoplasmic eosinophilic inclusions, and infiltration of eosinophilic granulocytes. Second, the amount of food (e.g., arthropods or other invertebrates) in the gastrointestinal tract (GIF) was ranked as none (0), min (1), moderate (2), or abundant (3); contents that were unlikely to be food particles were scored with a question (?) mark. And third, acute lesions likely associated with collection trauma (CT) were ranked as other lesions (0 - 3). The most frequent lesions associated with trauma were hemorrhage and rupture of the yolk.

Statistics -

Because of the large sample size and large numbers of sites sampled, these data are well-suited for statistical evaluation. Basic ANOVA will be conducted on total length. More complex statistics will be required to determine if differences in scored data are related to oil exposure. Statistical analysis has not yet been completed.

RESULTS and DISCUSSION

Lesion scores for each fish are listed in Table 10. Autolysis was minimal and sectioning artifact was mild in all but one fish, indicating that the sections were generally of excellent quality for histopathologic examination. Nearly all important organs were included in the sections from each fish. For example, the liver was absent from sections of only one fish (0.8%. 1 of 128).

The four sample groups had clear differences in total length, hepatic glycogen, and yolk stores. The only group with mean total length greater than 30.0 mm (32.0 mm, Sample #16, Port Audrey, clean) had less glycogen and yolk stores than the other three sample groups. Decreased hepatocellular glycogen stores are probably related more to decreased yolk stores than to oil exposure. More of the Port Audrey (control site) larvae had food in their gastrointestinal tract (44%, 14 of 32) than did fish in the other three groups (28-38%, 9-12 of 32), but differences were not great. Clearly, pink salmon larvae feed (exclusively on invertebrates in these samples) before they emerge and while they still retain abundant yolk stores. However, the presence of food in the gastrointestinal tract did not seem to correlate with the amount of hepatic glycogen or exposure to oil.

About 68% (57 of 84) larvae had some degree of epidermal cell necrosis, degeneration, and/or inflammation (ECN). These lesions occurred with about equal frequency among all three sample groups with abundant yolk stores, and likely were related to irritation of the yolk-distended ventral body wall as the larvae scraped across environmental objects such as rocks and gravel. None of the 32 fish from Port Audrey (i.e., the longer fish that had minimal yolk stores) had ECN lesions.

One larva from Sleepy Bay (oiled site, 89PSL545) had a small tumor along the ventral midline that was about 500 µm wide and 200 µm high. The tumor, tentatively classified as a fibroma of the stratum compactum, was composed of irregular fibroblasts arranged into whirls. The overlying epithelium was slightly raised but not ulcerated, and had ECN changes. The tumor may have developed in response to oil exposure. Alternatively, because neoplasms are rare in larval fish, the lesion may be a hamartoma.

Myodegeneration and necrosis was infrequent, and in all cases was associated with, and probably caused by, trauma during the collection process. Degenerative muscle fibers often contained hemorrhage, but were never infiltrated by inflammatory cells. Hemorrhage was common throughout the body, including the cerebral ventricles, body cavity, periorbital connective tissue, and skeletal muscle. Other lesions associated with collection trauma (see "Alaska comments" in Table 10) included: 1) rupture of the yolk into the body cavity, which was often accompanied by anterior infiltration of yolk material into cranial connective tissues; and 2), herniation of the yolk through the ventral body wall.

Collection trauma was more frequent in larvae from oiled sites than in larvae from clean sites. In clean sites, only 25% (8 of 32, Whale Bay) and 19% (6 of 32, Port Audrey) of the fish sampled had some degree of collection trauma. By comparison, larvae from oiled sites had 44% (14 of 32, Shelter Bay) and 38% (12 of 32, Sleepy Bay) incidence of traumatic lesions. Differences in traumatic lesions were independent of differences in yolk stores and total length among the groups, and likely are significant. In the known-exposure study conducted with herring adults (see page 2204 above), vascular lesions were frequently observed in oil-exposed fish. Although the nature of the vascular lesions in the pink salmon larvae could not be detected directly by histologic examination, the increased frequency of collection-associated hemorrhage is strong evidence for some type of vascular wall damage or hemostasis deficiency. Alternatively, differences in collection-associated trauma among the

four groups might be due to chance alone. Because pink salmon larvae and juveniles are likely to be subjected to natural traumatic events (e.g., narrow escape from predators), oil-caused decrease in the ability to control hemorrhage would be a significant detriment to survivability. To confirm the potential damage effects, complete histopathologic analysis of the remaining 1989 Pink Salmon larvae is highly recommended. None of the other pink salmon samples we have analyzed have either the sample size or the completeness of sections to assess traumatic injury; further, the other pink salmon larvae--all from 1990 or 1991--were taken after the acute effects of the 1989 oil spill were gone.

Table 10. Summary of histopathologic findings in 1989 "damage assessment" Pink Salmon Larvae (four sites only).

Filenames: 89PSL4.PRN
or 89PSL4.WK1

NOTE: sample numbers 7,12,13, and 16 were read first as part of a preliminary screen

Abbreviations used:
Proc. # = random number (processing number) generated by Dr. Hinton's laboratory
TL = total length
Sample # (S#) and Jar # = numbers submitted with each sample from ADF&G
min = minimal; mod = moderate; sev = severe; NE or "." = not examined, because organ was not present

OS = oiled status; oiled (O) or control/clean (C)
MFO = mixed function oxidase; ranked as negative (0), very mild (1), mild (2), mod (3), or strong (4)
note: reported MFO values are means for each group and are not individual fish values
Atly = autolysis; ranked as min (1), mild (2), mod (3), or sev (4)
art = sectioning artifact; ranked as none (0), mild (1), mod (2), or sev (3)
sex = gonad; listed as male (M), female (F), unknown/undifferentiated (U), absent (A)
GLY = hepatic glycogen; ranked as min (1), mod (2), abundant (3), or hepatocytes not present (.)
YOLK = status of yolk stores; ranked as none (0), pale (1), min (2), or eosinophilic/abundant (3)
Lesion scores: none (0), mild (1), moderate (2), severe (3), or not present (.)
EA = epidermal atrophy
MDN = myofiber degeneration and/or necrosis
IHN = individual hepatocellular necrosis
VDGG = vacuolar degeneration of gastric gland epithelial cells
NG (no good) - the stomach is absent or too autolyzed for evaluation
ECN = epidermal cell necrosis or inflammation; sometimes with eosinophilic cytoplasmic inclusions
GIF = gastrointestinal food (i.e., recognizable food particles in gi tract)
amount ranked as none (0), min (1), moderate (2), abundant (3), or unsure (?)
CT = collection trauma; hemorrhage (hem.), intraperitoneal (IP), intramuscular (IM), and gill lamellar telangiectasis (GLT)
n. = number affected (i.e., number with score greater than 0)

#	Proc. #	TL (mm)	S#	Jar number	Sample date	Stream #	Stream name	location	OS	MFO	Atly	art	sex	GLY	YOLK	EA	MDN	IHN	VDGG	ECN	GIF	CT	Proc. #	Alaska comments
1	89PSL 20	29	7	89-1505	16 APR 1989	630	BAINBRIDGE	WHALE BAY	C	?	1	1	F	3	3	0	0	0	0	1	0	0	20	
2	89PSL 89	29	7	89-1505	16 APR 1989	630	BAINBRIDGE	WHALE BAY	C	?	1	1	F	3	3	0	0	0	0	2	0	0	89	
3	89PSL 95	30	7	89-1505	16 APR 1989	630	BAINBRIDGE	WHALE BAY	C	?	1	1	U	3	3	0	0	0	0	0	0	0	95	
4	89PSL 105	28	7	89-1505	16 APR 1989	630	BAINBRIDGE	WHALE BAY	C	?	1	1	F	3	3	0	0	0	0	1	1	0	105	
5	89PSL 167	30	7	89-1505	16 APR 1989	630	BAINBRIDGE	WHALE BAY	C	?	1	1	U	3	3	0	0	0	0	1	0	0	167	
6	89PSL 226	30	7	89-1505	16 APR 1989	630	BAINBRIDGE	WHALE BAY	C	?	1	1	F	3	3	0	0	0	0	0	0	0	226	
7	89PSL 241	29	7	89-1505	16 APR 1989	630	BAINBRIDGE	WHALE BAY	C	?	1	1	F	3	3	0	0	0	0	1	1	0	241	
8	89PSL 244	28	7	89-1505	16 APR 1989	630	BAINBRIDGE	WHALE BAY	C	?	1	1	F	3	3	0	0	0	0	1	0	0	244	
9	89PSL 273	30	7	89-1505	16 APR 1989	630	BAINBRIDGE	WHALE BAY	C	?	1	1	F	3	3	0	0	0	0	1	1	0	273	
10	89PSL 275	ND	7	89-1505	16 APR 1989	630	BAINBRIDGE	WHALE BAY	C	?	1	1	U	3	3	0	0	0	0	0	0	0	275	
11	89PSL 286	30	7	89-1505	16 APR 1989	630	BAINBRIDGE	WHALE BAY	C	?	1	1	U	3	3	0	0	0	0	1	1	0	286	chloride cell hyperplasia (1)
12	89PSL 307	29	7	89-1505	16 APR 1989	630	BAINBRIDGE	WHALE BAY	C	?	1	1	F	3	3	0	0	0	0	0	0	1	307	intracranial hem.
13	89PSL 317	31	7	89-1505	16 APR 1989	630	BAINBRIDGE	WHALE BAY	C	?	1	1	U	3	3	0	0	0	0	0	0	0	317	chloride cell hyperplasia (1)
14	89PSL 323	30	7	89-1505	16 APR 1989	630	BAINBRIDGE	WHALE BAY	C	?	1	1	F	3	3	0	0	0	0	2	0	0	323	
15	89PSL 334	ND	7	89-1505	16 APR 1989	630	BAINBRIDGE	WHALE BAY	C	?	1	1	U	3	3	0	0	0	0	0	0	0	334	chloride cell hyperplasia (1)
16	89PSL 384	ND	7	89-1505	16 APR 1989	630	BAINBRIDGE	WHALE BAY	C	?	1	1	F	3	3	0	0	0	0	0	0	1	384	GLT (1)

#	Proc. #	TL (mm)	S#	Jar number	Sample date	Stream #	Stream name	Location	OS	MFO	Atly	art	sex	GLY	YOLK	EA	MDN	THN	VDGG	ECN	GIF	CT	Proc. #	Alaska comments
17	89PSL 386	29	7	89-1505	16 APR 1989	630	BAINBRIDGE	WHALE BAY	C	?	1	1	U	3	3	0	0	0	0	2	0	0	386	
18	89PSL 408	30	7	89-1505	16 APR 1989	630	BAINBRIDGE	WHALE BAY	C	?	1	1	F	3	3	0	0	0	0	0	0	1	408	intracerebral hem.
19	89PSL 444	30	7	89-1505	16 APR 1989	630	BAINBRIDGE	WHALE BAY	C	?	1	1	U	3	3	0	0	0	0	1	1	2	444	cerebral and peri-pseudobranch hem.
20	89PSL 479	30	7	89-1505	16 APR 1989	630	BAINBRIDGE	WHALE BAY	C	?	1	1	F	3	3	0	0	0	0	1	1	0	479	
21	89PSL 495	30	7	89-1505	16 APR 1989	630	BAINBRIDGE	WHALE BAY	C	?	1	1	U	3	0	0	0	0	0	1	1	0	495	
22	89PSL 559	30	7	89-1505	16 APR 1989	630	BAINBRIDGE	WHALE BAY	C	?	1	1	U	3	3	0	0	0	NG	1	1	0	559	
23	89PSL 589	30	7	89-1505	16 APR 1989	630	BAINBRIDGE	WHALE BAY	C	?	1	1	F	3	3	0	0	0	0	0	1	1	589	IP hem.
24	89PSL 607	30	7	89-1505	16 APR 1989	630	BAINBRIDGE	WHALE BAY	C	?	1	1	U	3	3	0	0	0	NG	0	0	0	607	
25	89PSL 629	30	7	89-1505	16 APR 1989	630	BAINBRIDGE	WHALE BAY	C	?	1	1	F	3	3	0	0	0	0	0	0	1	629	intracranial hem.
26	89PSL 634	30	7	89-1505	16 APR 1989	630	BAINBRIDGE	WHALE BAY	C	?	1	1	F	3	3	0	0	0	0	0	0	0	634	chloride cell hyperplasia (1)
27	89PSL 638	30	7	89-1505	16 APR 1989	630	BAINBRIDGE	WHALE BAY	C	?	1	1	F	3	3	0	0	0	0	1	0	0	638	
28	89PSL 682	31	7	89-1505	16 APR 1989	630	BAINBRIDGE	WHALE BAY	C	?	1	1	F	3	3	0	0	0	0	1	0	1	682	periorbital hem.
29	89PSL 694	31	7	89-1505	16 APR 1989	630	BAINBRIDGE	WHALE BAY	C	?	1	1	U	3	3	0	0	0	0	1	1	0	694	
30	89PSL 695	ND	7	89-1505	16 APR 1989	630	BAINBRIDGE	WHALE BAY	C	?	1	1	U	A	3	0	0	A	0	2	0	0	695	
31	89PSL 701	29	7	89-1505	16 APR 1989	630	BAINBRIDGE	WHALE BAY	C	?	1	1	U	3	3	0	0	0	0	1	0	1	701	yolk ruptured into oil globule
32	89PSL 714	ND	7	89-1505	16 APR 1989	630	BAINBRIDGE	WHALE BAY	C	?	1	1	U	3	3	0	0	0	0	0	1	0	714	
Stats:	n =	27						Statistics:	n, =		32	32		31	32	32	32	31	30	32	32	32		
	ave.	30.							ave. =		1	1		3	2.9	0	0	0	0	.72	.34	.28		
	std.	.75							std. =		0	0		0	.52	0	0	0	0	.67	.47	.51		
	SE =	.14							SE =		0	0		0	.09	0	0	0	0	.12	.08	.09		
																				n = 11		8		
33	89PSL 30	33	16	89-1514	20 APR 1989	695	NONE	PORT AUDREY	C	?	1	1	F	3	2	0	0	0	0	0	0	1	30	IP hem.
34	89PSL 100	31	16	89-1514	20 APR 1989	695	NONE	PORT AUDREY	C	?	1	1	F	2	2	0	0	0	0	0	0	0	100	
35	89PSL 146	32	16	89-1514	20 APR 1989	695	NONE	PORT AUDREY	C	?	1	1	F	2	1	0	0	0	NG	0	0	0	146	
36	89PSL 184	ND	16	89-1514	20 APR 1989	695	NONE	PORT AUDREY	C	?	1	1	F	2	2	0	0	0	0	0	1	0	184	
37	89PSL 190	33	16	89-1514	20 APR 1989	695	NONE	PORT AUDREY	C	?	1	1	A	3	1	0	0	0	0	0	0	1	190	intrahepatic hem.
38	89PSL 200	32	16	89-1514	20 APR 1989	695	NONE	PORT AUDREY	C	?	1	1	F	2	2	0	0	0	0	0	1	0	200	min. hepatic autolysis
39	89PSL 202	32	16	89-1514	20 APR 1989	695	NONE	PORT AUDREY	C	?	1	1	U	3	2	0	0	0	0	0	0	0	202	
40	89PSL 222	29	16	89-1514	20 APR 1989	695	NONE	PORT AUDREY	C	?	1	1	U	1	2	0	0	0	0	0	0	0	222	
41	89PSL 267	32	16	89-1514	20 APR 1989	695	NONE	PORT AUDREY	C	?	1	1	U	3	1	0	0	0	0	0	0	0	267	hepatic megalocytosis (1)
42	89PSL 284	31	16	89-1514	20 APR 1989	695	NONE	PORT AUDREY	C	?	1	1	F	1	0	0	0	0	0	0	1	0	284	min. peribiliary autolysis
43	89PSL 298	33	16	89-1514	20 APR 1989	695	NONE	PORT AUDREY	C	?	1	1	U	1	2	0	0	0	0	0	0	0	298	
44	89PSL 322	33	16	89-1514	20 APR 1989	695	NONE	PORT AUDREY	C	?	1	1	U	2	2	0	0	0	0	0	1	0	322	
45	89PSL 339	32	16	89-1514	20 APR 1989	695	NONE	PORT AUDREY	C	?	1	1	U	1	2	0	0	0	0	0	0	0	339	
46	89PSL 341	ND	16	89-1514	20 APR 1989	695	NONE	PORT AUDREY	C	?	1	1	F	2	2	0	0	0	0	0	0	0	341	
47	89PSL 385	33	16	89-1514	20 APR 1989	695	NONE	PORT AUDREY	C	?	1	1	F	2	2	0	0	0	0	0	1	0	385	
48	89PSL 400	31	16	89-1514	20 APR 1989	695	NONE	PORT AUDREY	C	?	1	1	F	2	2	0	0	0	0	0	0	3	400	renal hem. and ruptured intestine
49	89PSL 448	32	16	89-1514	20 APR 1989	695	NONE	PORT AUDREY	C	?	1	1	F	1	2	0	0	0	0	0	0	1	448	IP hem.
50	89PSL 460	32	16	89-1514	20 APR 1989	695	NONE	PORT AUDREY	C	?	1	1	F	2	1	0	0	0	0	0	0	0	460	
51	89PSL 533	ND	16	89-1514	20 APR 1989	695	NONE	PORT AUDREY	C	?	1	1	F	2	1	0	?	0	0	0	0	2	533	IM and multifocal spinal cord hem.
52	89PSL 541	32	16	89-1514	20 APR 1989	695	NONE	PORT AUDREY	C	?	1	1	F	1	1	0	0	0	0	0	1	0	541	
53	89PSL 549	33	16	89-1514	20 APR 1989	695	NONE	PORT AUDREY	C	?	1	1	U	1	1	0	0	0	0	0	1	0	549	
54	89PSL 556	33	16	89-1514	20 APR 1989	695	NONE	PORT AUDREY	C	?	1	1	F	1	1	0	0	0	0	0	1	0	556	
55	89PSL 575	31	16	89-1514	20 APR 1989	695	NONE	PORT AUDREY	C	?	1	1	U	1	1	0	0	0	0	0	0	0	575	
56	89PSL 593	32	16	89-1514	20 APR 1989	695	NONE	PORT AUDREY	C	?	2	1	F	1	2	0	0	0	0	0	1	1	593	cerebral hem.
57	89PSL 603	32	16	89-1514	20 APR 1989	695	NONE	PORT AUDREY	C	?	1	1	U	1	2	0	0	0	0	0	1	0	603	
58	89PSL 609	32	16	89-1514	20 APR 1989	695	NONE	PORT AUDREY	C	?	1	1	F	1	1	0	0	0	0	0	0	0	609	
59	89PSL 649	32	16	89-1514	20 APR 1989	695	NONE	PORT AUDREY	C	?	1	1	F	1	1	0	0	0	0	0	0	0	649	
60	89PSL 653	32	16	89-1514	20 APR 1989	695	NONE	PORT AUDREY	C	?	1	1	F	1	1	0	1	0	0	0	1	0	653	
61	89PSL 656	31	16	89-1514	20 APR 1989	695	NONE	PORT AUDREY	C	?	1	1	F	1	1	0	0	0	0	0	1	0	656	min. peribiliary autolysis
62	89PSL 686	32	16	89-1514	20 APR 1989	695	NONE	PORT AUDREY	C	?	1	1	U	2	2	0	0	0	0	0	0	0	686	
63	89PSL 704	ND	16	89-1514	20 APR 1989	695	NONE	PORT AUDREY	C	?	1	1	U	1	1	0	0	0	0	0	1	0	704	
64	89PSL 728	32	16	89-1514	20 APR 1989	695	NONE	PORT AUDREY	C	?	1	1	U	2	2	0	0	0	0	0	1	0	728	
Stats:	n =	28						Statistics:	n, =		32	32		32	32	32	32	32	31	32	32	32		
	ave.	32.							ave. =		1.0	1		1.6	1.5	0	.09	0	0	0	.44	.28		
	std.	.87							std. =		.17	0		.70	.56	0	.38	0	0	0	.50	.67		
	SE =	.16							SE =		.03	0		.12	.10	0	.07	0	0	0	.09	.12		
																				n = 14		6		

Progress report: 5-4-92

#	Proc. #	TL (mm)	S#	Jar number	Sample date	Stream #	Stream name	Location	OS	MFO	Ally	art	sex	GLY	YOLK	EA	MDN	IHN	VDGG	ECN	GIF	CT	Proc. #	Alaska comments
65	89PSL 43	30	13	89-1511	18 APR 1989	663	NONE	SHELTER BAY	O	?	1	1	F	3	3	0	0	0	0	1	0	0	43	
66	89PSL 46	29	13	89-1511	18 APR 1989	663	NONE	SHELTER BAY	O	?	1	1	F	3	3	0	0	0	0	0	1	0	46	
67	89PSL 54	29	13	89-1511	18 APR 1989	663	NONE	SHELTER BAY	O	?	1	1	F	3	3	0	0	0	0	0	1	0	54	
68	89PSL 58	28	13	89-1511	18 APR 1989	663	NONE	SHELTER BAY	O	?	1	1	F	3	3	0	0	0	0	0	1	0	58	
69	89PSL 65	29	13	89-1511	18 APR 1989	663	NONE	SHELTER BAY	O	?	1	1	U	2	3	0	0	0	0	1	0	0	65	
70	89PSL 79	28	13	89-1511	18 APR 1989	663	NONE	SHELTER BAY	O	?	1	1	F	3	3	0	2	0	0	1	0	2	79	periolfactory and IM hem.
71	89PSL 83	28	13	89-1511	18 APR 1989	663	NONE	SHELTER BAY	O	?	1	1	U	3	3	0	0	0	0	1	0	0	83	
72	89PSL 87	29	13	89-1511	18 APR 1989	663	NONE	SHELTER BAY	O	?	1	1	U	3	3	0	0	0	0	1	0	1	87	intracranial hem.
73	89PSL 90	29	13	89-1511	18 APR 1989	663	NONE	SHELTER BAY	O	?	1	1	U	3	3	0	0	0	0	0	0	2	90	ruptured yolk
74	89PSL 120	31	13	89-1511	18 APR 1989	663	NONE	SHELTER BAY	O	?	1	1	U	3	3	0	0	0	0	1	0	0	120	
75	89PSL 180	28	13	89-1511	18 APR 1989	663	NONE	SHELTER BAY	O	?	1	1	F	3	3	0	0	0	0	0	1	2	180	branchial and intrarenal hem.
76	89PSL 188	30	13	89-1511	18 APR 1989	663	NONE	SHELTER BAY	O	?	1	1	A	3	3	0	0	0	NG	1	0	0	188	
77	89PSL 234	28	13	89-1511	18 APR 1989	663	NONE	SHELTER BAY	O	?	1	1	U	3	3	0	0	0	0	1	0	3	234	ruptured yolk
78	89PSL 290	30	13	89-1511	18 APR 1989	663	NONE	SHELTER BAY	O	?	1	1	A	3	3	0	0	0	0	1	0	2	290	ruptured yolk
79	89PSL 318	30	13	89-1511	18 APR 1989	663	NONE	SHELTER BAY	O	?	1	1	F	3	3	0	0	0	NG	0	1	0	318	
80	89PSL 345	28	13	89-1511	18 APR 1989	663	NONE	SHELTER BAY	O	?	1	1	U	3	3	0	0	0	0	1	1	0	345	
81	89PSL 360	30	13	89-1511	18 APR 1989	663	NONE	SHELTER BAY	O	?	1	1	U	3	3	0	0	0	0	1	1	0	360	
82	89PSL 366	29	13	89-1511	18 APR 1989	663	NONE	SHELTER BAY	O	?	1	1	U	3	3	0	0	0	0	2	0	0	366	
83	89PSL 380	29	13	89-1511	18 APR 1989	663	NONE	SHELTER BAY	O	?	1	1	U	3	3	0	0	0	0	1	1	0	380	
84	89PSL 382	29	13	89-1511	18 APR 1989	663	NONE	SHELTER BAY	O	?	1	1	F	3	3	0	0	0	0	1	0	2	382	yolk herniated through V. body wall
85	89PSL 392	28	13	89-1511	18 APR 1989	663	NONE	SHELTER BAY	O	?	1	1	U	3	3	0	0	0	0	1	0	0	392	
86	89PSL 397	29	13	89-1511	18 APR 1989	663	NONE	SHELTER BAY	O	?	1	1	F	3	3	0	0	0	0	1	0	0	397	
87	89PSL 496	28	13	89-1511	18 APR 1989	663	NONE	SHELTER BAY	O	?	1	1	U	3	3	0	0	0	0	1	0	1	496	intracerebral hem.
88	89PSL 502	29	13	89-1511	18 APR 1989	663	NONE	SHELTER BAY	O	?	1	1	U	3	3	0	0	0	0	1	1	1	502	retroperitoneal hem.
89	89PSL 548	29	13	89-1511	18 APR 1989	663	NONE	SHELTER BAY	O	?	1	1	U	2	3	0	0	0	NG	1	0	1	548	branchial hem.
90	89PSL 560	29	13	89-1511	18 APR 1989	663	NONE	SHELTER BAY	O	?	1	1	U	3	3	0	0	0	0	0	0	1	560	peri-retinal hem.
91	89PSL 635	29	13	89-1511	18 APR 1989	663	NONE	SHELTER BAY	O	?	1	1	U	3	3	0	0	0	0	1	0	0	635	
92	89PSL 685	30	13	89-1511	18 APR 1989	663	NONE	SHELTER BAY	O	?	1	1	U	3	3	0	0	0	0	1	0	0	685	
93	89PSL 697	31	13	89-1511	18 APR 1989	663	NONE	SHELTER BAY	O	?	1	1	F	3	3	0	0	0	0	1	1	1	697	intracranial hem.
94	89PSL 703	30	13	89-1511	18 APR 1989	663	NONE	SHELTER BAY	O	?	1	1	U	3	3	0	0	0	0	1	0	1	703	IP hem.
95	89PSL 718	27	13	89-1511	18 APR 1989	663	NONE	SHELTER BAY	O	?	1	1	U	3	3	0	0	0	0	1	1	0	718	
96	89PSL 729	29	13	89-1511	18 APR 1989	663	NONE	SHELTER BAY	O	?	1	1	F	3	3	0	0	0	0	2	1	3	729	IM hem. and ruptured yolk
Stats:	n =	32						Statistics:	n, =		32	32		32	32	32	32	32	29	32	32	32		
	ave.	29.							ave. =		1	1		2.9	3	0	.06	0	0	.84	.38	.72		
	std.	.92							std. =		0	0		.24	0	0	.35	0	0	.51	.48	.94		
	SE =	.16							SE =		0	0		.04	0	0	.06	0	0	.09	.09	.17		
																				n =	12	14		
97	89PSL 26	29	12	89-1510	18 APR 1989	678	NONE	SLEEPY BAY	O	?	1	1	U	3	3	0	0	0	NG	1	0	1	26	subdural hem.
98	89PSL 92	29	12	89-1510	18 APR 1989	678	NONE	SLEEPY BAY	O	?	1	1	U	2	2	0	0	0	0	1	1	0	92	
99	89PSL 124	30	12	89-1510	18 APR 1989	678	NONE	SLEEPY BAY	O	?	1	1	F	3	3	0	0	0	0	2	1	1	124	intracranial hem.
100	89PSL 125	30	12	89-1510	18 APR 1989	678	NONE	SLEEPY BAY	O	?	1	1	U	3	3	0	0	0	0	1	0	0	125	
101	89PSL 140	30	12	89-1510	18 APR 1989	678	NONE	SLEEPY BAY	O	?	1	1	F	3	3	0	0	0	0	1	0	0	140	
102	89PSL 161	30	12	89-1510	18 APR 1989	678	NONE	SLEEPY BAY	O	?	1	1	U	3	3	0	0	0	0	1	0	0	161	
103	89PSL 183	29	12	89-1510	18 APR 1989	678	NONE	SLEEPY BAY	O	?	1	1	F	3	3	0	0	0	0	0	0	1	183	retroperitoneal hem.
104	89PSL 229	30	12	89-1510	18 APR 1989	678	NONE	SLEEPY BAY	O	?	1	1	U	3	3	0	0	0	0	1	0	0	229	
105	89PSL 235	30	12	89-1510	18 APR 1989	678	NONE	SLEEPY BAY	O	?	1	1	A	3	3	0	0	0	0	1	?	1	235	intracranial and IM hem.; large bac
106	89PSL 256	29	12	89-1510	18 APR 1989	678	NONE	SLEEPY BAY	O	?	1	1	F	3	3	0	0	0	0	1	0	1	256	IM hem.
107	89PSL 280	30	12	89-1510	18 APR 1989	678	NONE	SLEEPY BAY	O	?	1	1	F	3	3	0	0	0	0	1	0	0	280	
108	89PSL 292	30	12	89-1510	18 APR 1989	678	NONE	SLEEPY BAY	O	?	1	1	F	3	3	0	0	0	0	1	0	0	292	
109	89PSL 315	30	12	89-1510	18 APR 1989	678	NONE	SLEEPY BAY	O	?	1	1	F	3	3	0	0	0	0	2	0	0	315	
110	89PSL 321	30	12	89-1510	18 APR 1989	678	NONE	SLEEPY BAY	O	?	1	1	F	3	3	0	0	0	0	2	0	0	321	
111	89PSL 333	29	12	89-1510	18 APR 1989	678	NONE	SLEEPY BAY	O	?	1	1	F	3	3	0	0	0	0	1	1	0	333	
112	89PSL 364	30	12	89-1510	18 APR 1989	678	NONE	SLEEPY BAY	O	?	1	1	F	3	3	0	0	0	0	?	?	0	364	
113	89PSL 425	29	12	89-1510	18 APR 1989	678	NONE	SLEEPY BAY	O	?	1	1	U	3	3	0	0	0	0	1	0	0	425	
114	89PSL 429	30	12	89-1510	18 APR 1989	678	NONE	SLEEPY BAY	O	?	1	1	F	3	3	0	0	0	0	1	0	1	429	hem. around optic nerve
115	89PSL 447	31	12	89-1510	18 APR 1989	678	NONE	SLEEPY BAY	O	?	1	1	F	3	3	0	0	0	0	1	0	2	447	cerebral and IM hem.
116	89PSL 452	30	12	89-1510	18 APR 1989	678	NONE	SLEEPY BAY	O	?	1	1	F	3	3	0	0	0	0	1	1	0	452	
117	89PSL 540	30	12	89-1510	18 APR 1989	678	NONE	SLEEPY BAY	O	?	1	1	U	3	3	0	0	0	0	1	0	0	540	
118	89PSL 544	30	12	89-1510	18 APR 1989	678	NONE	SLEEPY BAY	O	?	1	1	U	3	3	0	0	0	0	2	?	0	544	

Progress report: 5-4-92

#	Proc. #	TL (mm)	Sf	Jar number	Sample date	Stream #	Stream name	Location	OS	MFO	Ally	art	sex	GLY	YOLK	EA	MDN	IHN	VDGG	ECN	GIF	CT	Proc. #	Alaska comments
119	89PSL 545	31	12	89-1510	18 APR 1989	678	NONE	SLEEPY BAY	O	?	1	1	U	3	3	0	0	0	0	1	1	0	545	TUMOR - stratum compactum fibroma?;
120	89PSL 558	29	12	89-1510	18 APR 1989	678	NONE	SLEEPY BAY	O	?	1	1	U	3	3	0	0	0	0	1	1	0	558	
121	89PSL 564	32	12	89-1510	18 APR 1989	678	NONE	SLEEPY BAY	O	?	1	1	F	3	3	0	1	0	0	1	1	1	564	IM hem.
122	89PSL 581	31	12	89-1510	18 APR 1989	678	NONE	SLEEPY BAY	O	?	1	2	U	3	3	0	0	0	0	1	0	0	581	
123	89PSL 614	30	12	89-1510	18 APR 1989	678	NONE	SLEEPY BAY	O	?	1	1	U	3	3	0	0	0	0	1	?	1	614	IM hem.
124	89PSL 663	29	12	89-1510	18 APR 1989	678	NONE	SLEEPY BAY	O	?	1	1	F	3	3	0	0	0	0	1	0	0	663	
125	89PSL 696	31	12	89-1510	18 APR 1989	678	NONE	SLEEPY BAY	O	?	1	1	F	3	3	0	0	0	0	1	1	1	696	IM hem.
126	89PSL 719	30	12	89-1510	18 APR 1989	678	NONE	SLEEPY BAY	O	?	1	1	F	3	3	0	0	0	0	2	0	0	719	
127	89PSL 725	30	12	89-1510	18 APR 1989	678	NONE	SLEEPY BAY	O	?	1	1	F	3	3	0	0	0	0	1	0	2	725	Intracranial and IP hem.
128	89PSL 727	30	12	89-1510	18 APR 1989	678	NONE	SLEEPY BAY	O	?	1	1	F	3	3	0	1	0	0	1	0	1	727	IM hem.
Stats:	n =	32						Statistics:	n =		32	32		32	32	32	32	32	31	32	29	32		
	ave.	30.							ave. =		1	1.0		3.0	3.0	0	.06	0	0	1.1	.31	.44		
	std.	.70							std. =		0	.17		.17	.17	0	.24	0	0	.41	.46	.61		
	SE =	.12							SE =		0	.03		.03	.03	0	.04	0	0	.07	.09	.11		
																				n_e =	9	12		

XIV. Final Report - 1990 "Damage Assessment" Pink Salmon Larvae

PATHOLOGIST - Gary D. Marty, DVM

Filenames: 91PSL_DA.PRN or 91PSL_DA.WK1

METHODS

Pathology -

Histologic sections and paraffin-embedded tissues of 84 pink salmon larvae were received from Dr. Roxanna Smolowitz, Woods Hole Oceanographic Institute (WHOI), on March 14, 1992. Glass slides contained a longitudinal section from two larvae, each from the same sample site. For each sample number, we received sections and blocks of 6 larvae. At Davis, an additional three step sections [each from about 70 µm deeper in the block] were cut to yield a broader range of organs. Slides were read in numerical order, using the "WHOI number" listed in Table 11. Because each slide already had two larvae, and nearly every sample group contained only six larvae, no attempt was made to randomize the slides for "blind" examination; however, the pathologist (Gary D. Marty) had/has no knowledge of the exposure history of larvae.

For histologic examination, each larval section, particularly the intestinal tract, was examined for extent of autolysis: 1) minimum (min), all cell membranes were intact; 2) mild, a few cells on the tips of the villi were affected; 3) moderate (mod), at least one section of intestine had transmural autolysis; and 4) severe (sev), more than focal transmural autolysis. Next, sectioning artifact was ranked as none, mild, mod, or sev. All sections had at least mild sectioning artifact (as expected with paraffin embedding), and other rankings were based on the extent that artifacts made interpretation of tissue sections difficult.

Each larva was first scanned at low power (4x objective) for major organs: gonad, retina, brain, heart, gill, skin, skeletal muscle, kidney, gastrointestinal tract, yolk, liver, and spleen. For each larva, the presence or absence of each organ was recorded on a scoring sheet similar to Appendix 5 in the 10-28-92 progress report. The gonad, when present, was further classified as undifferentiated (or unable to classify), male (testicle), or female (ovary). The extent of liver glycogen was ranked and scored as minimum (no obvious hepatocellular vacuoles, score = 1), moderate (volume of hepatocellular vacuoles less than nuclear volume, score = 2), or abundant (volume of hepatocellular vacuoles greater than nuclear volume, score = 3). Yolk stores were ranked as abundant/eosinophilic (score = 3), minimal (score = 2, for yolks with about equal amounts of eosinophilic protein and pale peripheral tissues), pale (score = 1, when only the pale peripheral yolk-sac tissues remained), or absent (score = 0, for no yolk sac in the sections). Lesions were ranked and scored as none (0), mild (1), mod (2), or sev (3) in relation to other similar lesions. Other comments, pathologist's initials, and date(s) examined were also recorded.

As potential lesions, epidermal atrophy, individual hepatocellular necrosis, and

vacuolar degeneration of gastric glands were included on the data sheet because they had been observed in other groups of pink salmon larvae. However, none of the larvae in this group had either of these lesions. Myodegeneration and necrosis was as previously described. Epidermal cell necrosis and/or inflammation (ECN; see page 2222 above for a detailed description) occurred exclusively on the ventral epidermis near the midline and usually just anterior to the anus.

RESULTS and DISCUSSION

Lesion scores for each fish are listed in Table 11. Autolysis was minimal in all but one fish, and sectioning artifact was mild in all but three fish, indicating that the sections were generally of excellent quality for histopathologic examination. Livers were absent from sections of 11% (9 of 84) of the larvae; in the 75 livers examined, all but three had abundant glycogen stores. Only two of 84 larvae had less than abundant yolk stores, and these larvae had either pale or minimal hepatic glycogen, providing further evidence that decreased hepatic glycogen stores are correlated to decreased yolk stores.

About 68% (57 of 84) larvae had some degree of epidermal cell necrosis, degeneration, and/or inflammation. These lesions occurred among all sample groups, and likely were related to irritation of the yolk-distended ventral body wall by environmental objects such as rocks and gravel. As further evidence, neither of the two fish with minimal yolks stores (hence, less distension of the ventral body wall) had epidermal lesions.

Myodegeneration and necrosis was infrequent in all but the C-3-90 group, in which three of the six larvae were affected. In all cases, however, these lesions were very acute and might have been related to collection trauma, particularly if the fish were allowed to survive a few minutes after collection. In conclusion, we found no lesions in these larvae that could clearly be related to oil exposure.

Table 11. Summary of histopathologic findings in 1990 "Damage Assessment" Pink Salmon Larvae.

Abbreviations used:

Filenames: 91PSL_DA.PRN or 91PSL_DA.WK1

min = minimal; mod = moderate; sev = severe; NE or "." = not examined, because organ was not present

OS = oiled status; oiled (O), control/clean (C), or unknown (?)
MFO = mixed function oxidase; ranked as negative (0), very mild (1), mild (2), mod (3), or strong (4)
note: reported MFO values are means for each group and are not individual fish values
Atly = autolysis; ranked as min (1), mild (2), mod (3), or sev (4)
art = sectioning artifact; ranked as none (0), mild (1), mod (2), or sev (3)
sex = gonad; listed as male (M), female (F), unknown/undifferentiated (U), absent (A)
GLY = hepatic glycogen; ranked as min (1), mod (2), abundant (3), or hepatocytes not present (.)
YOLK = status of yolk stores; ranked as none (0), pale (1), min (2), or eosinophilic/abundant (3)
lesion scores: none (0), mild (1), moderate (2), severe (3), or not present (.)
EA = epidermal atrophy
MDN = myofiber degeneration and/or necrosis
IHN = individual hepatocellular necrosis
VDGG = vacuolar degeneration of gastric gland epithelial cells
NG (no good) = the stomach is absent or too autolyzed for evaluation
ECN = epidermal cell necrosis or inflammation; sometimes with eosinophilic cytoplasmic inclusions
GIF = gastrointestinal food (i.e., recognizable food particles in gi tract)
amount ranked as none (0), min (1), moderate (2), or abundant (3)
CT = collection trauma
GLT = gill lamellar telangiectasis (due to collection trauma)
Additional comments - see end of table

Hinton Number	WHOI Number	Alaska Number	Site	Date Collected	OS	MFO	Atly	art	sex	GLY	YOLK	EA	MDN	IHN	VDGG	ECN	Hinton #
1	91.879.A1 a	A-3-90-NRDA #2	?	?	?	?	1	1	M	2	2	0	0	0	0	0	1
2	91.879.A1 b	A-3-90-NRDA #2	?	?	?	?	1	1	U	3	3	0	1	0	0	1	2
3	91.879.A2 a	A-3-90-NRDA #2	?	?	?	?	1	1	F	3	3	0	0	0	0	0	3
4	91.879.A2 b	A-3-90-NRDA #2	?	?	?	?	1	1	A	3	3	0	0	0	0	1	4
5	91.879.A3 a	A-3-90-NRDA #2	?	?	?	?	1	1	M	3	3	0	0	0	0	0	5
6	91.879.A3 b	A-3-90-NRDA #2	?	?	?	?	1	1	M	3	3	0	0	0	0	0	6
7	91.880.A1 a	A-4-90	?	?	?	?	1	1	U	.	3	0	0	.	0	0	7
8	91.880.A1 b	A-4-90	?	?	?	?	1	1	U	3	3	0	0	0	0	0	8
9	91.880.A2 a	A-4-90	?	?	?	?	1	1	F	.	3	0	0	.	0	0	9
10	91.880.A2 b	A-4-90	?	?	?	?	1	1	A	3	3	0	0	0	0	0	10
11	91.880.A3 a	A-4-90	?	?	?	?	1	1	U	3	3	0	0	0	0	1	11
12	91.880.A3 b	A-4-90	?	?	?	?	1	1	U	3	3	0	0	0	NG	1	12
13	91.881.A1 a	B-3-90	?	?	?	?	1	1	U	3	3	0	0	0	NG	0	13
14	91.881.A1 b	B-3-90	?	?	?	?	1	1	A	3	3	0	0	0	0	0	14
15	91.881.A2 a	B-3-90	?	?	?	?	1	1	F	3	3	0	0	0	0	1	15
16	91.881.A2 b	B-3-90	?	?	?	?	1	1	F	3	3	0	0	0	0	0	16
17	91.881.A3 a	B-3-90	?	?	?	?	1	1	F	3	3	0	0	0	0	1	17
18	91.881.A3 b	B-3-90	?	?	?	?	1	1	F	3	3	0	0	0	0	0	18
19	91.882.A1 a	B-4-90	?	?	?	?	1	1	U	3	3	0	0	0	0	2	19
20	91.882.A1 b	B-4-90	?	?	?	?	1	1	F	.	3	0	0	.	0	0	20
21	91.882.A2 a	B-4-90	?	?	?	?	1	1	F	3	3	0	0	0	0	0	21
22	91.882.A2 b	B-4-90	?	?	?	?	1	1	F	3	3	0	0	0	0	1	22
23	91.882.A3 a	B-4-90	?	?	?	?	1	1	U	.	3	0	0	.	0	1	23
24	91.882.A3 b	B-4-90	?	?	?	?	1	1	U	3	3	0	0	0	0	1	24
25	91.883.A1 a	C-3-90	?	?	?	?	1	1	F	3	3	0	0	0	0	2	25
26	91.883.A1 b	C-3-90	?	?	?	?	1	1	U	3	3	0	0	0	0	0	26
27	91.883.A2 a	C-3-90	?	?	?	?	1	1	F	3	3	0	0	0	0	1	27
28	91.883.A2 b	C-3-90	?	?	?	?	2	1	F	1	2	0	2	0	0	0	28
29	91.883.A3 a	C-3-90	?	?	?	?	1	1	F	3	3	0	1	0	0	1	29
30	91.883.A3 b	C-3-90	?	?	?	?	1	1	F	3	3	0	2	0	0	1	30
31	91.884.A1 a	C-4-90	?	?	?	?	1	1	U	3	3	0	0	0	0	1	31
32	91.884.A1 b	C-4-90	?	?	?	?	1	1	U	3	3	0	0	0	0	1	32
33	91.884.A2 a	C-4-90	?	?	?	?	1	1	U	3	3	0	1	0	0	1	33
34	91.884.A2 b	C-4-90	?	?	?	?	1	1	F	3	3	0	0	0	0	0	34
35	91.884.A3 a	C-4-90	?	?	?	?	1	2	F	2	3	0	0	0	0	0	35
36	91.884.A3 b	C-4-90	?	?	?	?	1	2	F	3	3	0	0	0	0	2	36
37	91.885.A1 a	D-3-90	?	?	?	?	1	1	U	3	3	0	0	0	0	1	37
38	91.885.A1 b	D-3-90	?	?	?	?	1	1	A	3	3	0	0	0	0	0	38
39	91.885.A2 a	D-3-90	?	?	?	?	1	1	F	3	3	0	0	0	0	1	39
40	91.885.A2 b	D-3-90	?	?	?	?	1	1	F	3	3	0	0	0	0	1	40

Hinton Number	WHOI Number	Alaska Number	Site	Date Collected	OS	MFC	Atly	art	sex	GLY	YOLK	EA	MDN	IHN	VDGG	ECN	Hinton #
41	91.885.A3 a	D-3-90	?	?	?	?	1	1	F	3	3	0	0	0	0	0	41
42	91.885.A3 b	D-3-90	?	?	?	?	1	1	F	3	3	0	0	0	0	0	42
43	91.886.A1 a	D-4-90	?	?	?	?	1	1	U	.	3	0	1	.	0	1	43
44	91.886.A1 b	D-4-90	?	?	?	?	1	1	F	3	3	0	0	0	0	1	44
45	91.886.A2 a	D-4-90	?	?	?	?	1	1	U	3	3	0	1	0	0	0	45
46	91.886.A2 b	D-4-90	?	?	?	?	1	1	U	3	3	0	0	0	0	1	46
47	91.886.A3 a	D-4-90	?	?	?	?	1	1	U	3	3	0	0	0	0	1	47
48	91.886.A3 b	D-4-90	?	?	?	?	1	1	U	3	3	0	0	0	0	1	48
49	91.887.A1 a	E-3-90	?	?	?	?	1	1	F	3	3	0	0	0	0	0	49
50	91.887.A1 b	E-3-90	?	?	?	?	1	1	U	3	3	0	0	0	0	1	50
51	91.887.A2 a	E-3-90	?	?	?	?	1	1	F	3	3	0	0	0	0	1	51
52	91.887.A2 b	E-3-90	?	?	?	?	1	1	A	3	3	0	0	0	0	0	52
53	91.887.A3 a	E-3-90	?	?	?	?	1	1	U	3	3	0	1	0	0	1	53
54	91.887.A3 b	E-3-90	?	?	?	?	1	1	F	3	3	0	0	0	0	1	54
55	91.888.A1 a	E-4-90	?	?	?	?	1	1	F	3	3	0	0	0	0	1	55
56	91.888.A1 b	E-4-90	?	?	?	?	1	1	U	3	3	0	0	0	0	1	56
57	91.888.A2 a	E-4-90	?	?	?	?	1	1	F	.	3	0	0	.	0	1	57
58	91.888.A2 b	E-4-90	?	?	?	?	1	1	F	3	3	0	0	0	0	1	58
59	91.888.A3 a	E-4-90	?	?	?	?	1	1	F	3	3	0	0	0	NG	0	59
60	91.888.A3 b	E-4-90	?	?	?	?	1	1	U	3	3	0	0	0	0	1	60
61	91.889.A1 a	F-3-90	?	?	?	?	1	2	U	3	3	0	0	0	0	0	61
62	91.889.A1 b	F-3-90	?	?	?	?	1	1	F	3	3	0	0	0	0	1	62
63	91.889.A2 a	F-3-90	?	?	?	?	1	1	A	3	3	0	0	0	0	1	63
64	91.889.A2 b	F-3-90	?	?	?	?	1	1	F	3	3	0	0	0	0	1	64
65	91.889.A3 a	F-3-90	?	?	?	?	1	1	U	3	3	0	0	0	0	1	65
66	91.889.A3 b	F-3-90	?	?	?	?	1	1	F	3	3	0	0	0	0	1	66
67	91.890.A1 a	F-4-90	?	?	?	?	1	1	F	3	3	0	0	0	0	1	67
68	91.890.A1 b	F-4-90	?	?	?	?	1	1	F	3	3	0	0	0	0	1	68
69	91.890.A2 a	F-4-90	?	?	?	?	1	1	U	3	3	0	0	0	NG	2	69
70	91.890.A2 b	F-4-90	?	?	?	?	1	1	F	3	3	0	0	0	0	1	70
71	91.890.A3 a	F-4-90	?	?	?	?	1	1	U	3	3	0	0	0	0	1	71
72	91.890.A3 b	F-4-90	?	?	?	?	1	1	F	3	3	0	0	0	0	1	72
73	91.891.A1 a	G-3-90	?	?	?	?	1	1	U	3	3	0	0	0	0	1	73
74	91.891.A1 b	G-3-90	?	?	?	?	1	1	U	3	3	0	0	0	0	0	74
75	91.891.A2 a	G-3-90	?	?	?	?	1	1	U	.	3	0	0	.	0	1	75
76	91.891.A2 b	G-3-90	?	?	?	?	1	1	F	3	3	0	0	0	0	1	76
77	91.891.A3 a	G-3-90	?	?	?	?	1	1	F	.	3	0	0	.	0	1	77
78	91.891.A3 b	G-3-90	?	?	?	?	1	1	A	3	3	0	0	0	0	1	78
79	91.892.A1 a	G-4-90	?	?	?	?	1	1	F	.	3	0	0	.	0	1	79
80	91.892.A1 b	G-4-90	?	?	?	?	1	1	F	3	3	0	0	0	0	0	80
81	91.892.A2 a	G-4-90	?	?	?	?	1	1	A	3	3	0	0	0	0	1	81
82	91.892.A2 b	G-4-90	?	?	?	?	1	1	F	3	3	0	0	0	0	1	82
83	91.892.A3 a	G-4-90	?	?	?	?	1	1	A	3	3	0	0	0	0	1	83
84	91.892.A3 b	G-4-90	?	?	?	?	1	1	U	3	3	0	0	0	0	0	84

Hinton #	Alaska comments
2	MDN has hemorrhage (CT)
24	intracerebral hemorrhage (CT)
33	GLT (1)
43	intramuscular hemorrhage (CT)
51	GLT(1); liver has high mitotic rate
52	ruptured yolk (CT)
69	ruptured yolk (CT)
71	intramuscular hemorrhage (CT)
72	intramuscular hemorrhage (CT)
77	GIF (1)
78	GIF (1)