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PRELIMINARY REPORT ON THE GENETIC DIVERSITY OF SOCKEYE SALMON POPULATIONS FROM SOUTHEAST ALASKA AND NORTHERN BRITISH COLUMBIA

by

C.M. Guthrie III[1], J.H. Helle[1], P. Aebersold[2],
G.A. Winans[2], and A.J. Gharrett[1,3]

[1]Auke Bay Laboratory
Alaska Fisheries Science Center
National Marine Fisheries Service
National Oceanographic and Atmospheric Administration
11305 Glacier Highway,
Juneau, Alaska 99801-8626

[2]Northwest Fisheries Science Center
National Marine Fisheries Service
National Oceanographic and Atmospheric Administration
2725 Montlake Boulevard East,
Seattle, Washington 98112

[3]School of Fisheries and Ocean Sciences,
University of Alaska Fairbanks,
11120 Glacier Highway,
Juneau, Alaska 99801

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ABSTRACT

Genetic data were collected and prepared with the use of protein electrophoresis from 52 spawning locations in southeastern Alaska and northern British Columbia. Genetic relationships were examined from principal components analysis and unrooted trees constructed from genetic distances between collections. These descriptive analyses suggest a geographic basis to genetic divergence among populations. This geographic basis was confirmed using log-likelihood-ratio analysis and analyses of variance. Three groups of populations were observed: one from systems that drain into the inside waters of northern and central southeast Alaska; another from the far southeastern islands (including Prince of Wales Island); and the third in systems of the southern inside waters. Although the geographic structure was a statistically significant component of the overall genetic structure, gene diversity analysis indicates that only about 4.7% of the total genetic variability was attributable to genetic differences among those regions, whereas about 8.4% of the total was due to differences among populations within each region. The other 87.0% of the variation occurred, on average, within each collection.

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INTRODUCTION

Because anadromous sockeye salmon (*Oncorhynchus nerka*) home precisely, populations are isolated sufficiently to allow them to diverge genetically (Quinn et al. 1987). As a result, local populations may differ substantially. Although such differences may be useful for fine–scale stock identification, most stock–separation applications involve larger assemblages of stocks. For application of genetic methods to identify stocks in aggregations farther from the terminal areas, a geographic basis for the genetic variation is useful.

Until recently, data for only a few variable loci were routinely gathered in baseline surveys (Grant et al. 1980; Utter et al. 1984; Wilmot and Burger 1985; Quinn et al. 1987; Wood et al. 1987) and, with the exception of a study of sockeye salmon in major Cook Inlet drainages (Grant et al. 1980), population genetic analyses were not made with data sets that included sockeye salmon populations collected over a relatively wide geographic range. As a result, scale pattern analysis and parasite incidence are the primary stock separation tools for sockeye salmon populations of Southeast Alaska and British Columbia (Marshall et al. 1987; Wood et al. 1989). Although these markers are quite useful, they rely on the environmental differences of juvenile sockeye rearing habitat rather than heritable, geographically based characters. In many situations the environmental basis suffices because some environmentally based differences follow geographic differences. For example, scale–pattern analysis adequately separates sockeye salmon of various habitats of the large inland lake systems in northern British Columbia from those of small coastal lake systems which are primarily in Southeast Alaska. However, heritable characters that have some geographic basis might allow a finer discrimination than is possible with the environmental characters presently in use.

In this paper we report results and analysis of baseline genetic data for sockeye salmon collections from much of Southeast Alaska, and from the transboundary Stikine and Taku Rivers. By obtaining data from more allozyme loci than have been reported previously and by broadly sampling populations over Southeast Alaska, our data could be examined for geographically based genetic differences.

METHODS AND MATERIALS

Samples

Between 1982 and 1990, 95 collections of tissue samples were taken from sockeye salmon at 52 spawning locations in Southeast Alaska and northern British Columbia (Table 1; Figs. 1,2). We collected samples in more than one year at many locations. Samples were collected between mid–July and mid–October from weirs on outlet streams, in inlet stream spawning areas, at beach spawning areas, and in spawning areas of upwelling groundwater. In 1986, age–0 (rearing) juveniles were also collected from 23 sites on the Taku River drainage (Table 2; Fig. 3) between late July and late September, primarily with beach seines. Each juvenile collection was sampled at three stations 50 m apart, with at least three seine passes at each station as described in Murphy et al. (1989).

Whole eyes and samples of liver, skeletal muscle, and heart from a single adult fish were packaged in Whirl–pak[1] bags and put in coolers containing frozen gel–ice. The samples were frozen at –20°C shortly after they were collected, and shipped to the Auke Bay Laboratory where they were stored at –85°C until analyzed. Juvenile fish were frozen whole in resealable plastic bags and handled in the same manner as the adult samples. We dissected the tissues from

[1]Reference to trade names does not imply endorsement by the National Marine Fisheries Service.

the juveniles shortly before analysis. Heart and liver tissues were macerated in the same tube and analyzed together because those tissues were too small to be separated.

Protein electrophoresis was conducted as described by Aebersold et al. (1987). Buffer systems used are described in Table 3. Specific enzyme activities (Table 4) were stained according to Harris and Hopkinson (1976) or Aebersold et al. (1987). Specific (putative) loci for which data were obtained, the tissues in which they were expressed, and the buffer systems with which they were resolved are listed in Table 5. We started this investigation analyzing a suite of variable loci. During the course of this investigation we discovered variability at additional loci. As a result, we do not have data for all loci for all collections.

Analysis

Departure from Hardy–Weinberg expectations (Hardy 1908) was examined with chi-square goodness-of-fit tests. This analysis was applied only when the least prevalent genotype had an expectation of at least four individuals. When this minimum expectation was not met, the conformance to Hardy–Weinberg frequencies was tested by generating nonparametrically a distribution of X^2-statistics for each test using a Monte Carlo process. The distribution of X^2-statistics for each Hardy–Weinberg test was made by 1) reconstructing each set of genotypes by randomly drawing from the observed allelic frequencies (with replacement) the number of individuals originally observed in each collection, and 2) calculating a X^2 goodness-of-fit statistic. The process was repeated 2000 times to generate a distribution. The proportion of X^2-statistics generated by the resampling process that exceeded the observed X^2-statistic was inferred as the significance of the test on the observed data. For most loci, the genotype can be inferred from the banding pattern of the phenotype observed. Genetic variation at *PGM-1**, however, involves a **null* allele which, unlike a normal allele, does not produce a gene product that has enzymatic activity (i.e. can be stained). Consequently, only four phenotypes (banding patterns) are detectable for the six possible *PGM-1** genotypes that can result from the three alleles we observed. Therefore, tests to confirm Hardy–Weinberg expectations were not possible at *PGM-1**, and in log-likelihood ratio analyses (*G*-tests) comparing data at *PGM-1** we used phenotypic frequencies rather than allelic frequencies.

Homogeneity of allelic frequencies was examined using the *G*-test (Sokal and Rohlf 1981). Pooling allelic frequencies eliminated classes with expected values < 4.

Variation at co-migrating, duplicated loci (termed isoloci, Allendorf and Thorgaard 1984) was treated as if all the variability appeared at one locus and the other was monomorphic. This is a conservative treatment for isoloci with relatively low allelic variability (Gharrett and Thomason 1987). No Hardy–Weinberg tests were conducted on isoloci.

Relationships among collections were descriptively examined in two ways: 1) principal component analysis of allelic frequencies (arcsine-square root transformed using SYSTAT [Wilkinson 1990]), and 2) neighbor-joining trees (Saitou and Nei 1987) estimated from the chord distances of Cavalli-Sforza and Edwards (1967) determined between each pair of populations.

We used log-likelihood ratio analysis (Sokal and Rohlf 1981) to test for heterogeneity 1) among collections from the same locations, 2) among collections at various spatial and temporal levels, 3) between collections of adults and juveniles from the same or nearby location, and 4) among collections of juveniles. Adult collections from the same location were pooled when the *G*-test did not indicate heterogeneity. Gene diversity analysis (Chakraborty and Leimar 1987) was used to hierarchically partition genetic variability.

We used two methods to examine factors underlying the genetic structure among collections that might be related to geographic proximity or freshwater habitat. In addition to the *G*–test, we used one–way analysis of variance (ANOVA) or one–way multiple variate analysis of variance (MANOVA) of arcsine–square root–transformed allelic frequencies or average unbiased estimates of heterozygosity (Nei 1978) of collections. Wilks' λ was used to infer significance in the MANOVAs. Loci which showed variation in only one collection or pooled collection, and other loci which produced singular matrices were omitted from this analysis.

We were concerned that the low levels of variation at some loci might produce spurious results in the one–way ANOVAs, so we also determined significance levels by generating nonparametrically a distribution of *F*–statistics for each test. Since the hypothesis we tested was that all the groups of collections have the same allelic frequencies, the Monte Carlo process iteratively resampled from a pool of alleles whose frequencies are the weighted average of all the collections. The distribution of *F*–statistics for each locus was made by 1) reconstructing each collection by randomly drawing from the pool for that locus (with replacement) the number of alleles originally observed in each collection, and 2) conducting one–way ANOVA to calculate the *F*–statistic. The process was repeated 2000 times to generate a distribution. The proportion of *F*–statistics generated by the resampling process that exceeded the observed *F*–statistic generally was quite similar to the probability obtained from the *F*–distribution.

We used gene diversity analysis (Chakraborty and Leimar 1987) to partition genetic diversity into components attributable to the average variation observed at a site [H_S/H_T], differences among collections taken from the same site at different times [$G_{IS} = (H_S - H_I)/H_T$], differences among collections within a region [$H_{SR} = (H_R - H_S)/H_T$], and differences among regions [$G_{RT} = (H_T - H_R)/H_T$]. H_I is the average expected heterozygosity of each collection, H_S is the average expected heterozygosity of each sample site, H_R is the average expected heterozygosity within each region, and H_T is the overall average expected heterozygosity. Average allelic frequencies are calculated from unweighted averages of component collections.

RESULTS

Genetic Description of the Collections

We used 23 enzyme–specific stains to obtain data from adult sockeye salmon for 42 protein coding loci. At 14 loci and 2 isoloci, the most abundant allele had a frequency of $\leq$ 0.95 in at least one collection. The loci were *PGM-1**, *PGM-2**, *LDH-B2**, *PEPC**, *ALAT**, *sAAT-3**, *mAAT-1**, *ADA-1**, *LDH-B1**, *EST-D**, *mIDHP-2**, *FBALD-3**, *sAH**, *sIDHP-2**, *sMDH-B1,2**, and *sAAT-1,2**. The frequency of the most abundant allele was between 0.95 and 0.99 in at least one collection at 10 loci and 2 isoloci: *G3PDH-1**, *PEPLT**, *GPI-A**, *PEPD2**, *mAH-3**, *mAH-4**, *LDH-C**, *sSOD**, *PMI**, *mMEP-1**, *GPI-B1,2**, and *sMDH-A1,2**. At *FDHG** and *mIDHP-1**, the most abundant allele had a frequency < 0.99 in at least one collection (Appendix 1). The loci *PEPA**, *sIDHP-1**, *ADA-2**, *mMEP-2**, *PGDH**, and *αMAN** were monomorphic (Appendix 2).

Pooling Adult Collections for Analyses

Tissues were collected from spawning populations in nearly every fishing district in Southeast Alaska. Southern Southeast Alaska (Districts 101, 102, and 103) and the Taku River and Juneau area (District 111) were especially well represented. Out of 361 tests possible for the collections, 10 did not conform to Hardy–Weinberg expectations ($P > 0.05$), which is less than the number of departure one would expect for that many tests.

In some locations, collections were taken in several years, or at several times in the same year. Collections from the same location that were not heterogeneous (G–test) were pooled for subsequent analyses. Pooling was possible for most locations; the exceptions were McDonald Lake [D and E], Karta River [H and I], Salmon Bay [U and V], the Chilkat drainage [t and u], and Yehring Creek [p, q, and r] (Appendix 3). The small heterogeneities observed at single loci for Naha River [F], Upper Sarkar Lake [O], Hugh Smith Lake [A], Kegan Lake [J], Alecks Lake [c], and Shustahini Slough on the lower Taku River [k] are not significant when multiple testing is taken into account (Appendix 3).

Differences in allelic frequencies at *ALAT** are primarily responsible for the heterogeneity observed among McDonald Lake collections ($G = 15.24$, 2 df; $P = 0.004$) and among Karta River collections ($G = 16.63$, 2 df; $P < 0.001$). Allelic frequency differences at *mAAT-1** also contributed to the heterogeneity among McDonald Lake collections ($G = 6.15$; 1 df; $P = 0.013$). Allelic frequencies of *PEPC** differed among Salmon Bay collections ($G = 11.52$, 2 df; $P = 0.003$). For the Yehring Creek collections, allele frequencies at *PGM-1** ($G = 17.40$, 2 df; $P < 0.001$) and *PEPC** ($G = 9.33$, 2 df; $P = 0.009$) differed; these differences may reflect temporal structure within the creek. Differences among the Chilkat Lake and Chilkat River collections were attributable mostly to *PEPC** ($G = 12.68$, 3 df; $P = 0.005$), *LDH-B2** ($G = 23.11$, 3 df; $P << 0.001$), and *ALAT** ($G = 19.2$, 6 df, $P = 0.004$). Although there was heterogeneity between the Chilkat Lake collections mostly from *PEPC** allele frequency differences, we pooled Chilkat Lake collections for subsequent analyses.

The three collections of sockeye salmon from the Taku River lower main stem [j (1)–(2)] were pooled as were the 12 collections from the upper main stem [k (3)–(10)]. After taking multiple testing into account, there was no heterogeneity at sites sampled more than once or among collections included within either of the Taku River main–stem groupings [j or k].

Taku River Juvenile Sockeye

Between July and September 1986, 20 collections of rearing juvenile sockeye salmon were taken from 15 sites on the Taku River system (Table 2; Fig. 3): Tatsemenie Lake, 11 lower main–stem sites, and 3 lower main–stem tributaries. Because many of the collections sampled from the main stem were quite small, we pooled them into a single group. The adult main–stem collections were also quite similar to each other. Allozyme data were obtained for *PGM-1**, *PGM-2**, *LDH-B2**, *sIDHP-2**, *PEPC**, *ALAT**, *sAAT-3**, *sAAT-1,2**, *mAAT-1**, *sIDHP-1**, and *PEPA** (Appendix 4).

Three collections of juveniles came from sites at which adult fish had also been sampled. The log-likelihood ratio comparison between allelic frequencies observed for small collections of juveniles and adults from Fish Creek showed no heterogeneity ($P = 0.32$). However, there was heterogeneity between the juvenile and adult collections from Tatsemenie Lake ($P = 0.010$) which was attributable primarily to *ALAT** ($P < 0.001$). The differences observed indicate that there is further genetic structure within Tatsemenie Lake (Appendix 5).

Comparisons among the Yehring Creek adult and juvenile collections also indicated heterogeneity ($P = 0.012$); the heterogeneity was primarily attributable to the adult Yehring Creek collections (Appendix 3). Pairwise comparisons between the juvenile samples and each of the three adult run segments showed no heterogeneity; and, taking multiple testing into consideration, no single locus shows heterogeneity. This kind of result might be expected if the collection of juveniles were composed of offspring from all three segments.

To determine whether the juveniles collected in the lower Taku River originated from lower river populations or were aggregations of many populations, we examined the heterogeneity among main-stem collections [BB] and between these collections and the adult main-stem collections [j and k]. We also tested for heterogeneity among collections from tributaries to the lower Taku River (Appendix 6). In contrast to the adult collections, the juvenile collections from the lower main stem were heterogeneous (G = 105.95, 64 df; $P < 0.001$). Surprisingly, there was no overall significant difference between the adults and juveniles (G = 10.03, 7 df; P = 0.187). There was no heterogeneity between the collections of juveniles from tributaries to the lower Taku, or between juveniles and adults from the tributaries. Because heterogeneity was observed among the juvenile collections from the lower river but no heterogeneity was observed among adult samples from the same area, the origin of the juvenile collections is in doubt. Therefore, the data from juveniles were not used in any other analysis.

Descriptive Analysis

The first examination of these genetic data involves descriptive procedures, specifically, principal component analysis and construction of unrooted trees (or clustering) of collections using genetic distance estimations. Subsequently, we subjected the data to statistical analyses, which included the G–test and ANOVA, to elicit commonalities of genetically similar collections.

Principal component analysis and estimation of genetic distances require data from every collection for every locus used. Because the number of loci for which we obtained data varies among collections, we performed the analyses twice, once maximizing the geographic range of sampling and once maximizing the number of loci used. In maximizing the number of loci, we used 31 loci for which data were available in 25 collections or collection pools; 21 were variable and used in the principal component analysis. To maximize the geographic representation, we used data from 47 collections (or collection pools) that had data for 8 loci; the 6 variable loci were used in the principal component analysis (Appendix 1).

The level of resolution appears to be higher when more loci are used. In plots of the first two principal components from the analysis that used transformed frequencies of the common alleles of 21 variable loci, the collections from Prince of Wales Island are distinct from two other southern Southeast Alaska collections and from collections from northern Southeast Alaska and the Taku River drainage (Fig. 4). Other areas are not well represented in this analysis. The first two components account for 19.2% and 13.0% of the total variation; but most of the separation is along the axis of the first principal component to which *ALAT**, *LDH–B2**, and *sAAT–3** are the largest contributors. *GPI–A** and *MDH–B1** are the largest contributors to the second principal component, which separates the Hugh Smith Lake [A] and McDonald Lake [E] collections from the rest.

Geographically defined groups are not as easily distinguishable using a smaller number of loci. From plots using the first and second principal components of the transformed allelic frequencies of alleles, it appears that northern mainland collections extending from the Chilkat River to the Stikine River are reasonably distinct from most other Southeast Alaska collections (Fig. 5). Two southern Southeast Alaska groups, collections from the southwestern islands (including Kuiu and Prince of Wales Islands) and other collections from southern Southeast Alaska (including Revillagigedo Island) are evident, but they overlap to some degree. As with the previous analysis, these separations are primarily along the axis of the first principal component. The heaviest weightings for the first component are alleles *LDH–B2*100*, *LDH–B2*115*, *ALAT*100*, *PGM–2*100*, *ALAT*95*, and *PGM–1*100*; the loci *LDH–B2** and *ALAT** were important factors in the previous analysis. The *PGM–2** and *PGM–1** alleles had the heaviest weightings for the second component; however, the second component contributed little to resolution among the groups. Three northern mainland collections that differ from other northern collections are Turner Lake [o], Steep Creek [i], and Auke Creek [e]. These three systems are small and may have been affected by random drift. Turner Lake is landlocked (kokanee) and does not cluster near other northern collections in any of the analyses.

Unrooted trees constructed by neighbor-joining (Saitou and Nei 1987) had topologies that also suggested a geographic basis for the genetic structure of Southeast Alaska sockeye populations. In the tree constructed using 31 loci, collections from northern Southeast Alaska are generally separated from collections from Prince of Wales Island; but the Hugh Smith Lake [A] and McDonald Lake [E] collections from southern Southeast Alaska, the Chilkat Lake collection [u] from northern Southeast Alaska, and Upper Sarkar Lake on Prince of Wales Island [O] are not clearly separated (Fig. 6). The three inland collections on the transmountain rivers (Little Trapper Lake [n] and Tatsemenie Lake [m] of the Taku drainage and Tahltan Lake [a] of the Stikine drainage) cluster on the same branch.

The unrooted neighbor-joining tree constructed using eight loci generally shows the same groupings as the principal component analysis: northern Southeast Alaska [a–u and W–Z], Prince of Wales Island [G–V], and other southern Southeast Alaska collections [A–F] (Fig. 7). However, separation of these groups using data from eight loci is imperfect. One similarity between this tree and the principal component analysis (Fig. 5) is the divergence from the other northern Southeast Alaska group of the four Juneau-area collections (Auke Creek [e], Steep Creek [i], Windfall Lake [h], and Turner Lake [o]). As in the 31-loci tree (Fig. 6), the interior collections (Little Trapper Lake [n], Tatsemenie Lake [m], and Tahltan Lake [a]) clustered on one branch.

Analysis of Geographic Structure

Both principal component analysis and neighbor-joining trees suggest a geographic basis for some of the genetic variation observed among Southeast Alaska sockeye collections. We used log-likelihood ratio (G-test) analysis and analysis of variance to partition the variation observed within and among collections and among aggregations of collections to test for the significance of geographic structure. The first geographic grouping of collections we examined was defined by Alaska Department of Fish and Game statistical districts. Our collections included 11 of 15 geographically defined districts in Southeast Alaska and two districts near Yakutat (Figs. 1,2; Table 1), although data for some variable loci were not available for some districts. Comparison of heterogeneity (G-value) among collections within districts to the heterogeneity among districts showed significant heterogeneity both within and among districts (Appendix 7) at all five testable loci. Approximate F-statistics

$$(G_{among}/df_{among})/(G_{within}/df_{within})$$

indicate relatively more heterogeneity among districts than within at four of five loci examined and for the totals ($F_{69,175} = 2.177$; $P << 0.001$). This analysis divides the collections into a relatively large number of groups; only 8 of the 13 districts had two or more collections from which to obtain within-district variation. As a result, the among-district variation is influenced by the overall divergence among collections.

The MANOVA (Wilkinson 1990) of arcsine-square root-transformed allelic frequencies within and among districts also showed a significant effect of district. We conducted the analysis on the set of 46 anadromous collections (13 districts) using 6 variable loci and on the set of 24 anadromous collections (10 districts) for 12 loci and 2 isoloci. Omitted from the latter analysis were *sIDHP-2**, *ADA-1**, *FDHG**, *PEPLT**, *MDH-A1,2**, *mMEP-1**, and *GPI-B1,2**, because they were not variable in more than one system or because they produced singularities. In the analysis, which maximizes collections, there was a significant multivariate effect of district (Wilks' $\lambda = 0.028$, $F_{72,158} = 2.035$; $P << 0.001$). Univariate *F*-tests for three of the six loci (*PGM-1**, *PGM-2**, and *ALAT**) were significant ($P < 0.05$).

The 24-collection set included 10 of the districts. The MANOVA for these data was also significant (Wilks' $\lambda = 0.0000$, $F_{126,22} = 1.961$; $P = 0.035$). Of the 14 loci, 8 had significant (based on the resampling analysis) univariate *F*-tests: *PGM-1**, *PGM-2**, *sAAT-3**, *GPI-A**, and *ESTD** ($P < 0.05$) and *ALAT**, *MDH-B1,2**, and *LDH-B1** ($P < 0.01$).

The descriptive analyses suggested a geographic division among the southwestern island collections, the southern inside waters collections, and the northern mainland collections. We grouped collections on this basis for MANOVA; the Petersburg [W] and Thoms [X] lakes collections were included with the southern islands, the single Chichagof Island collection [s] was retained as a fourth group, and the Yakutat collections [w and x] as a fifth group. We excluded the nonanadromous Turner Lake collection [o]. The analysis of the 46-collection data set was significant, (Wilks' $\lambda = 0.243$, $F_{24,126} = 2.66$; $P < 0.001$), and four of the six loci had significant univariate *F*-tests ($P < 0.01$ for *PGM-1**, *PGM-2**, and *LDH-B2** and $P < 0.05$ for *ALAT**). The MANOVA of 24 collections using 20 loci (*sIDHP-2**, *ADA-1**, *FDHG**, and *MEP-1** were omitted) was highly significant (Wilks' $\lambda = 0.000001$, $F_{68,14} = 7.011$; $P = 0.0001$). Eight of the loci had significant univariate *F*-tests ($P << 0.001$ for *MDH-B1,2**, *PGI-A**, *LDH-B1**, and *EST-D**; $P < 0.001$ for *ALAT**; and $P < 0.05$ for *PGM-1**, *mAAT-1**, and *MDH-A1,2**). The Monte Carlo analysis confirmed that those loci were significant except for *PGM-1** ($P = 0.062$).

Entry Route

Because it seems more likely that fish will stray into systems along their migration routes than into other systems, we considered the entrance corridor through which migrating salmon return to their natal streams as a factor affecting genetic structure.

The major spawning corridors are through Cross Sound, northern Chatham Strait and Sumner Strait, and Dixon Entrance. Also, some of the fish return directly to the Yakutat area and to western Prince of Wales Island. We used *G*-tests to partition the genetic variation at five variable loci into the variation among collections that use a particular corridor and the variation that occurs among the corridors (Appendix 8). The kokanee collection (Turner Lake) was not used in the analysis. Substantial heterogeneity was observed at nearly every level for all loci included. The total heterogeneity observed among collections within a grouping was highly significant ($G = 4546.46$, 208 df; $P << 0.001$) as was the total among entries ($G = 1064.58$, 36 df; $P << 0.001$). However, approximate *F*-statistics comparing the heterogeneity within and among entry routes was not significant for any locus used ($P > 0.05$) nor was it significant for the totals ($F_{36,2} = 1.35$; $P = 0.10$).

In contrast, the MANOVA of the data set that maximized the number of collections and maximized the number of loci was significant ($P < 0.05$), indicating that the entry route may have a significant influence on the allelic frequencies. Only *PGM-1** was significant in the analysis that maximized collections ($F_{4,41} = 3.748$; $P = 0.011$); whereas in the analysis that maximized loci (*sIDHP-2**, *ADA-1**, *FDHG**, and *mMEP-1** were omitted from the analysis), the significant one-way ANOVAs were for *MDH-A1,2**, *GPI-A**, and *EST-D**. These loci were also significant in the tests for geographic structure.

Effect of Rearing Habitat on Genetic Structure

Ecological factors may also contribute to similarities among different populations. For sockeye salmon, freshwater habitat is a factor of interest because it affects selection or population size. We tested for the effect of freshwater habitat on the genetic composition of populations by comparing collections sampled from small lakes (less than 250 hectares), medium lakes (300–500 hectares), large lakes (more than 650 hectares), and rivers. The MANOVA of the maximum number of collections was not significant (Wilks' $\lambda = 0.552$, $F_{18,105} = 1.36$; $P = 0.165$), and only the univariate test for *PGM-2** was significant ($F_{3,42}$ 5.087; $P = 0.004$). A planned pairwise comparison for *PGM-2** indicated that the group of collections from medium-sized lakes differed from the other groups and had a mean allelic frequency of 0.87 as compared to 0.70, 0.79, and 0.81 for the small-lake, the large-lake, and river collections, respectively.

The MANOVA for the test that maximized loci (*sIDHP-2**, *FDHG**, and *mMEP-1** were omitted) was not significant (Wilks' $\lambda = 0.006526$, $F_{54,9} = 0.897$; $P = 0.717$), and univariate F-tests were not significant ($P < 0.10$) for this smaller number of collections. The G-test produced similar results (Appendix 9).

We further examined the effect of freshwater rearing habitat on the genetic structure of populations by testing the effect of habitat type on the average unbiased heterozygosity (Nei 1978) of a collection. ANOVA did not indicate an effect of size in either the data set that maximized collections ($F_{3,42} = 0.52$; $P = 0.70$) or the set that maximized loci ($F_{3,20} = 0.50$; $P = 0.69$).

In contrast, geographic structure had significant effects on average heterozygosity in both the 8-locus ($F_{4,41} = 4.41$; $P = 0.005$) and the 31-locus ($F_{4,19} = 3.67$; $P = 0.22$) data sets. Tests involving entry corridor were not significant ($P > 0.30$). Analysis of heterozygosities and arcsine-square root-transformed heterozygosities had similar results.

Gene Diversity Analysis

We performed gene diversity analyses that included the anadromous collections and that included only the Taku River collections. We did two analyses for each, one that used the sets of data that maximized the number of collections and one that used the sets of data that maximized the number of loci. We used the five geographic areas observed from the principal component analysis to estimate the proportion of variation attributable to three levels of hierarchy: within collections (H_S/H_T), among collections within regions (G_{SR}), and among regions (G_{RT}). In the analyses that involved the larger number of collections, we were able to add a level of hierarchy (G_{IS}) that estimated the amount of variability among collections at a site.

In the 31-locus analysis of the Southeast Alaska anadromous collections, 87.0% of the variation was found on the average within each collection, 8.4% was found among collections within a region, and 4.7% was attributable to differences among regions (Table 6). In the 8-locus analysis, 88.1% of the variation was due to within-collection variation, 8.3% to differences among collections within a region, and 2.5% to average regional differences. Variability among collections at a sample site accounted for 1.2% of the total. The results of the two analyses were similar, in part because the six variable loci used in the analysis that maximized the number of collections accounted for a large portion of the variability observed.

For the analysis of collections from the Taku River system, we made the highest level of hierarchy the separation of lower river main-stem and upper river lake populations. We estimated the average proportion of variability that occurs within each collection site, among populations in the lower and upper river areas, and between the river areas. In the 31-locus analysis, 95.7% of the variation is found on the average within each collection. The average divergence among collections within the upper and lower areas accounted for 2.7% of the variability, and the differences between the upper and lower collections accounted for 1.6%. These results are similar to those from the 8–locus analysis, from which we also estimated that the variation among collections at a sample site accounted for 1.5% of the total variation (Table 7).

DISCUSSION

We observed substantial divergence among collections from Southeast Alaska sockeye salmon populations, which is consistent with the accurate homing of sockeye salmon observed by Quinn et al. (1987). Gene diversity analysis shows that approximately 8.3% of the variation is attributable to differences among populations within a geographically defined region. This level of divergence corresponds (from Wright's (1943) island model for gene flow) to an exchange between populations of approximately 2–3 individuals ($N_e m$) per generation. One thousand fish would be a conservative estimate of average effective population sizes (N_e), even for the small lake systems in Southeast Alaska if a generation time > 4 years is taken into account (Waples 1989). An estimate of migration rate (m) from these values is less than 0.003 and comparable to the rates estimated for some sockeye salmon populations of British Columbia (Quinn et al. 1987).

We also observed geographic structure superimposed on the genetic divergence at the population level. Only 2.5–4.7% of the total variability was attributable to regional differences as compared to approximately 8.3% which was observed on the average among populations within regions. However, every analysis we conducted supported an underlying geographic basis for the genetic variability we observed among Southeast Alaska sockeye salmon populations. Moreover, tests for the effect of rearing habitat type were not significant, as was also demonstrated for sockeye populations of the Stikine River (Wood et al. 1987). Divergence among local populations with an underlying geographic structure also occurs among sockeye salmon populations in the major drainages of Cook Inlet, Alaska (Grant et al. 1980).

The major regions we identified were 1) the northern mainland, 2) the southern mainland and inside waters, and 3) the southern and central islands, notably Prince of Wales Islands. The boundaries of the regions are not sharp. Two other regions, 4) northern coastal and 5) northern island, were designated tentatively because they are represented by only three collections. More extensive sampling and resolution of more variable loci will be necessary to clarify these relationships.

Collection sites in the northern region include the Taku and Stikine Rivers, which are large transmountain river systems that cut through the coastal mountains. Sockeye populations we sampled in the three lake systems near the origins of these rivers have *sAAT–3** variation, which was not seen elsewhere in this study. We also observed substantial variation at *LDH–B2**; variation at this locus was seen only rarely elsewhere. Because the upper reaches of these rivers lie fairly close to each other, it is conceivable that similarities among the three lake systems on the upper reaches of these rivers (Figs. 6,7) resulted from exchange between them, possibly as a result of headwater capture or a blockage of the Taku River by glacial action. Gharrett et al. (1987) suggested a similar exchange between the Taku River and Yukon River as a result of glacial activity such as that reported by Kerr (1948).

Collections from the main stem of the lower Taku River are similar. This area of the river is braided and may change substantially from year to year. As a result, it is likely that the progeny from sockeye that spawn there are often prevented from homing to their natal grounds.

The similarity among collections suggests that this lower area may in effect be one large population. In contrast, we observed heterogeneity among collections from Yehring Creek, a tributary to the lower Taku River. Such heterogeneity would be expected if Yehring Creek fish were not part of the lower main-stem population and there was strong temporal structure in their spawning timing.

Three small populations in the northern mainland group did not cluster well with other northern mainland collections in either the principal components analysis or the neighbor-joining trees. These populations—Steep Creek (a tributary to the Mendenhall River), Windfall Lake, and Auke Creek—are near Juneau, close to the mouth of the Taku River. Between 1919 and 1923, a controversial hatchery superintendent for the Territorial Fish Commission, A. J. Sprague, planted sockeye salmon eggs from Afognak Lake (near Kodiak) in Auke Lake tributaries and in the lower tidal area of the Mendenhall River (Roppel 1982). Although Sprague made numerous transplants during those years, the success of many are doubtful. Moreover, he kept limited records, so it is not possible to determine the effect of his efforts on these stocks. Another one-time transplant was made in 1951 in which the Alaska Department of Fisheries planted eyed sockeye salmon eggs from Lake Creek (an Auke Lake tributary) to streams in the Mendenhall River system (Roppel 1982). Although these transplants may have influenced the genetic compositions of sockeye salmon in Auke Creek and Steep Creek, in particular, there is some question about the immediate survival of the transplanted fish (Roppel 1982). Other recorded transplants in northern Southeast Alaska include movements of eggs from Chilkat Lake to Chilkoot Lake. Our samples from these two lakes (near Haines) were heterogeneous.

As we observed for the transboundary collections, several rare alleles characterized the southern mainland collections. Variation at *GPI-A** and *MDH-B1,2** were seen in several populations of this region, but only occasionally in other locations. In addition to the more variable loci, these loci and *sAAT-3** and *LDH-B2** received heavy weightings in the principal component analysis. The one-way ANOVAs that tested for geographic structure were significant for all these loci. These and other relatively rare alleles should not be overlooked for stock identification purposes. Although they may be relatively infrequent, if they are found in many or all populations of a region, they may prove useful as regional markers.

The collections of juveniles from the lower Taku River were heterogeneous. Although the collections sampled from tributaries resembled the adult collections from the same tributaries, the juveniles sampled from the main stem differed from adult collections in the same area. These kinds of differences could arise as a result of natural selection acting differentially on different life-history stages, but it is more likely that the differences we observed reflect either mixing of genetically divergent spawning populations or unrepresentative sampling of families of juveniles. Regardless, a more thorough sampling effort of juveniles in this area is impractical.

In addition, the collection of juveniles taken from Tatsemenie Lake differed from adults sampled from that lake. This difference suggests additional population structure in that system, which is consistent with the observation that approximately 90% of the adults spawn in the inlet to little Tatsemenie Lake and presumably rear in Little Tatsemenie Lake; and the other 10% pass through Little Tatsemenie Lake to Tatsemenie Lake, where they spawn and rear. Samples of adults and juveniles do not unequivocally represent either of these possible groups. We also observed some heterogeneity between collections of (presumably) the same population that were sampled in different years. Although some variation may be expected between years, especially in small populations (Waples 1989), it is more likely that there is additional population structure in the systems that show such heterogeneity. It is imperative that sampling be done using full knowledge of the existing population structure, especially for sockeye salmon which exhibit genetic divergence even between geographically proximal populations. In many cases in Alaska this will require that field studies supplement genetic sampling. In some instances (e.g. Little Tatsemenie Lake) neither the adult nor the juvenile data may reflect the population structure because sampling was not done using the available knowledge of run structure. Therefore, caution must be exercised when juvenile data are included as baseline data, especially for complex systems in which rearing juveniles may represent a number of genetically isolated spawning populations. Sampling over both time and space should be more extensive for McDonald Lake, Karta River, Salmon Bay Lake, Yehring Creek, Tatsemenie Lake, and Chilkat Lake and River. Lake systems that have multiple inlets or multiple lakes or both lake and stream spawners may support multiple populations (Raleigh 1967; Brannon 1972). If adults are sampled on the spawning grounds, they clearly represent a spawning population; however, much more knowledge must be obtained about the population structure of a drainage before it can be presumed that a sample of juveniles represents a spawning population.

The geographic structure we observed may be explained in a number of ways. The most obvious explanation is that straying occurs more often among geographically proximal populations. A related explanation involves the colonization of the entire region. If the colonization of systems in the region happened about the same time, it is reasonable to expect that it occurred from the same source. Otherwise, the colonizers of a particular system probably came from nearby populations. Another explanation is that the populations evolved in parallel as a result of similar selection regimes. The local climates of these regions are noticeably different. The winters are harsher to the northeast and milder to the southwest. The topography also differs among those regions.

RECOMMENDATIONS

1. Perform a broad-based screen of electrophoretically detectable loci and buffers which resolve variability; sockeye salmon populations from all major geographic regions would be sampled. Although it may not be possible to screen a large enough number of samples to observe all the variation present, it should be possible to detect regional variation.
2. Many of the systems sampled may have multiple, genetically isolated populations. It is essential for baseline purposes to sample those drainage systems more thoroughly. In order to assess the usefulness of genetic differences among populations for stock-identification applications, it is imperative to know the extent of local (within-drainage) divergence.
3. Exercise caution in using juvenile sockeye salmon for developing baseline information. Even within a drainage there may be genetically isolated populations. This means that in a complex system, the sample of juveniles may be an admixture of stocks. This is not the quality of data required for stock-separation applications.

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TABLES

Table 1.—Group designation (letters correspond to spawning areas listed in Figs. 1, 3–6 and appendices 1–3), location, collection date, and number of sockeye salmon (*N*), used for electrophoretic analysis. Districts are Alaska Department of Fish and Game statistical areas.

Group desig.	Location	Date	*N*	Group *N*
	District 101			
	Boca de Quadra			
A.	Hugh Smith Lake (pooled)			206
	Hugh Smith Lake	1982	50[a]	
	Hugh Smith Lake	7/28-8/19/83	96[a]	
	Hugh Smith Lake	7/11/86	10	
	Hugh Smith Lake	9/14/88	50	
	George Inlet			
B.	Leask Lake	7/18/86	25[b]	25
	Western Behm Canal			
C.	Helm Lake (pooled)			100
	Helm Lake	1983	50[a]	
	Helm Lake	9/23/86	10	
	Helm Lake	9/23/86	40[a]	
D.	McDonald Lake (i) (pooled)			156
	McDonald Lake	1982	50[a]	
	McDonald Lake	8/21,22,30/87	106	
E.	McDonald Lake (ii) (pooled)			152
	McDonald Lake	1983	100[a]	
	McDonald Lake	9/88	52	
F.	Naha River (pooled)			284
	Naha River	7/24-8/10/83	104[a]	
	Naha River, early	1984	50[a]	
	Naha River, late	8/30/84	50[a]	
	Naha River	6/29-8/09/86	40	
	Naha River	7/05-8/18/86	40[a]	
	District 102			
	Eastern Prince of Wales Island			
G.	Johnson Lake	8/13/83	79[a]	79
H.	Karta River (i) (pooled)			150
	Karta River	7/21/82	50[a]	
	Karta River	7/23-31/83	100[a]	
I.	Karta River (ii)	8/23/88	52	52

Table 1.—Continued.

Group desig.	Location	Date	N	Group N
J.	Kegan Lake (pooled)			287
	Kegan Lake	7/22-24/82	100[a]	
	Kegan Lake	7/23-24/83	100[a]	
	Kegan Lake	9/29/86	37	
	Kegan Lake	9/20/88	50	
	District 103 Western Prince of Wales Island			
K.	Chuck Lake			132
	Chuck Lake	8/16/83	100[a]	
	Chuck Lake	9/22/86	32	
L.	Hetta Lake	9/09/86	49	49
M.	Klakas Lake			159
	Klakas Lake	8/04/83	99[a]	
	Klakas Lake	9/22/88	60	
N.	Klawock Lake			148
	Klawock Lake	9/18/86	48	
	Klawock Lake	9/87	50	
	Klawock Lake	9/25/88	50	
O.	Upper Sarkar Lake (pooled)			121
	Upper Sarkar Lake	9/24/86	36	
	Upper Sarkar Lake	9/15/87	42	
	Upper Sarkar Lake	9/26/88	43	
	District 105 Northern Prince of Wales Island			
P.	Shipley Creek	10/05/83	50[a]	50
Q.	Sutter Creek	9/14/86	19[b]	19
	District 106 Northeastern Prince of Wales Island			
R.	Galea Lake	9/11/88	54	54
S.	Luck Lake (pooled)			214
	Luck Lake	9/03/83	50[a]	
	Luck Lake	8/31/86	10	
	Luck Lake	9/17/86	40[a]	
	Luck Lake	9/87	50	
	Luck Lake	8/31/88	64	

Table 1.—Continued.

Group desig.	Location	Date	N	Group N
T.	Red Bay Lake (pooled)			123
	Red Bay Lake	9/03/83	70[a]	
	Red Bay Lake	8/27/86	13	
	Red Bay Lake	8/27/86	40[a]	
U.	Salmon Bay Lake	7/26-27/82	69[a]	69
V.	Salmon Bay Lake (pooled)			127
	Salmon Bay Lake	8/09/83	76[a]	
	Salmon Bay Lake	9/8,26/86	51	
	Kupreanoff Island			
W.	Petersburg Lake	8/21/86	50	50
	District 107			
	Western Wrangell Island			
X.	Thoms Lake (pooled)			185
	Thoms Lake	1983	75[a]	
	Thoms Lake	9/08/86	50	
	Thoms Lake	9/10/87	60	
	District 108			
	Stikine River drainage			
Y.	Chutine Lake	9/86	64	64
Z.	Chutine River	9/86	50	50
a.	Tahltan Lake	9/24/90	100	100
b.	Stikine River	9/86	50	50
	District 109			
	Kuiu Island			
c.	Alecks Lake (pooled)			104
	Alecks Lake	9/03/86	50	
	Alecks Lake	9/01/87	54	
d.	Kutlaku Lake	9/05/86	50	50
	District 111			
	North of Juneau			
e.	Auke Creek (pooled)			126
	Auke Creek	9/86	12	
	Auke Creek	8/10/88	114	

Table 1.—Continued.

Group desig.	Location	Date	N	Group N
	Eastern Stephens Passage-Port Snettisham			
f.	Crescent Lake	7/28/83	100[a]	100
g.	Speel Lake	7/29/83	100[a]	100
	Herbert River drainage			
h.	Windfall Lake	8/18/89	73	73
	Mendenhall River drainage			
i.	Steep Creek (pooled)			81
	Steep Creek	8/15/86	18	
	Steep Creek	8/23/88	53	
	Steep Creek	8/02/89	10	
	Taku River drainage			
j.	Lower main stem (pooled)			80
	Fish Creek	9/30/86	20	
	South Fork Slough	9/25/86	40[a]	
	South Fork Slough	9/27/89	20	
k.	Upper main stem (pooled)			421
	Chuunk Mountain Slough	9/20/89	10	
	Coffee Slough	9/24/86	37	
	Coffee Slough	10/01/87	33	
	Honakta Slough	9/17,20/86	40[a]	
	Nakina River	7/20/86	51	
	Shustahini Creek	9/18/86	40[a]	
	Shustahini Creek	9/24/87	60	
	Shustahini Creek	9/25/86	35	
	Takwahoni Slough	9/19/86	20	
	Tuskwa Slough	9/24/86	40[a]	
	Tuskwa Slough	9/24/87	37	
	Yonakina Slough	1989	18	
m.	Little Tatsemenie Lake	9/21/90	67	67
n.	Little Trapper Lake	9/21/90	100	100
o.	Turner L. (kokanee)	1988	89	89
p.	Yehring Creek, early (pooled)			108
	Yehring Creek	8/29,9/15/86	22	
	Yehring Creek	9/11,9/13/86	49	
	Yehring Creek	1987	7	
	Yehring Creek	9/18/89	30	

Table 1.—Continued.

Group desig.	Location	Date	N	Group N
q.	Yehring Creek, middle (pooled)			50
	Yehring Creek	9/30,10/1/86	40	
	Yehring Creek	10/01/89	10	
r.	Yehring Creek, late	10/13/89	60	60
	District 113			
	Southern Chichagof Island			
s.	Sitkoh Lake (pooled)			197
	Sitkoh Lake	9/11/84	97[a]	
	Sitkoh Lake	9/26/87	100	
	District 115			
	Chilkat River drainage			
t.	Chilkat River	10/23/83	100[a]	100
u.	Chilkat Lake (pooled)			245
	Chilkat Lake, early	8/03/83	100[a]	
	Chilkat Lake, late	9/29/83	100[a]	
	Chilkat Lake, late	9/21,22/90	45	
	Chilkoot River drainage			
v.	Chilkoot River (pooled)			136
	Chilkoot River	7/29/83	96[a]	
	Chilkoot River	8/25/90	40	
	District 181			
	Alsek River drainage			
w.	East Alsek River	10/14/87	50	50
	Situk River drainage			
x.	Situk River	1984	98[a]	98

[a]Samples analyzed at NMFS, NWFSC, CZES genetics lab in Seattle, WA.
[b]Collections not used in any analysis.

Table 2.—Group designation (letters correspond to rearing areas listed in Fig. 2 and in Appendices 4–6), location, date of collection, and number of Taku River juvenile sockeye salmon (*N*) used for electrophoretic analysis.

Group desig.	Location	Date	*N*
AA.	Little Tatsemenie Lake	1986	88
BB.	Taku River, main stem		
	(1) Backwater, early	08/05/86	38
	(2) Backwater, late	09/04/86	29
	(3) Braided flow	09/02/86	36
	(4) Canyon Island, braided flow	08/28/86	38
	(5) Channel edge	08/08,06,27/86	53
	(6) Moose Creek Slough	08/07/86	53
	(7) Side slough, early	07/21,31,8/04/86	68
	(8) Side slough, late	09/09/86	53
	(9) Tributary mouth	08/28/86	51
	(10) Upper main channel	09/25/86	33
	(11) Yellow Bluff	09/25/86	52
	Total		504
CC.	Fish Creek, beaver ponds	08/27/86	46
DD.	Sockeye Creek, beaver pond	07/29,8/13/86	40
EE.	Yehring Creek	09/18/86	50

Table 3.—Buffer systems used for electrophoresis of Southeast Alaska and northern British Columbia sockeye salmon samples.

R	gel buffer pH 8.5 0.030 M tris(hydroxymethyl)amino methane (TRIS) 0.005 M citric acid electrode buffer pH 8.1 0.060 M lithium hydroxide 0.300 M boric acid Gels are made with a dilution of 10% gel buffer and 1% electrode buffer. (Ridgway et al. 1970).
CA6.1, CA6.5, and CA7	electrode buffer pH 6.1, 6.5, or 7.0 0.040 M citric acid adjusted to desired pH with N–(3–aminopropyl)–morpholine. Gels are made from a dilution of 5% electrode buffer. (Clayton and Tretiak 1972).
CAME7.2	(Modified from CA7 buffer) electrode buffer pH 7.2 0.040 M citric acid 0.010 M disodium ethylenediaminetetraacetate (EDTA) adjusted to desired pH with N–(3–aminopropyl)–morpholine. Gels are made from a dilution of 5% electrode buffer. (Aebersold et. al. 1987).
MF	stock solution pH 8.7 0.450 M tris(hydroxymethyl)amino methane (TRIS) 0.250 M boric acid 0.010 M disodium ethylenediaminetetraacetate (EDTA) Gels are made from a dilution that is 10% of stock. Electrode buffer is a dilution that is 40% of stock. (Markert and Faulhaber 1965).
TC–4	electrode buffer pH 5.8 0.223 M tris(hydroxymethyl)amino methane (TRIS) 0.086 M citric acid titrate with 10 M sodium hydroxide. Gels are made from a dilution that is 3.64% of electrode buffer. (buffer "a" of Schaal and Anderson 1974).

Table 4.—Enzymes screened, their International Union of Biochemistry (IUBNC 1984) enzyme commission (EC) numbers and abbreviations. Peptidases are designated according to their substrate specificity.

Enzyme	EC Number	Abbreviation
Aconitate hydratase	4.2.1.3	AH
Adenosine deaminase	3.5.4.4	ADA
Alanine aminotransferase	2.6.1.2	ALAT
Aspartate aminotransferase	2.6.1.1	AAT
Diaphorase	1.8.1.4	DIA
Esterase-D	3.1.1.*	ESTD
Fructose-biphosphate aldolase	4.1.1.13	FBALD
Glucosephosphate isomerase	1.1.1.8	GPI
α-Glucosidase	3.2.1.20	αGLU
Glycerol-3-phosphate dehydrogenase	1.1.1.8	G3PDH
Formaldehyde dehydrogenase (glutathione)	1.2.1.1	FDHG
Isocitrate dehydrogenase	1.1.1.42	IDH
Lactate dehydrogenase	1.1.1.27	LDH
Malate dehydrogenase	1.1.1.37	MDH
Malic Enzyme	1.1.1.40	ME
Mannose-6-phosphate isomerase	5.3.1.8	MPI
α-Mannosidase	3.2.1.24	αMAN
Peptidase	3.4.*.*	
glycyl-leucine activity		PEP(A,C)
leucyl-tyrosine activity		PEP(LT)
phenylalanyl-proline activity		PEP(D)
Phosphoglucomutase	5.4.2.2	PGM
6-Phosphogluconate dehydrogenase	1.1.1.44	PGDH
Superoxide dismutase	1.15.1.1	SOD

Table 5.—Protein-coding loci (Shaklee et. al. 1990) for enzymes resolved in this study and the tissues and buffer in which they were resolved. Peptidase loci are designated according to their substrate specificity. The buffers are designated by the acronyms in Table 4. L = liver, H = heart, M = muscle, E = eye.

Enzyme	Locus	Tissue	Buffer	Level of variability[a]
Aconitate hydratase	*mAH-1**	M,H	TC-4, CAME7.2	1,5
	*mAH-2**	M,H	TC-4, CAME7.2	1,5
	*mAH-3**	M,H	TC-4, CAME7.2	4
	*mAH-4**	M,H	TC-4, CAME7.2	4
	*sAH**	L	TC-4, CAME7.2	5
Adenosine deaminase	*ADA-1**[b]	M,H	CA6.1, CA6.5	5
	*ADA-2**[b]	M,H	CA6.1, CA6.5	2
Alanine aminotransferase	*ALAT**[bc]	M,H	MF	5
Aspartate aminotransferase	*mAAT-1**[b]	M,H	CAME7.2, CA6.5	5
	*sAAT-1,2**[b]	M,H	CAME7.2, CA6.5	5
	*sAAT-3**[b]	E	CAME7.2, CA7, R	5
Diaphorase	*DIA**	E	R, CAME7.2	1,5
Esterase-D	*ESTD-D**[b]	M,H	MF, TC-4	5
Fructose-biphosphate aldolase	*FBALD-3**	E	CAME7.2	5
Glucosephosphate isomerase	*GPI-B1,2**[b]	M,H	R	4
	*GPI-A**[b]	M,H,E	R	4
α-Glucosidase	*αGLU**	L	R, CA7	1,5
Glycerol-3-phosphate dehydrogenase	*G3PDH-1**[b]	M,H	TC-4	4

Table 5.—Continued.

Enzyme	Locus	Tissue	Buffer	Level of variability[a]
Formaldehyde dehydrogenase (glutathione)	FDHG*[b]	H	CAME7.2	3
Isocitrate dehydrogenase	mIDHP-1,2*	M,H	CAME7.2	3
	sIDHP-1,2*[bc]	L,E	CA7, CAME7.2	4
Lactate dehydrogenase	LDH-A1,2*	M	R	1,5
	LDH-B1*[b]	M,H,E	R	5
	LDH-B2*[bc]	M,H,L,E	R	5
	LDH-C*	E	R	4
Malate dehydrogenase	sMDH-A1,2*[b]	M,H	CA6.5, MF	4
	sMDH-B1,2*[b]	H,M,L	CA7, CAME7.2	5
Malic enzyme	mMEP-1*[b]	M,H	TC-4	3
	mMEP-2*[b]	M,H	TC-4	2
Mannose-6-phosphate isomerase	MPI*[b]	H	CAME7.2	3
α-Mannosidase	αMAN*	M,H,L,E	R, MF	2
Peptidase				
glycyl-leucine activity	PEPA*[bc]	E	MF	3
	PEPC*[bc]	E	MF	5
leucyl-tyrosine activity	PEPLT*[b]	M,H	R, CA6.1	4
phenylalanyl-proline activity	PEPP2*[b]	M,H,E	MF, CA6.5	4
Phosphoglucomutase	PGM-1*[bc]	H	CA6.5, CAME7.2	5
	PGM-2*[bc]	M,H	CA6.5, CAME7.2	5

Table 5.—Continued.

Enzyme	Locus	Tissue	Buffer	Level of variability[a]
6-Phosphogluconate dehydrogenase	*PGDH**[b]	M,H	CA6.5, CAME7.2	2
Superoxide dismutase	*sSOD**	H,L	MF, TC-4, CA 6.5	5

[a] 1 poor resolution
2 monomorphic
3 rarely variable; most abundant allele > 0.99
4 variable; 0.95 ≤ most abundant allele < 0.99
5 highly variable; most abundant allele < 0.95

[b] locus used in 31-loci data set analysis

[c] locus used in 8-loci data set analysis

Table 6.—Hierarchical gene diversity analysis (Chakraborty and Leimar 1987) of Southeast Alaska sockeye populations. One analysis used data from 31 loci and included 25 collections, the other used 8 loci and included 47 collections. The additional collections in the latter analysis enabled use of an additional level of hierarchy, among collections taken at a sample site.

Source	Relative gene differentiation 8 loci	31 loci
Average within collections	H_I/H_T = 0.8814	H_S/H_T = 0.8696
Average among collections at a sample site	G_{IS} = 0.0126	
Average among sample sites within a region	G_{SR} = 0.0826	G_{SR} = 0.0838
Average among regions	G_{RT} = 0.0247	G_{RT} = 0.0467

Table 7.—Hierarchical gene diversity analysis (Chakraborty and Leimar 1987) of Taku River sockeye populations. One analysis used data from 31 loci and the other used 8 loci. Additional collections in the latter analysis enabled use of an additional level of hierarchy, among collections taken at a sample site.

Source	Relative gene differentiation 8 loci	31 loci
Average within collections	H_I/H_T = 0.9674	H_S/H_T = 0.9568
Average among collections at a sample site	G_{IS} = 0.0154	
Average among sample sites within a region	G_{SR} = 0.0244	G_{SR} = 0.0273
Average among regions	G_{RT} = 0.0082	G_{RT} = 0.0164

FIGURES

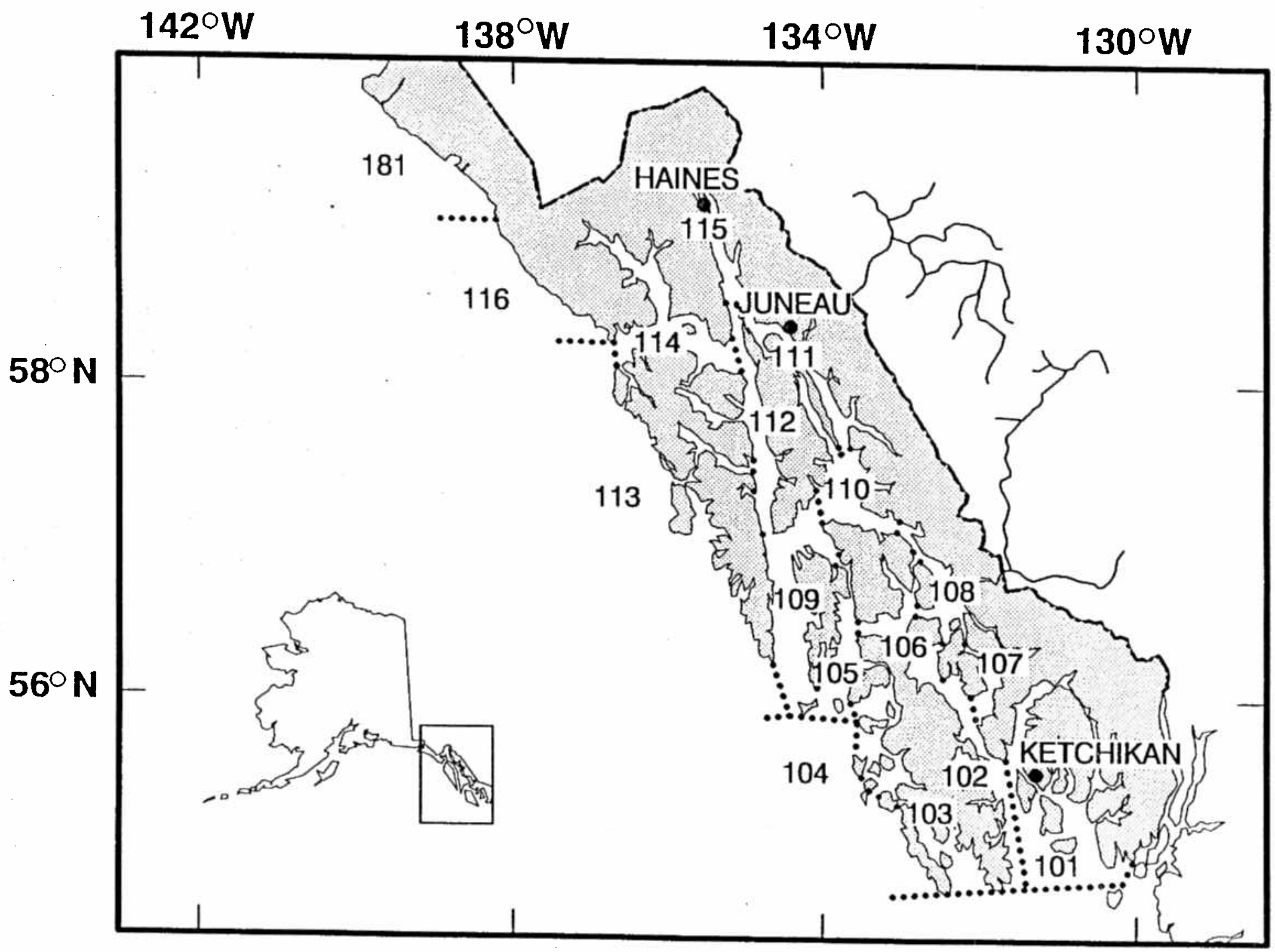

Figure 1.—Alaska Department of Fish and Game statistical fishery districts, designated by three-digit code.

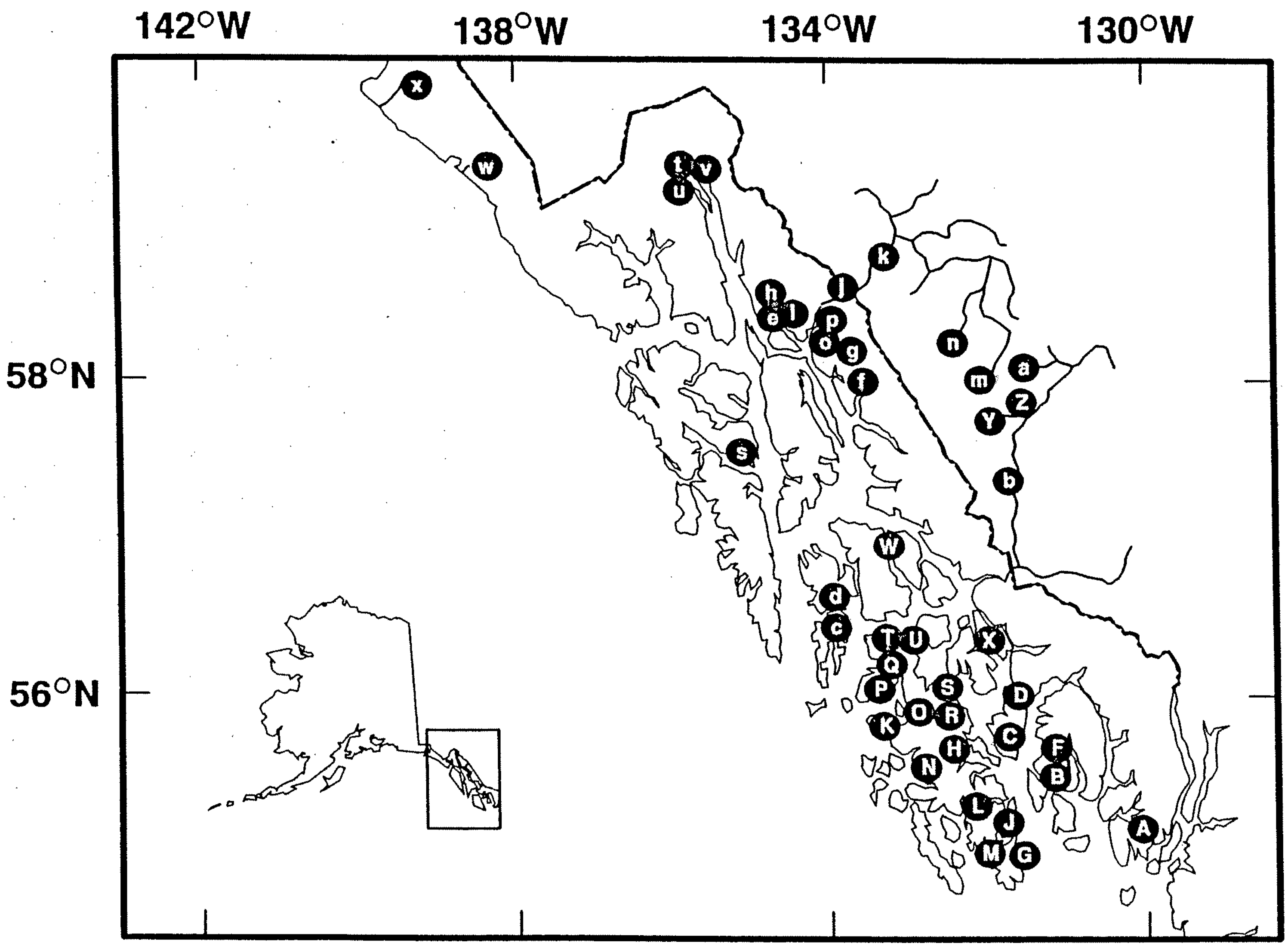

Figure 2.—Sampling sites for sockeye salmon in Southeast Alaska and northern British Columbia. Letters correspond to collection sites listed in Table 1, Figs. 4–7, and Appendices 1–3. Sites with multiple collections are designated by a single letter.

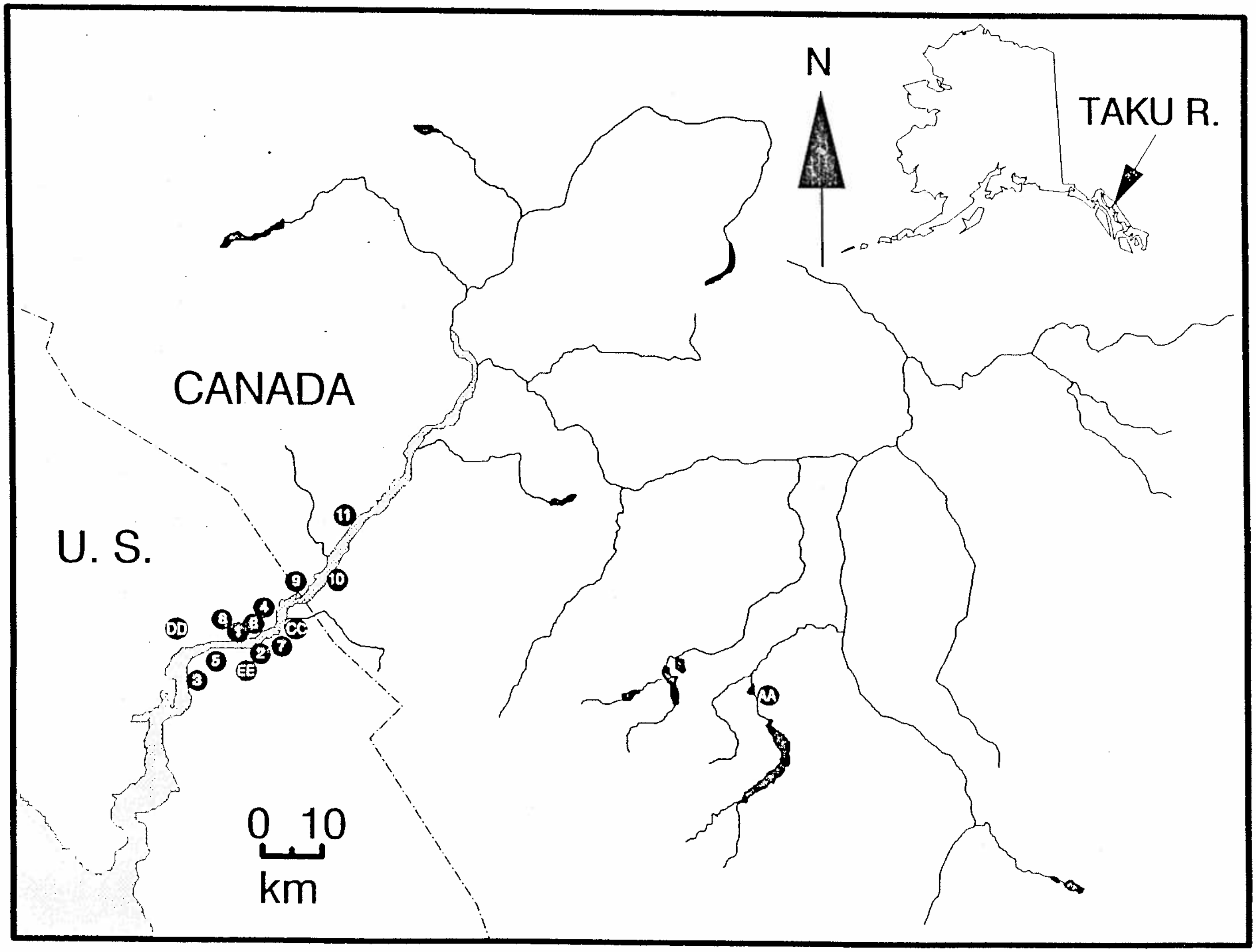

Figure 3.—Sampling sites for juvenile sockeye salmon on the Taku River drainage in Southeast Alaska and northern British Columbia. Letters correspond to collection sites listed in Table 2 and Appendix 4.

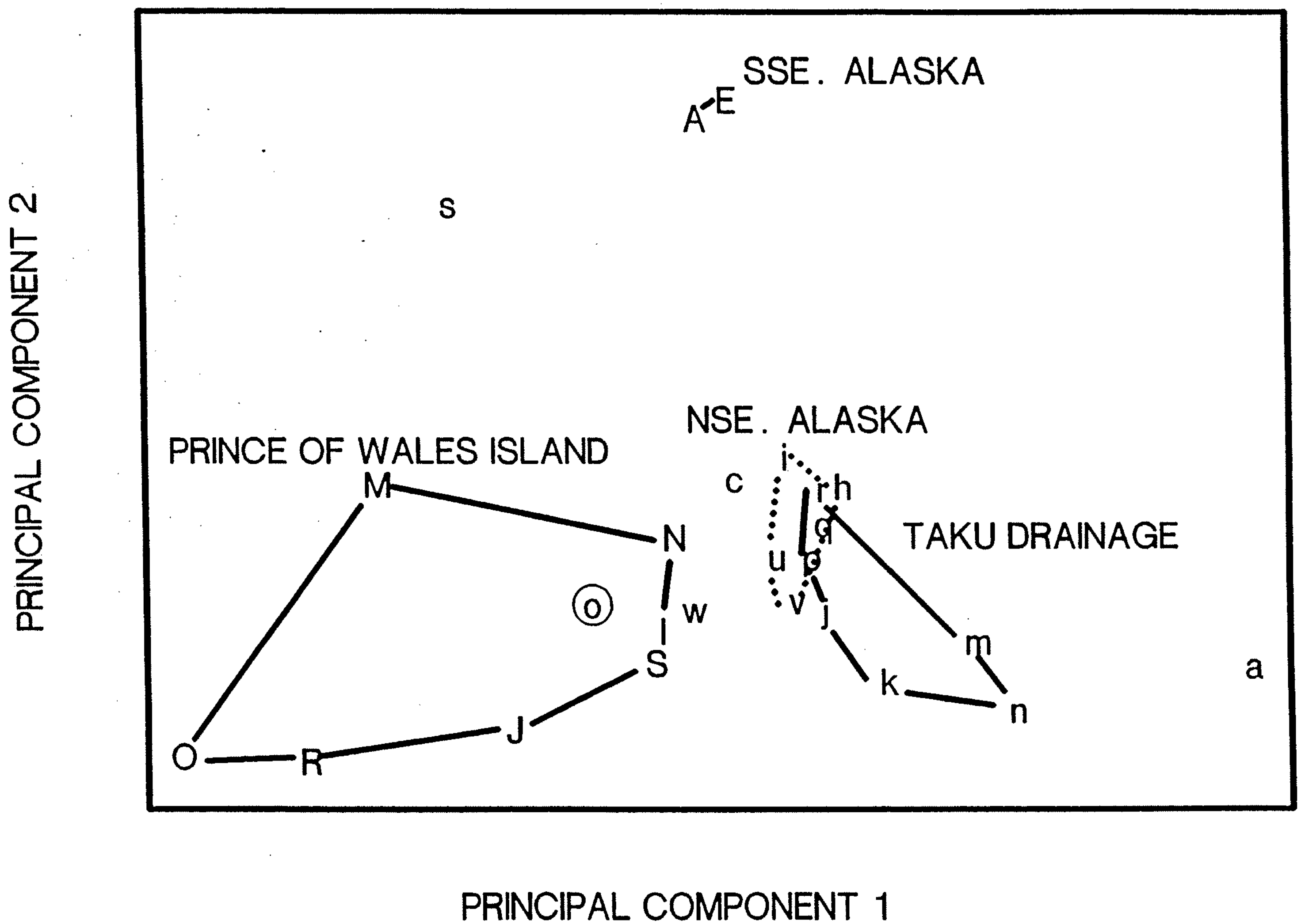

Figure 4.—Principal component analysis of Southeast Alaska and northern British Columbia sockeye salmon for allelic frequency of 21-locus data set. Letters correspond to collection sites listed in Table 1, Figs. 2, 5-7, and Appendices 1-3. Circled letters within aggregations indicate collections not geographically associated with the aggregation. NSE = northern Southeast; SSE = southern Southeast.

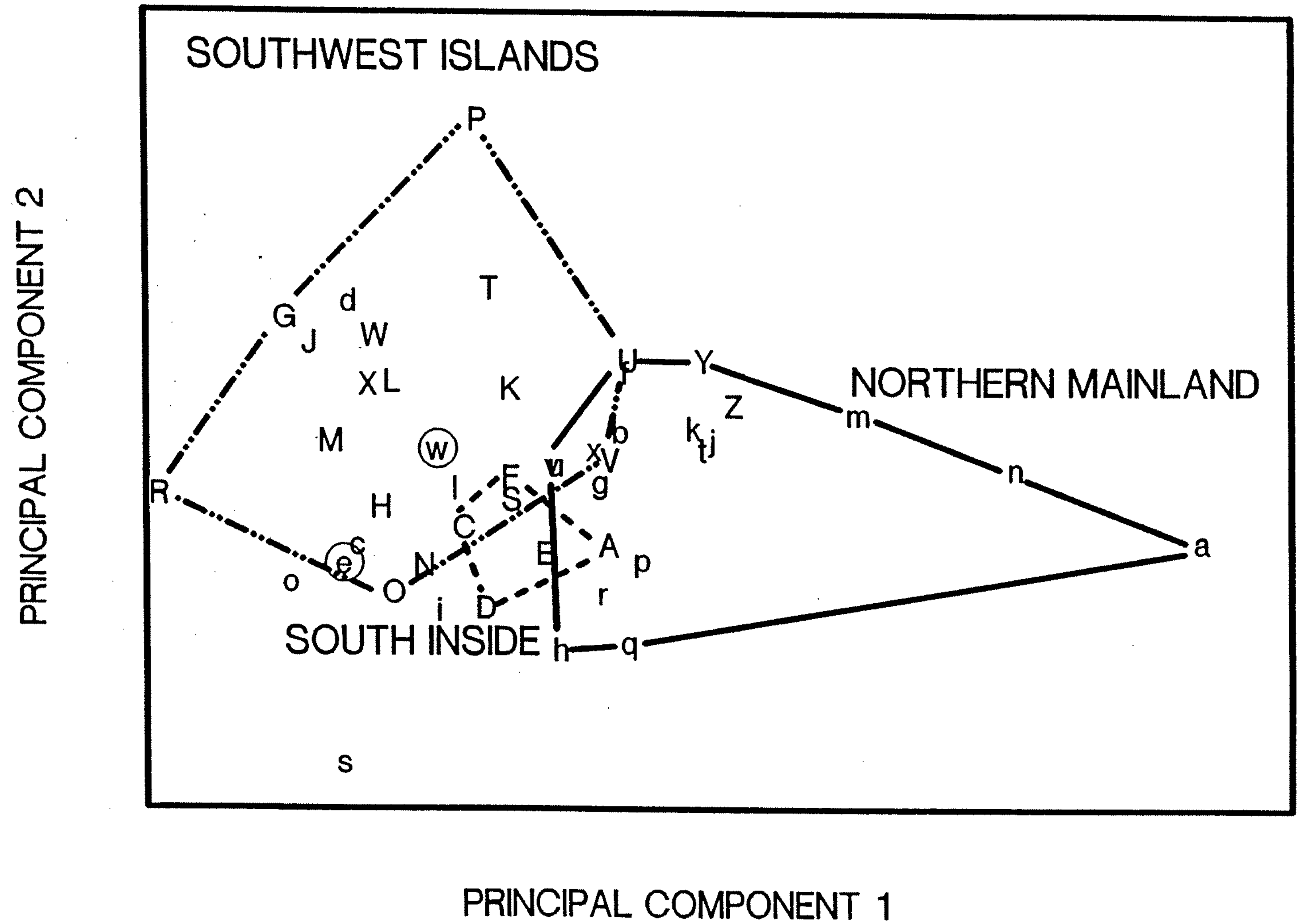

Figure 5.—Principal component analysis of Southeast Alaska and northern British Columbia sockeye salmon for the most common allele in a 6–locus data set. Letters correspond to collection sites listed in Table 1, Figs. 2, 5–7, and Appendices 1–3. Circled letters within aggregations indicate collections not geographically associated with the aggregation.

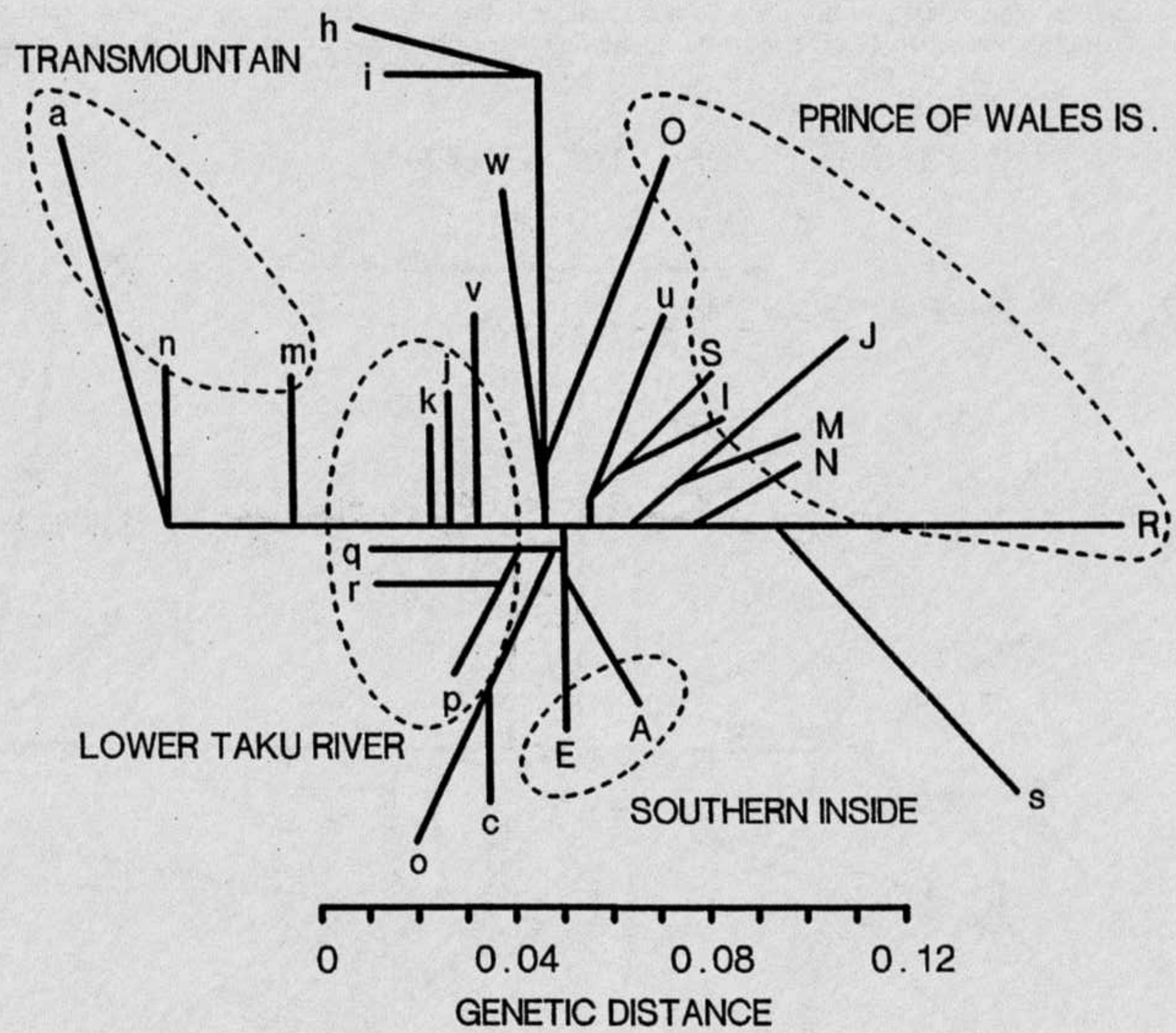

Figure 6.—Neighbor-joining tree (Saitou and Nei 1987) using genetic distances (Cavalli-Sforza and Edwards 1967) estimated from allelic frequencies at 31 loci.

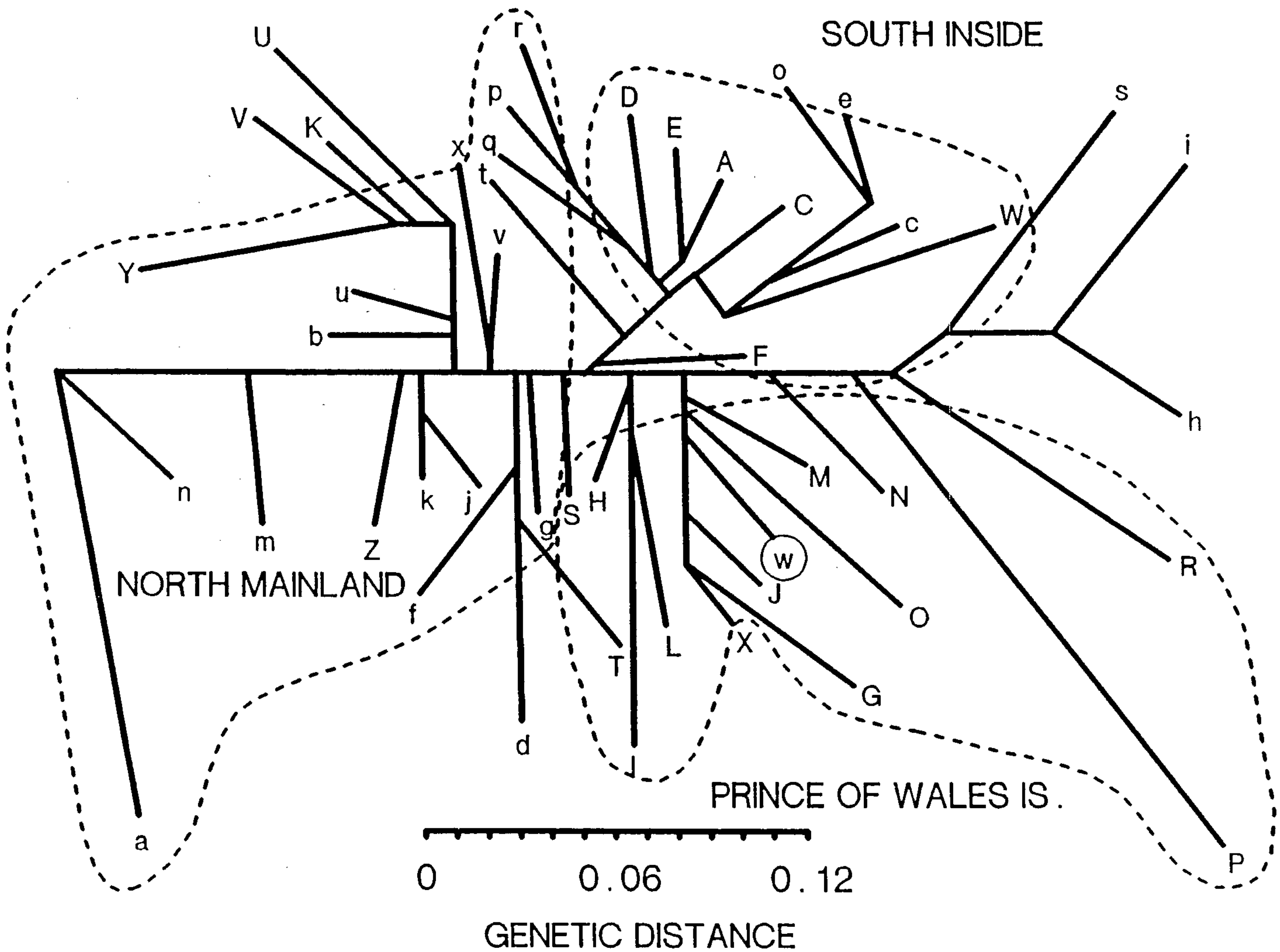

Figure 7.—Neighbor-joining tree (Saitou and Nei 1987) using genetic distances (Cavalli-Sforza and Edwards 1967) estimated from allelic frequencies at 8 loci. Circled letters within aggregations indicate collections not geographically associated with the aggregation.

APPENDICES

Appendix 1.—Allozyme variation in collections of sockeye salmon from Southeast Alaska and northern British Columbia. Allelic frequencies and collection sizes (*N*) are designated as in Table 1. Alleles are designated by their mobility relative to the most common allele (**100*) and as described in Shaklee et. al. (1990). Collections are pooled in accordance with Appendix 3.

Location/drainage stream	Year	*PGM-1**				*PGM-2**				
		N	**-100*	**Null*	**-88*	*N*	**-100*	**-77*	**-20*	**-93*
District 101										
Boca de Quadra										
A. Hugh Smith Lake	1982	50	0.19	0.81	0	50	0.85	0.13	0.02	0
	1983	96	0.17	0.83	0	95	0.88	0.12	0	0
	1986	10	0.11	0.89	0	10	0.90	0.10	0	0
	1988	50	0.18	0.82	0	50	0.85	0.15	0	0
	Total	206	0.17	0.83	0	205	0.866	0.129	0.005	0
George Inlet										
B. Leask Lake	1986	25	0.51	0.49	0	25	0.38	0.62	0	0
Western Behm Canal										
C. Helm Lake	1983	50	0.12	0.88	0	50	0.76	0.24	0	0
	1986	8	0.13	0.87	0	9	0.83	0.17	0	0
	1986	39	0.05	0.95	0	39	0.73	0.27	0	0
	Total	97	0.09	0.91	0	98	0.76	0.24	0	0
D. McDonald Lake (i)	1982	50	0.08	0.92	0	50	0.86	0.13	0.01	0
	1987	106	0.12	0.88	0	106	0.87	0.13	0	0
	Total	156	0.11	0.89	0	156	0.869	0.128	0.003	0
E. McDonald Lake (ii)	1983	93	0.13	0.87	0	99	0.85	0.15	0	0
	1988	52	0.10	0.90	0	52	0.83	0.17	0	0
	Total	145	0.12	0.88	0	151	0.84	0.16	0	0
F. Naha River	1983	104	0.12	0.88	0	104	0.75	0.25	0	0
Early	1984	50	0.15	0.85	0	50	0.64	0.36	0	0
Late	1984	50	0.14	0.86	0	50	0.78	0.20	0.02	0
	1986	40	0.38	0.62	0	40	0.64	0.36	0	0
	1986	30	0.14	0.86	0	35	0.80	0.20	0	0
	Total	274	0.15	0.85	0	279	0.724	0.272	0.004	0
District 102										
Eastern Prince of Wales Island										
G. Johnson Lake	1983	78	0.53	0.47	0	78	0.55	0.45	0	0
H. Karta River (i)	1982	50	0.20	0.80	0	50	0.76	0.24	0	0
	1983	100	0.18	0.82	0	99	0.72	0.28	0	0
	Total	150	0.18	0.82	0	149	0.73	0.27	0	0

Appendix 1.—Continued.

Location/drainage stream	Year	PGM-1*				PGM-2*				
		N	*-100	*Null	*-88	N	*-100	*-77	*-20	*-93
I. Karta River (ii)	1988	52	0.24	0.76	0	52	0.75	0.25	0	0
J. Kegan Lake	1982	100	0.36	0.64	0	100	0.545	0.450	0.005	0
	1983	100	0.34	0.66	0	100	0.540	0.455	0.005	0
	1986	37	0.34	0.66	0	37	0.58	0.42	0	0
	1988	50	0.34	0.66	0	50	0.57	0.43	0	0
	Total	287	0.35	0.65	0	287	0.552	0.444	0.003	0
District 103										
Western Prince of Wales Island										
K. Chuck Lake	1983	100	0.27	0.73	0	100	0.76	0.24	0	0
	1986	32	0.27	0.73	0	31	0.85	0.15	0	0
	Total	132	0.27	0.73	0	131	0.78	0.22	0	0
L. Hetta Lake	1986	46	0.17	0.83	0	46	0.66	0.34	0	0
M. Klakas Lake	1983	97	0.24	0.76	0	97	0.64	0.36	0	0
	1988	59	0.24	0.76	0	58	0.64	0.36	0	0
	Total	156	0.24	0.76	0	155	0.64	0.36	0	0
N. Klawock Lake	1986	48	0.13	0.87	0	48	0.79	0.21	0	0
	1987	50	0.14	0.86	0	50	0.71	0.29	0	0
	1988	48	0.07	0.93	0	44	0.80	0.20	0	0
	Total	146	0.11	0.89	0	142	0.76	0.24	0	0
O. Upper Sarkar Lake	1986	35	0.52	0.48	0	35	0.93	0.07	0	0
	1987	42	0.40	0.60	0	42	0.85	0.15	0	0
	1988	43	0.41	0.59	0	43	0.95	0.05	0	0
	Total	120	0.44	0.56	0	120	0.91	0.09	0	0
District 105										
Northern Prince of Wales Island										
P. Shipley Creek	1983	50	0.19	0.81	0	50	0.35	0.55	0.10	0
Q. Sutter Creek	1986	19	0.31	0.69	0	19	0.92	0.08	0	0
District 106										
Northwestern Prince of Wales Island										
R. Galea Lake	1988	52	0.25	0.75	0	54	0.62	0.38	0	0

Appendix 1.—Continued.

Location/drainage stream	Year	PGM-1* N	PGM-1* *-100	PGM-1* *Null	PGM-1* *-88	PGM-2* N	PGM-2* *-100	PGM-2* -77*	PGM-2* *-20	PGM-2* *-93
S. Luck Lake	1983	50	0.11	0.89	0	50	0.79	0.21	0	0
	1986	9	0.12	0.88	0	9	0.89	0.11	0	0
	1986	36	0.13	0.87	0	37	0.69	0.31	0	0
	1987	49	0.12	0.88	0	49	0.69	0.29	0	0.02
	1988	62	0.09	0.91	0	62	0.74	0.26	0	0
	Total	206	0.11	0.89	0	207	0.739	0.256	0	0.005
T. Red Bay Lake	1983	69	0.16	0.84	0	57	0.43	0.57	0	0
	1986	13	0.08	0.92	0	13	0.58	0.42	0	0
	1986	40	0.24	0.76	0	39	0.58	0.42	0	0
	Total	122	0.18	0.82	0	109	0.50	0.50	0	0
U. Salmon Bay Lake (i)	1982	69	0.23	0.77	0	69	0.84	0.15	0.01	0
V. Salmon Bay Lake (ii)	1983	75	0.23	0.77	0	75	0.83	0.17	0	0
	1986	51	0.22	0.78	0	51	0.87	0.13	0	0
	Total	125	0.40	0.60	0	126	0.85	0.15	0	0
Kupreanof Island										
W. Petersburg Lake	1986	49	0.12	0.88	0	49	0.50	0.50	0	0
District 107										
Western Wrangell Island										
X. Thoms Lake	1983	73	0.40	0.60	0	75	0.64	0.36	0	0
	1986	49	0.30	0.70	0	49	0.59	0.41	0	0
	1987	59	0.32	0.68	0	58	0.71	0.29	0	0
	Total	182	0.35	0.65	0	182	0.65	0.35	0	0
District 108										
Stikine River drainage										
Y. Chutine Lake	1986	64	0.43	0.57	0	64	0.82	0.17	0.01	0
Z. Chutine River	1986	50	0.13	0.87	0	50	0.80	0.17	0.01	0.02
a. Tahltan Lake	1990	100	0.14	0.82	0.04	55	0.95	0.05	0	0
b. Stikine River	1986	50	0.19	0.81	0	50	0.75	0.24	0	0.01

Appendix 1.—Continued.

Location/drainage stream	Year	PGM-1* N	PGM-1* *-100	PGM-1* *Null	PGM-1* *-88	PGM-2* N	PGM-2* *-100	PGM-2* *-77*	PGM-2* *-20	PGM-2* *-93
District 109										
Kuiu Island										
c. Alecks Lake	1986	48	0.06	0.94	0	48	0.79	0.21	0	0
	1987	54	0.14	0.86	0	54	0.72	0.28	0	0
	Total	102	0.10	0.90	0	102	0.75	0.25	0	0
d. Kutlaku Lake	1986	49	0.19	0.81	0	49	0.57	0.43	0	0
District 111										
North of Juneau										
e. Auke Creek	1986	12	0	1.00	0	12	0.83	0.17	0	0
	1988	114	0	1.00	0	114	0.69	0.31	0	0
	Total	126	0	1.00	0	126	0.70	0.30	0	0
Eastern Stephens Passage-Port Snettisham										
f. Crescent Lake	1983	100	0.13	0.87	0	98	0.68	0.30	0.02	0
g. Speel Lake	1983	100	0.18	0.82	0	97	0.83	0.15	0.02	0
Herbert River drainage										
h. Windfall Lake	1989	73	0.12	0.88	0	73	0.95	0.05	0	0
Mendenhall River drainage										
i. Steep Creek	1986	18	0.15	0.85	0	18	0.83	0.17	0	0
	1988	53	0.28	0.72	0	53	0.90	0.10	0	0
	1989	10	0.16	0.79	0.05	10	0.90	0.10	0	0
	Total	81	0.15	0.84	0.01	81	0.89	0.11	0	0
Taku River drainage										
j. Lower main stem										
(1) Fish Creek	1986	20	0.23	0.77	0	20	0.78	0.20	0.02	0
(2) South Fork Slough	1986	38	0.22	0.78	0	40	0.84	0.16	0	0
	1989	20	0.16	0.84	0	20	0.75	0.23	0.02	0
	Total	78	0.21	0.79	0	78	0.80	0.19	0.01	0
k. Upper main stem										
(3) Chuunk Mountain Slough	1989	8	0.39	0.61	0	9	0.78	0.22	0	0
(4) Coffee Slough	1986	36	0.27	0.73	0	37	0.84	0.16	0	0
	1987	33	0.28	0.72	0	32	0.75	0.22	0.02	0.02
(5) Honakta Slough	1986	40	0.15	0.85	0	38	0.82	0.18	0	0
(6) Nakina River	1986	51	0.33	0.67	0	51	0.79	0.20	0.01	0

Appendix 1.—Continued.

Location/drainage stream	Year	PGM-1*				PGM-2*				
		N	**-100*	**Null*	**-88*	*N*	**-100*	**-77*	**-20*	**-93*
(7) Shustahini Creek	1986	40	0.18	0.82	0	40	0.88	0.12	0	0
	1986	60	0.17	0.83	0	60	0.78	0.21	0.01	0.01
	1987	35	0.19	0.81	0	35	0.84	0.14	0.01	0
(8) Takwahoni Slough	1986	20	0.23	0.77	0	20	0.78	0.20	0.02	0
(9) Tuskwa Slough	1986	39	0.25	0.75	0	38	0.82	0.18	0	0
	1987	37	0.26	0.74	0	37	0.74	0.26	0	0
(10) Yonakina Slough	1989	17	0.23	0.77	0	18	0.86	0.14	0	0
	Total	415	0.23	0.77	0	415	0.805	0.187	0.006	0.002
m. Little Tatsemenie Lake	1990	67	0.14	0.86	0	67	0.82	0.13	0.04	0.01
n. Little Trapper Lake	1990	99	0.11	0.89	0	100	0.85	0.10	0.02	0.03
o. Turner Lake (kokanee)	1988	89	0.02	0.98	0	88	0.74	0.26	0	0
p. Yehring Creek, early	1986 (1)[a]	22	0.20	0.80	0	22	0.86	0.14	0	0
	1986 (2)[b]	48	0.20	0.80	0	48	0.83	0.16	0	0.01
	1987	7	0.16	0.84	0	7	0.71	0.29	0	0
	1989 (1)[c]	30	0.07	0.93	0	30	0.90	0.10	0	0
	Total	107	0.16	0.84	0	107	0.850	0.145	0	0.005
q. Yehring Creek, middle	1986 (3)[d]	40	0.04	0.96	0	40	0.83	0.16	0	0.01
	1989 (2)[e]	10	0.04	0.90	0.06	10	0.90	0.10	0	0
	Total	50	0.04	0.95	0.01	50	0.84	0.15	0	0.01
r. Yehring Creek, late	1989 (3)[f]	59	0.08	0.92	0.01	60	0.91	0.09	0	0
District 113										
Southern Chichagof Island										
s. Sitkoh Lake	1984	97	0.08	0.92	0	97	0.96	0.04	0	0
	1987	100	0.05	0.95	0	100	0.93	0.06	0	0.01
	Total	197	0.07	0.93	0	197	0.944	0.053	0	0.003
District 115										
Chilkat River drainage										
t. Chilkat River	1983	100	0.14	0.86	0	100	0.79	0.15	0.06	0
u. Chilkat Lake										
Early	1983	100	0.15	0.85	0	100	0.80	0.20	0	0
Late	1983	100	0.09	0.91	0	100	0.76	0.24	0	0
	1990	45	0.14	0.86	0	45	0.77	0.23	0	0
	Total	245	0.12	0.88	0	245	0.78	0.22	0	0

Appendix 1.—Continued.

Location/drainage stream	Year	PGM-1*				PGM-2*				
		N	*-100	*Null	*-88	*N*	*-100	*-77	*-20	*-93
Chilkoot River drainage										
v. Chilkoot River	1983	96	0.23	0.77	0	96	0.78	0.22	0	0
	1990	40	0.19	0.81	0	40	0.78	0.22	0	0
	Total	136	0.22	0.78	0	136	0.78	0.22	0	0
District 181										
Alsek River drainage										
w. East Alsek River	1987	50	0.37	0.63	0	50	0.71	0.29	0	0
Situk River drainage										
x. Situk River	1984	98	0.39	0.61	0	92	0.79	0.21	0	0

Appendix 1.—Extended.

Location	Year	*LDH-B2** N	*LDH-B2** *100	*LDH-B2** *115	*LDH-B2** *85	*sIDHP-2** N	*sIDHP-2** *100	*sIDHP-2** *125	*PEPC** N	*PEPC** *100	*PEPC** *105
<u>District 101</u>											
Boca de Quadra											
A.	1982	50	0.91	0.09	0	50	1.00	0	50	0.96	0.04
	1983	96	0.98	0.02	0	96	1.00	0	96	0.97	0.03
	1986	10	0.90	0.10	0	10	1.00	0	10	1.00	0
	1988	50	0.95	0.05	0	50	1.00	0	50	0.94	0.06
	Total	206	0.95	0.05	0	206	1.00	0	206	0.96	0.04
George Inlet											
B.	1986	25	0.92	0.08	0	25	0.94	0.06	25	0.86	0.14
Western Behm Canal											
C.	1983	50	0.96	0.04	0	50	1.00	0	50	0.99	0.01
	1986	10	0.90	0.10	0	10	1.00	0	10	1.00	0
	1986	40	0.96	0.04	0	40	1.00	0	40	1.00	0
	Total	100	0.96	0.04	0	100	1.00	0	100	0.99	0.01
D.	1982	50	0.98	0.02	0	50	1.00	0	50	0.92	0.08
	1987	106	0.96	0.04	0	106	1.00	0	103	0.95	0.05
	Total	156	0.96	0.04	0	156	1.00	0	153	0.94	0.06
E.	1983	100	0.96	0.03	0.01	100	1.00	0	100	0.93	0.07
	1988	51	0.98	0.02	0	52	1.00	0	52	0.94	0.06
	Total	151	0.970	0.026	0.003	152	1.00	0	152	0.93	0.07
F.	1983	104	0.92	0.08	0	104	1.00	0	101	0.98	0.02
Early	1984	50	0.84	0.16	0	50	1.00	0	50	0.96	0.04
Late	1984	50	0.87	0.13	0	50	1.00	0	50	0.98	0.02
	1986	40	0.90	0.10	0	40	1.00	0	37	0.97	0.03
	1986	40	0.84	0.16	0	39	0.99	0.01	40	1.00	0
	Total	284	0.88	0.12	0	283	0.998	0.002	278	0.98	0.02
<u>District 102</u>											
Eastern Prince of Wales Island											
G.	1983	79	1.00	0	0	79	1.00	0	78	0.90	0.10
H.	1982	50	0.95	0.05	0	50	1.00	0	50	0.97	0.03
	1983	100	0.99	0.01	0	100	1.00	0	99	0.99	0.01
	Total	150	0.98	0.02	0	150	1.00	0	149	0.99	0.01
I.	1988	49	0.96	0.04	0	52	1.00	0	48	0.94	0.06

Appendix 1.—Continued.

Location	Year	*LDH-B2** N	*LDH-B2** **100*	*LDH-B2** **115*	*LDH-B2** **85*	*sIDHP-2** N	*sIDHP-2** **100*	*sIDHP-2** **125*	*PEPC** N	*PEPC** **100*	*PEPC** **105*
J.	1982	100	0.99	0.01	0	100	1.00	0	98	0.96	0.04
	1983	100	1.00	0	0	100	1.00	0	100	1.00	0
	1986	36	0.99	0.01	0	36	1.00	0	37	0.93	0.07
	1988	50	1.00	0	0	50	1.00	0	46	0.95	0.05
	Total	286	0.997	0.003	0	287	1.00	0	181	0.95	0.05
District 103											
Western Prince of Wales Island											
K.	1983	100	1.00	0	0	100	1.00	0	100	1.00	0
	1986	32	1.00	0	0	32	0.98	0.02	27	0.83	0.17
	Total	132	1.00	0	0	132	0.996	0.004	127	0.96	0.04
L.	1986	49	0.97	0.03	0	48	0.96	0.04	47	0.93	0.07
M.	1983	99	0.99	0.01	0	99	1.00	0	0	—	—
	1988	60	0.98	0.02	0	59	1.00	0	59	0.92	0.08
	Total	159	0.99	0.01	0	158	1.00	0	59	0.92	0.08
N.	1986	48	0.96	0.04	0	48	1.00	0	0	—	—
	1987	50	0.94	0.06	0	50	1.00	0	50	0.75	0.25
	1988	49	0.94	0.06	0	50	1.00	0	47	0.74	0.26
	Total	147	0.95	0.05	0	148	1.00	0	97	0.75	0.25
O.	1986	32	1.00	0	0	32	1.00	0	0	—	—
	1987	42	1.00	0	0	42	1.00	0	40	0.90	0.10
	1988	43	1.00	0	0	43	1.00	0	40	0.83	0.17
	Total	121	1.00	0	0	117	1.00	0	80	0.86	0.14
District 105											
Northern Prince of Wales Island											
P.	1983	50	0.97	0.03	0	50	0.99	0.01	49	0.35	0.65
Q.	1986	19	0.84	0.16	0	19	1.00	0	19	0.74	0.26
District 106											
Northwestern Prince of Wales Island											
R.	1988	54	1.00	0	0	54	1.00	0	53	0.59	0.41

Appendix 1.—Continued.

Location	Year	LDH-B2*				sIDHP-2*			PEPC*		
		N	**100*	**115*	**85*	*N*	**100*	**125*	*N*	**100*	**105*
S.	1983	50	0.95	0.05	0	50	1.00	0	50	1.00	0
	1986	10	0.85	0.15	0	9	1.00	0	7	1.00	0
	1986	40	0.91	0.09	0	40	1.00	0	39	1.00	0
	1987	50	0.97	0.03	0	50	1.00	0	50	0.98	0.02
	1988	63	0.95	0.05	0	64	1.00	0	64	0.96	0.04
	Total	213	0.94	0.06	0	213	1.00	0	210	0.98	0.02
T.	1983	68	0.95	0.05	0	70	1.00	0	70	1.00	0
	1986	13	0.88	0.12	0	13	1.00	0	13	1.00	0
	1986	40	0.98	0.02	0	40	1.00	0	40	1.00	0
	Total	121	0.95	0.05	0	123	1.00	0	123	1.00	0
U.	1982	69	0.99	0.01	0	69	0.98	0.02	67	0.89	0.11
V.	1983	76	0.99	0.01	0	76	1.00	0	76	0.98	0.02
	1986	50	1.00	0	0	50	1.00	0	49	0.96	0.04
	Total	126	0.997	0.003	0	123	1.00	0	125	0.97	0.03
Kupreanof Island											
W.	1986	50	0.99	0.01	0	49	1.00	0	48	0.99	0.01
<u>District 107</u>											
West Wrangell Island											
X.	1983	75	1.00	0	0	75	1.00	0	75	0.97	0.03
	1986	50	1.00	0	0	50	1.00	0	47	0.94	0.06
	1987	60	1.00	0	0	60	1.00	0	57	0.92	0.08
	Total	185	1.00	0	0	185	1.00	0	179	0.95	0.05
<u>District 108</u>											
Stikine River drainage											
Y.	1986	64	0.97	0.03	0	64	1.00	0	57	0.98	0.02
Z.	1986	48	0.86	0.14	0	48	0.98	0.02	47	0.95	0.05
a.	1990	98	0.43	0.57	0	90	1.00	0	99	1.00	0
b.	1986	50	0.93	0.07	0	50	1.00	0	50	0.98	0.02

Appendix 1.—Continued.

Location	Year	LDH-B2* N	LDH-B2* *100	LDH-B2* *115	LDH-B2* *85	sIDHP-2* N	sIDHP-2* *100	sIDHP-2* *125	PEPC* N	PEPC* *100	PEPC* *105
District 109											
Kuiu Island											
c.	1986	50	1.00	0	0	50	1.00	0	50	0.96	0.04
	1987	54	0.99	0.01	0	54	1.00	0	53	0.96	0.04
	Total	104	0.995	0.005	0	104	1.00	0	103	0.96	0.04
d.	1986	49	1.00	0	0	50	0.99	0.01	49	1.00	0
District 111											
North of Juneau											
e.	1986	12	0.96	0.04	0	12	1.00	0	12	0.96	0.04
	1988	114	1.00	0	0	113	1.00	0	112	1.00	0
	Total	126	0.996	0.004	0	125	1.00	0	124	0.996	0.004
Eastern Stephens Passage-Port Snettisham											
f.	1983	100	0.90	0.10	0	100	1.00	0	99	1.00	0
g.	1983	100	0.95	0.05	0	100	1.00	0	97	0.97	0.03
Herbert River drainage											
h.	1989	73	1.00	0	0	73	1.00	0	71	0.52	0.48
Mendenhall River drainage											
i.	1986	18	1.00	0	0	18	1.00	0	18	0.36	0.64
	1988	53	1.00	0	0	53	1.00	0	52	0.41	0.59
	1989	10	1.00	0	0	10	1.00	0	10	0.25	0.75
	Total	81	1.00	0	0	81	1.00	0	81	0.38	0.62
Taku River drainage											
j. (1)	1986	20	0.80	0.20	0	20	1.00	0	19	0.89	0.11
	1986	38	0.92	0.08	0	40	1.00	0	31	0.97	0.03
(2)	1989	20	0.95	0.05	0	20	1.00	0	18	0.86	0.14
	Total	78	0.90	0.10	0	80	1.00	0	69	0.92	0.08
k. (3)	1989	10	0.85	0.15	0	10	1.00	0	9	0.94	0.06
(4)	1986	34	0.94	0.06	0	37	1.00	0	36	0.99	0.01
	1987	33	0.86	0.14	0	33	1.00	0	33	0.94	0.06
(5)	1986	40	0.92	0.08	0	40	1.00	0	40	1.00	0
(6)	1986	49	0.89	0.11	0	51	1.00	0	49	0.94	0.06

Appendix 1.—Continued.

Location	Year	LDH-B2*				sIDHP-2*			PEPC*		
		N	*100	*115	*85	N	*100	*125	N	*100	*105
(7)	1986	40	0.95	0.05	0	40	1.00	0	40	1.00	0
	1986	58	0.82	0.18	0	60	0.99	0.01	57	0.95	0.05
	1987	35	0.91	0.09	0	35	0.99	0.01	31	0.89	0.11
(8)	1986	19	0.82	0.18	0	20	1.00	0	20	0.92	0.08
(9)	1986	29	0.90	0.10	0	40	1.00	0	24	1.00	0
	1987	37	0.88	0.12	0	37	1.00	0	37	0.93	0.07
(10)	1989	18	0.81	0.19	0	18	1.00	0	18	0.94	0.06
	Total	402	0.88	0.12	0	421	0.998	0.002	394	0.96	0.04
m.	1990	67	0.79	0.21	0	67	1.00	0	66	1.00	0
n.	1990	100	0.55	0.45	0	98	1.00	0	98	0.90	0.10
o.	1988	88	1.00	0	0	89	1.00	0	85	0.99	0.01
p. Early	1986	22	0.82	0.18	0	22	1.00	0	22	0.84	0.16
	1986	46	0.93	0.07	0	48	1.00	0	45	0.96	0.04
	1987	5	0.90	0.10	0	7	1.00	0	6	0.67	0.33
	1989	30	0.87	0.13	0	30	1.00	0	30	0.77	0.23
	Total	103	0.89	0.11	0	107	1.00	0	103	0.86	0.14
q. Middle	1986	37	0.91	0.09	0	40	1.00	0	40	0.94	0.06
	1989	10	0.85	0.15	0	10	1.00	0	10	1.00	0
	Total	47	0.89	0.11	0	50	1.00	0	50	0.95	0.05
r. Late	1989	60	0.89	0.11	0	60	1.00	0	60	0.82	0.18
<u>District 113</u>											
Southern Chichagof Island											
s.	1984	97	1.00	0	0	97	1.00	0	95	0.55	0.45
	1987	100	1.00	0	0	100	1.00	0	98	0.59	0.41
	Total	197	1.00	0	0	197	1.00	0	193	0.57	0.43
<u>District 115</u>											
Chilkat River drainage											
t.	1983	100	0.90	0.10	0	100	1.00	0	99	0.98	0.02
u. Early	1983	100	0.99	0.01	0	100	1.00	0	100	0.98	0.02
Late	1983	100	0.98	0.02	0	100	1.00	0	95	0.98	0.02
	1990	45	0.97	0.03	0	45	1.00	0	45	0.90	0.10
	Total	245	0.98	0.02	0	245	1.00	0	240	0.96	0.04

Appendix 1.—Continued.

Location	Year	LDH-B2*				sIDHP-2*			PEPC*		
		N	**100*	**115*	**85*	*N*	**100*	**125*	*N*	**100*	**105*
Chilkoot River drainage											
v.	1983	95	0.958	0.037	0.005	95	1.00	0	92	0.98	0.02
	1990	40	0.95	0.05	0	40	1.00	0	40	0.99	0.01
	Total	135	0.955	0.041	0.004	135	1.00	0	132	0.98	0.02
District 181											
Alsek River drainage											
w.	1987	50	0.94	0.06	0	50	1.00	0	49	0.91	0.09
Situk River drainage											
x.	1984	98	0.91	0.09	0	98	1.00	0	95	0.995	0.005

Appendix 1.—Extended.

Location	Year	ALAT* N	ALAT* *100	ALAT* *95	ALAT* *91	ALAT* *108	ALAT* *86	sAAT-3* N	sAAT-3* *100	sAAT-3* *117	sAAT-1,2* N	sAAT-1,2* *100	sAAT-1,2* *77	sAAT-1,2* *64
District 101														
Boca de Quadra														
A.	1982	44	0.58	0.03	0.35	0.03	0	0	–	–	0	–	–	–
	1983	0	–	–	–	–	–	0	–	–	0	–	–	–
	1986	7	0.57	0.21	0.21	0	0	10	1.00	0	0	–	–	–
	1988	50	0.50	0.11	0.37	0.02	0	50	1.00	0	47	1.00	0	0
	Total	101	0.54	0.08	0.35	0.02	0	60	1.00	0	47	1.00	0	0
George Inlet														
B.	1986	1	1.00	0	0	0	0	25	1.00	0	0	–	–	–
Western Behm Canal														
C.	1983	49	0.62	0.02	0.36	0	0	0	–	–	0	–	–	–
	1986	6	0.75	0.08	0.17	0	0	10	1.00	0	0	–	–	–
	1986	25	0.66	0.08	0.26	0	0	0	–	–	0	–	–	–
	Total	80	0.64	0.04	0.31	0	0	10	1.00	0	0	–	–	–
D.	1982	45	0.71	0.04	0.24	0	0	0	–	–	0	–	–	–
	1987	10	0.80	0.05	0.15	0	0	106	1.00	0	95	1.00	0	0
	Total	55	0.73	0.05	0.23	0	0	106	1.00	0	95	1.00	0	0
E.	1983	76	0.53	0.07	0.40	0	0	0	–	–	0	–	–	–
	1988	52	0.44	0.09	0.45	0.02	0	52	1.00	0	52	1.00	0	0
	Total	128	0.50	0.08	0.42	0.01	0	52	1.00	0	52	1.00	0	0
F.	1983	0	–	–	–	–	–	0	–	–	0	–	–	–
Early	1984	48	0.73	0.08	0.19	0	0	0	–	–	0	–	–	–
Late	1984	44	0.72	0.08	0.19	0.01	0	0	–	–	0	–	–	–
	1986	31	0.82	0.08	0.10	0	0	40	1.00	0	0	–	–	–
	1986	0	–	–	–	–	–	0	–	–	0	–	–	–
	Total	123	0.748	0.081	0.167	0.004	0	40	1.00	0	0	–	–	–
District 102														
Eastern Prince of Wales Island														
G.	1983	79	0.49	0.04	0.46	0	0	0	–	–	0	–	–	–
H.	1982	44	0.72	0.27	0.01	0	0	0	–	–	0	–	–	–
	1983	0	–	–	–	–	–	0	–	–	0	–	–	–
	Total	44	0.72	0.27	0.01	0	0	0	–	–	0	–	–	–
I.	1988	48	0.65	0.19	0.17	0	0	52	1.00	0	52	0.98	0.02	0

Appendix 1.—Continued.

Location	Year	ALAT* N	ALAT* *100	ALAT* *95	ALAT* *91	ALAT* *108	ALAT* *86	sAAT-3* N	sAAT-3* *100	sAAT-3* *117	sAAT-1,2* N	sAAT-1,2* *100	sAAT-1,2* *77	sAAT-1,2* *64
J.	1982	99	0.63	0.07	0.30	0	0	0	—	—	0	—	—	—
	1983	45	0.72	0.08	0.20	0	0	0	—	—	0	—	—	—
	1986	0	0	0	0	0	0	37	1.00	0	0	—	—	—
	1988	38	0.46	0.07	0.47	0	0	48	1.00	0	43	1.00	0	0
	Total	182	0.62	0.07	0.31	0	0	85	1.00	0	43	1.00	0	0
District 103														
Western Prince of Wales Island														
K.	1983	25	0.24	0.54	0.22	0	0	0	—	—	0	—	—	—
	1986	0	0	0	0	0	0	32	1.00	0	0	—	—	—
	Total	25	0.24	0.54	0.22	0	0	32	1.00	0	0	—	—	—
L.	1986	43	0.73	0.12	0.12	0.03	0	48	0.99	0.01	0	—	—	—
M.	1983	0	—	—	—	—	—	0	—	—	0	—	—	—
	1988	60	0.69	0.09	0.22	0	0	59	1.00	0	56	1.00	0	0
	Total	60	0.69	0.09	0.22	0	0	59	1.00	0	56	1.00	0	0
N.	1986	46	0.75	0.08	0.17	0	0	47	1.00	0	0	—	—	—
	1987	50	0.77	0.04	0.19	0	0	50	1.00	0	0	—	—	—
	1988	44	0.67	0.06	0.27	0	0	49	1.00	0	50	1.00	0	0
	Total	140	0.73	0.06	0.21	0	0	146	1.00	0	50	1.00	0	0
O.	1986	34	0.65	0.09	0.26	0	0	29	1.00	0	0	—	—	—
	1987	41	0.73	0.06	0.21	0	0	42	1.00	0	0	—	—	—
	1988	42	0.68	0.05	0.27	0	0	42	1.00	0	43	0.93	0.07	0
	Total	117	0.69	0.06	0.25	0	0	113	1.00	0	43	0.93	0.07	0
District 105														
Northern Prince of Wales Island														
P.	1983	50	0.28	0.15	0.57	0	0	0	—	—	0	—	—	—
Q.	1986	19	0.58	0	0.39	0.03	0	19	1.00	0	0	—	—	—
District 106														
Northwestern Prince of Wales Island														
R.	1988	54	0.86	0.09	0.05	0	0	54	1.00	0	54	0.86	0.14	0

Appendix 1.—Continued.

Location	Year	ALAT*						sAAT-3*			sAAT-1,2*			
		N	*100	*95	*91	*108	*86	*N*	*100	*117	*N*	*100	*77	*64
S.	1983	45	0.68	0.09	0.21	0.02	0	0	—	—	0	—	—	—
	1986	9	0.28	0.44	0.28	0	0	9	1.00	0	0	—	—	—
	1986	33	0.58	0.20	0.23	0	0	0	—	—	0	—	—	—
	1987	49	0.59	0.22	0.18	0	0	50	1.00	0	0	—	—	—
	1988	61	0.60	0.16	0.24	0.01	0	63	1.00	0	62	0.98	0.02	0
	Total	197	0.597	0.178	0.218	0.003	0.005	113	1.00	0	62	0.98	0.02	0
T.	1983	52	0.37	0.34	0.30	0	0	0	—	—	0	—	—	—
	1986	11	0.27	0.36	0.36	0	0	13	1.00	0	0	—	—	—
	1986	0	—	—	—	—	—	0	—	—	0	—	—	—
	Total	63	0.35	0.34	0.31	0	0	13	1.00	0	0	—	—	—
U.	1982	45	0.20	0.48	0.32	0	0	0	—	—	0	—	—	—
V.	1983	49	0.24	0.40	0.36	0	0	0	—	—	0	—	—	—
	1986	48	0.18	0.36	0.45	0.01	0	46	1.00	0	0	—	—	—
	Total	97	0.21	0.38	0.40	0.01	0	46	1.00	0	0	—	—	—
Kupreanof Island														
W.	1986	50	0.37	0.01	0.62	0	0	49	1.00	0	0	—	—	—
<u>District 107</u>														
Western Wrangell Island														
X.	1983	70	0.39	0.04	0.57	0	0	0	—	—	0	—	—	—
	1986	47	0.44	0.05	0.50	0.01	0	50	1.00	0	0	—	—	—
	1987	60	0.52	0.05	0.41	0.02	0	60	1.00	0	0	—	—	—
	Total	177	0.45	0.05	0.50	0.01	0	110	1.00	0	0	—	—	—
<u>District 108</u>														
Stikine River drainage														
Y.	1986	19	0.11	0.16	0.74	0	0	61	0.98	0.02	0	—	—	—
Z.	1986	43	0.40	0.15	0.42	0.03	0	47	1.00	0	0	—	—	—
a.	1990	96	0.05	0.49	0.46	0	0	98	0.90	0.10	100	1.00	0	0
b.	1986	48	0.31	0.21	0.48	0	0	48	0.99	0.01	0	—	—	—

Appendix 1.—Continued.

Location	Year	ALAT* N	ALAT* *100	ALAT* *95	ALAT* *91	ALAT* *108	ALAT* *86	sAAT-3* N	sAAT-3* *100	sAAT-3* *117	sAAT-1,2* N	sAAT-1,2* *100	sAAT-1,2* *77	sAAT-1,2* *64
District 109														
Kuiu Island														
c.	1986	46	0.55	0	0.45	0	0	50	1.00	0	0	—	—	—
	1987	54	0.69	0	0.31	0	0	54	1.00	0	51	1.00	0	0
	Total	100	0.63	0	0.37	0	0	104	1.00	0	51	1.00	0	0
d.	1986	49	0.48	0.37	0.15	0	0	50	1.00	0	0	—	—	—
District 111														
North of Juneau														
e.	1986	12	0.75	0.04	0.21	0	0	12	1.00	0	0	—	—	—
	1988	112	0.70	0.02	0.28	0	0	113	1.00	0	0	—	—	—
	Total	124	0.70	0.02	0.27	0	0	125	1.00	0	0	—	—	—
Eastern Stephens Passage-Port Snettisham														
f.	1983	62	0.44	0.36	0.19	0	0	0	—	—	0	—	—	—
g.	1983	75	0.54	0.25	0.21	0	0	0	—	—	0	—	—	—
Herbert River drainage														
h.	1989	72	0.38	0.21	0.40	0.01	0	73	1.00	0	72	1.00	0	0
Mendenhall River drainage														
i.	1986	14	0.64	0.07	0.29	0	0	18	1.00	0	0	—	—	—
	1988	53	0.42	0.07	0.51	0	0	53	1.00	0	53	1.00	0	0
	1989	10	0.45	0.10	0.45	0	0	10	1.00	0	10	1.00	0	0
	Total	77	0.47	0.07	0.46	0	0	81	1.00	0	63	1.00	0	0
Taku River drainage														
j. (1)	1986	19	0.37	0.24	0.39	0	0	20	1.00	0	0	—	—	—
(2)	1986	36	0.38	0.24	0.36	0.03	0	0	—	—	0	—	—	—
	1989	12	0.29	0.08	0.63	0	0	20	1.00	0	20	1.00	0	0
	Total	75	0.35	0.21	0.41	0.02	0	40	1.00	0	20	1.00	0	0
k. (3)	1989	8	0.38	0.19	0.44	0	0	10	1.00	0	9	0.94	0	0.06
(4)	1986	29	0.43	0.10	0.45	0.02	0	37	1.00	0	0	—	—	—
	1987	32	0.30	0.25	0.44	0.02	0	33	1.00	0	0	—	—	—
(5)	1986	34	0.27	0.16	0.57	0	0	0	—	—	0	—	—	—
(6)	1986	50	0.44	0.11	0.43	0.02	0	51	0.99	0.01	40	1.00	0	0

Appendix 1.—Continued.

Location	Year	ALAT* N	ALAT* *100	ALAT* *95	ALAT* *91	ALAT* *108	ALAT* *86	sAAT-3* N	sAAT-3* *100	sAAT-3* *117	sAAT-1,2* N	sAAT-1,2* *100	sAAT-1,2* *77	sAAT-1,2* *64
(7)	1986	35	0.41	0.23	0.36	0	0	0	—	—	0	—	—	—
	1986	60	0.45	0.15	0.40	0	0	60	0.99	0.01	0	—	—	—
	1987	34	0.35	0.21	0.44	0	0	34	1.00	0	0	—	—	—
(8)	1986	17	0.41	0.21	0.32	0.06	0	20	0.95	0.05	0	—	—	—
(9)	1986	37	0.45	0.10	0.45	0.01	0	0	—	—	0	—	—	—
	1987	35	0.36	0.17	0.46	0.01	0	37	1.00	0	31	1.00	0	0
(10)	1989	18	0.36	0.28	0.36	0	0	18	1.00	0	18	1.00	0	0
	Total	389	0.39	0.17	0.43	0.01	0	300	0.99	0.01	98	0.99	0	0.01
m.	1990	66	0.29	0.35	0.36	0	0	67	0.98	0.02	67	1.00	0	0
n.	1990	100	0.18	0.20	0.62	0	0	99	0.95	0.05	98	0.95	0	0.05
o.	1988	88	0.76	0.01	0.24	0	0	89	1.00	0	89	1.00	0	0
p. Early	1986	21	0.38	0	0.57	0.05	0	22	1.00	0	0	—	—	—
	1986	47	0.41	0.04	0.53	0	0.01	0	—	—	0	—	—	—
	1987	7	0.64	0.14	0.21	0	0	7	1.00	0	0	—	—	—
	1989	30	0.57	0.07	0.37	0	0	30	1.00	0	30	1.00	0	0
	Total	105	0.467	0.048	0.471	0.010	0.005	59	1.00	0	30	1.00	0	0
q. Middle	1986	39	0.59	0.09	0.32	0	0	0	—	—	0	—	—	—
	1989	10	0.50	0.05	0.45	0	0	10	1.00	0	10	1.00	0	0
	Total	49	0.57	0.08	0.35	0	0	10	1.00	0	10	1.00	0	0
r. Late	1989	59	0.53	0.04	0.43	0	0	60	1.00	0	59	1.00	0	0
District 113														
Southern Chichagof Island														
s.	1984	96	0.88	0.02	0.10	0	0	0	—	—	0	—	—	—
	1987	99	0.83	0.07	0.10	0	0	100	1.00	0	99	1.00	0	0
	Total	195	0.85	0.05	0.10	0	0	100	1.00	0	99	1.00	0	0
District 115														
Chilkat River drainage														
t.	1983	92	0.52	0.09	0.38	0.02	0	0	—	—	0	—	—	—
u. Early	1983	0	—	—	—	—	—	0	—	—	0	—	—	—
Late	1983	0	—	—	—	—	—	0	—	—	0	—	—	—
	1990	43	0.34	0.24	0.42	0	0	44	1.00	0	45	1.00	0	0
	Total	43	0.34	0.24	0.42	0	0	44	1.00	0	45	1.00	0	0

Appendix 1.—Continued.

Location	Year	ALAT* N	*100	*95	*91	*108	*86	sAAT-3* N	*100	*117	sAAT-1,2* N	*100	*77	*64
Chilkoot River drainage														
v.	1983	0	—	—	—	—	—	0	—	—	0	—	—	—
	1990	40	0.45	0.24	0.31	0	0	40	1.00	0	40	1.00	0	0
	Total	40	0.45	0.24	0.31	0	0	40	1.00	0	40	1.00	0	0
District 181														
Alsek River drainage														
w.	1987	48	0.63	0.03	0.34	0	0	50	1.00	0	45	1.00	0	0
Situk River drainage														
x.	1984	93	0.49	0.34	0	0	0.17	0	—	—	0	—	—	—

Appendix 1.—Extended.

Location	Year	mAAT-1* N	mAAT-1* *-100	mAAT-1* *-82	ADA-1* N	ADA-1* *100	ADA-1* *107	G3PDH-1* N	G3PDH-1* *-100	G3PDH-1* *-240	FDHG* N	FDHG* *100	FDHG* *10
District 101													
Boca de Quadra													
A.	1982	0	–	–	25	1.00	0	0	–	–	0	–	–
	1983	0	–	–	50	1.00	0	0	–	–	0	–	–
	1986	0	–	–	0	–	–	0	–	–	0	–	–
	1988	48	0.96	0.04	50	1.00	0	48	1.00	0	44	1.00	0
	Total	48	0.96	0.04	75	1.00	0	48	1.00	0	44	1.00	0
George Inlet													
B.	1986	0	–	–	0	–	–	0	–	–	0	–	–
Western Behm Canal													
C.	1983	0	–	–	50	1.00	0	0	–	–	0	–	–
	1986	0	–	–	0	–	–	0	–	–	0	–	–
	1986	0	–	–	37	1.00	0	0	–	–	0	–	–
	Total	0	–	–	87	1.00	0	0	–	–	0	–	–
D.	1982	0	–	–	25	1.00	0	0	–	–	0	–	–
	1987	92	0.96	0.04	0	–	–	0	–	–	74	1.00	0
	Total	92	0.96	0.04	25	1.00	0	0	–	–	74	1.00	0
E.	1983	0	–	–	50	1.00	0	0	–	–	0	–	–
	1988	52	0.88	0.12	51	1.00	0	51	0.95	0.05	52	1.00	0
	Total	52	0.88	0.12	101	1.00	0	51	0.95	0.05	52	1.00	0
F.	1983	0	–	–	50	1.00	0	0	–	–	0	–	–
	1984	0	–	–	50	1.00	0	0	–	–	0	–	–
	1984	0	–	–	50	1.00	0	0	–	–	0	–	–
	1986	0	–	–	0	–	–	0	–	–	0	–	–
	1986	0	–	–	40	1.00	0	0	–	–	0	–	–
	Total	0	–	–	190	1.00	0	0	–	–	0	–	–
District 102													
Eastern Prince of Wales Island													
G.	1983	0	–	–	50	1.00	0	0	–	–	0	–	–
H.	1982	0	–	–	25	1.00	0	50	0.98	0.02	0	–	–
	1983	0	–	–	50	1.00	0	0	–	–	0	–	–
	Total	0	–	–	75	1.00	0	50	0.98	0	0	–	–
I.	1988	52	0.95	0.05	48	1.00	0	49	1.00	1.00	52	1.00	0

Appendix 1.—Continued.

		*mAAT-1**			*ADA-1**			*G3PDH-1**			*FDHG**		
Location	Year	*N*	**-100*	**-82*	*N*	**100*	**107*	*N*	**-100*	**-240*	*N*	**100*	**10*
J.	1982	0	–	–	25	1.00	0	0	–	–	0	–	–
	1983	0	–	–	50	1.00	0	0	–	–	0	–	–
	1986	0	–	–	0	–	–	0	–	–	0	–	–
	1988	43	1.00	0	11	1.00	0	45	1.00	0	42	1.00	0
	Total	43	1.00	0	86	1.00	0	45	1.00	0	42	1.00	0
District 103													
Western Prince of Wales Island													
K.	1983	0	–	–	50	1.00	0	0	–	–	0	–	–
	1986	0	–	–	0	–	–	0	–	–	0	–	–
	Total	0	–	–	50	1.00	0	0	–	–	0	–	–
L.	1986	0	–	–	0	–	–	0	–	–	0	–	–
M.	1983	0	–	–	50	1.00	0	0	–	–	0	–	–
	1988	59	0.99	0.01	59	0.94	0.06	53	1.00	0	51	0.99	0.01
	Total	59	0.99	0.01	109	0.97	0.03	53	1.00	0	51	0.99	0.01
N.	1986	0	–	–	0	–	–	0	–	–	0	–	–
	1987	0	–	–	0	–	–	0	–	–	0	–	–
	1988	50	0.99	0.01	50	1.00	0	50	1.00	0	50	1.00	0
	Total	50	0.99	0.01	50	1.00	0	50	1.00	0	50	1.00	0
O.	1986	0	–	–	0	–	–	0	–	–	0	–	–
	1987	0	–	–	0	–	–	0	–	–	0	–	–
	1988	43	0.92	0.08	44	0.98	0.02	44	1.00	0	41	1.00	0
	Total	43	0.92	0.08	44	0.98	0.02	44	1.00	0	41	1.00	0
District 105													
Northern Prince of Wales Island													
P.	1983	0	–	–	50	1.00	0	0	–	–	0	–	–
Q.	1986	0	–	–	0	–	–	0	–	–	0	–	–
District 106													
Northwestern Prince of Wales Island													
R.	1988	54	1.00	0	54	1.00	0	52	1.00	0	52	1.00	0

Appendix 1.—Continued.

Location	Year	mAAT-1*			ADA-1*			G3PDH-1*			FDHG*		
		N	*-100	*-82	N	*100	*107	N	*-100	*-240	N	*100	*10
S.	1983	0	–	–	50	1.00	0	0	–	–	0	–	–
	1986	0	–	–	0	–	–	0	–	–	0	–	–
	1986	0	–	–	38	1.00	0	0	–	–	0	–	–
	1987	0	–	–	0	–	–	0	–	–	0	–	–
	1988	64	0.95	0.05	63	1.00	0	63	1.00	0	61	1.00	0
	Total	64	0.95	0.05	151	1.00	0	63	1.00	0	61	1.00	0
T.	1983	0	–	–	50	1.00	0	0	–	–	0	–	–
	1986	0	–	–	0	–	–	0	–	–	0	–	–
	1986	0	–	–	40	1.00	0	40	1.00	0	0	–	–
	Total	0	–	–	90	1.00	0	40	1.00	0	0	–	–
U.	1982	0	–	–	50	1.00	0	0	–	–	0	–	–
V.	1983	0	–	–	50	1.00	0	0	–	–	0	–	–
	1986	0	–	–	0	–	–	0	–	–	0	–	–
	Total	0	–	–	100	1.00	0	0	–	–	0	–	–
Kupreanof Island													
W.	1986	0	–	–	0	–	–	0	–	–	0	–	–
District 107													
Western Wrangell Island													
X.	1983	0	–	–	50	1.00	0	0	–	–	0	–	–
	1986	0	–	–	0	–	–	0	–	–	0	–	–
	1987	0	–	–	0	–	–	0	–	–	0	–	–
	Total	0	–	–	50	1.00	0	0	–	–	0	–	–
District 108													
Stikine River drainage													
Y.	1986	41	0.91	0.09	18	1.00	0	0	–	–	0	–	–
Z.	1986	0	–	–	0	–	–	0	–	–	0	–	–
a.	1990	99	0.79	0.21	100	1.00	0	100	1.00	0	100	1.00	0
b.	1986	0	–	–	0	–	–	0	–	–	0	–	–

Appendix 1.—Continued.

Location	Year	mAAT-1* N	mAAT-1* *-100	mAAT-1* *-82	ADA-1* N	ADA-1* *100	ADA-1* *107	G3PDH-1* N	G3PDH-1* *-100	G3PDH-1* *-240	FDHG* N	FDHG* *100	FDHG* *10
District 109													
Kuiu Island													
c.	1986	0	—	—	0	—	—	0	—	—	0	—	—
	1987	51	0.82	0.18	40	1.00	0	52	0.99	0.01	46	1.00	0
	Total	51	0.82	0.18	40	1.00	0	52	0.99	0.01	46	1.00	0
d.	1986	0	—	—	0	—	—	0	—	—	0	—	—
District 111													
North of Juneau													
e.	1986	0	—	—	0	—	—	0	—	—	0	—	—
	1988	0	—	—	0	—	—	0	—	—	0	—	—
	Total	0	—	—	0	—	—	0	—	—	0	—	—
Eastern Stephens Passage-Port Snettisham													
f.	1983	0	—	—	100	0.98	0.02	0	—	—	0	—	—
g.	1983	0	—	—	100	1.00	0	0	—	—	0	—	—
Herbert River drainage													
h.	1989	73	0.34	0.66	73	1.00	0	73	1.00	0	73	1.00	0
Mendenhall River drainage													
i.	1986	0	—	—	0	—	—	0	—	—	0	—	—
	1988	53	0.50	0.50	53	1.00	0	51	1.00	0	0	—	—
	1989	10	0.45	0.55	10	1.00	0	10	1.00	0	10	1.00	0
	Total	63	0.49	0.51	63	1.00	0	61	1.00	0	10	1.00	0
Taku River drainage													
j. (1)	1986	0	—	—	0	—	—	0	—	—	0	—	—
(2)	1986	0	—	—	40	1.00	0	40	1.00	0	0	—	—
	1989	20	0.82	0.18	20	1.00	0	20	1.00	0	20	1.00	0
	Total	20	0.82	0.18	60	1.00	0	60	1.00	0	20	1.00	0
k. (3)	1989	8	0.88	0.12	8	1.00	0	9	1.00	0	8	1.00	0
(4)	1986	0	—	—	0	—	—	0	—	—	0	—	—
	1987	0	—	—	0	—	—	0	—	—	0	—	—
(5)	1986	0	—	—	30	1.00	0	0	—	—	0	—	—
(6)	1986	40	0.86	0.14	40	1.00	0	40	1.00	0	40	1.00	0

Appendix 1.—Continued.

Location	Year	*mAAT-1** *N*	*-100*	*-82*	*ADA-1** *N*	*100*	*107*	*G3PDH-1** *N*	*-100*	*-240*	*FDHG** *N*	*100*	*10*
(7)	1986	0	–	–	30	1.00	0	0	–	–	0	–	–
	1986	0	–	–	0	–	–	0	–	–	0	–	–
	1987	0	–	–	0	–	–	0	–	–	0	–	–
(8)	1986	0	–	–	0	–	–	0	–	–	0	–	–
(9)	1986	0	–	–	40	1.00	0	0	–	–	0	–	–
	1987	33	0.83	0.17	32	1.00	0	29	1.00	0	31	1.00	0
(10)	1989	18	0.81	0.19	18	1.00	0	18	1.00	0	17	1.00	0
	Total	99	0.84	0.16	198	1.00	0	96	1.00	0	96	1.00	0
m.	1990	67	0.86	0.14	67	1.00	0	66	1.00	0	67	1.00	0
n.	1990	99	0.94	0.06	93	1.00	0	99	1.00	0	99	1.00	0
o.	1988	88	0.89	0.11	86	1.00	0	87	1.00	0	89	1.00	0
p. Early	1986	0	–	–	0	–	–	0	–	–	0	–	–
	1986	0	–	–	40	1.00	0	40	1.00	0	0	–	–
	1987	0	–	–	0	–	–	0	–	–	0	–	–
	1989	30	0.87	0.13	30	1.00	0	30	1.00	0	30	1.00	0
	Total	30	0.87	0.13	70	1.00	0	70	1.00	0	30	1.00	0
q. Middle	1986	0	–	–	40	1.00	0	39	1.00	0	0	–	–
	1989	10	0.90	0.10	10	1.00	0	10	1.00	0	10	1.00	0
	Total	10	0.90	0.10	50	1.00	0	49	1.00	0	10	1.00	0
r. Late	1989	60	0.89	0.11	59	1.00	0	60	1.00	0	59	1.00	0
<u>District 113</u>													
Southern Chichagof Island													
s.	1984	0	–	–	97	1.00	0	0	–	–	0	–	–
	1987	99	1.00	0	96	0.99	0.01	98	1.00	0	90	1.00	0
	Total	99	1.00	0	193	0.997	0.003	98	1.00	0	90	1.00	0
<u>District 115</u>													
Chilkat River drainage													
t.	1983	0	–	–	50	1.00	0	0	–	–	0	–	–
u. Early	1983	0	–	–	50	1.00	0	0	–	–	0	–	–
Late	1983	0	–	–	100	1.00	0	0	–	–	0	–	–
	1990	45	0.99	0.01	45	1.00	0	45	1.00	0	45	1.00	0
	Total	45	0.99	0.01	195	1.00	0	45	1.00	0	45	1.00	0

Appendix 1.—Continued.

Location	Year	*mAAT-1**			*ADA-1**			*G3PDH-1**			*FDHG**		
		N	**-100*	**-82*	*N*	**100*	**107*	*N*	**-100*	**-240*	*N*	**100*	**10*
Chilkoot River drainage													
v.	1983	0	—	—	50	1.00	0	0	—	—	0	—	—
	1990	40	0.68	0.32	40	1.00	0	40	1.00	0	40	1.00	0
	Total	40	0.68	0.32	90	1.00	0	40	1.00	0	40	1.00	0
District 181													
Alsek River drainage													
w.	1987	45	0.91	0.09	33	1.00	0	45	1.00	0	40	1.00	0
Situk River drainage													
x.	1984	0	—	—	90	1.00	0	0	—	—	0	—	—

Appendix 1.—Extended.

Location	Year	PEPLT* N	PEPLT* *100	PEPLT* *92	sMDH-A1,2* N	sMDH-A1,2* *100	sMDH-A1,2* *64	sMDH-A1,2* *46	sMDH-B1,2* N	sMDH-B1,2* *100	sMDH-B1,2* *65	mMEP-1* N	mMEP-1* *100	mMEP-1* *125
District 101														
Boca de Quadra														
A.	1982	50	1.00	0	50	0.98	0.02	0	50	1.00	0	0	–	–
	1983	96	1.00	0	96	0.990	0.005	0.005	96	0.99	0.01	0	–	–
	1986	0	–	–	0	–	–	–	0	–	–	0	–	–
	1988	50	1.00	0	50	0.98	0.02	0	50	0.99	0.01	50	1.00	0
	Total	196	1.00	0	196	0.984	0.013	0.002	196	0.99	0.01	50	1.00	0
George Inlet														
B.	1986	0	–	–	0	–	–	–	0	–	–	0	–	–
Western Behm Canal														
C.	1983	50	1.00	0	50	1.00	0	0	50	1.00	0	0	–	–
	1986	0	–	–	0	–	–	–	0	–	–	0	–	–
	1986	40	1.00	0	40	1.00	0	0	33	1.00	0	0	–	–
	Total	90	1.00	0	90	1.00	0	0	83	1.00	0	0	–	–
D.	1982	50	1.00	0	50	0.99	0.01	0	50	1.00	0	0	–	–
	1987	0	–	–	98	0.99	0.01	0	99	0.99	0.01	0	–	–
	Total	50	1.00	0	148	0.99	0.01	0	149	0.997	0.003	0	–	–
E.	1983	97	1.00	0	100	0.99	0.01	0	100	1.00	0	0	–	–
	1988	52	1.00	0	52	1.00	0	0	52	0.98	0.02	52	1.00	0
	Total	149	1.00	0	152	0.997	0.003	0	152	0.99	0.01	52	1.00	0
F.	1983	104	1.00	0	104	1.00	0	0	104	1.00	0	0	–	–
Early	1984	47	1.00	0	50	1.00	0	0	50	1.00	0	0	–	–
Late	1984	49	1.00	0	50	1.00	0	0	50	1.00	0	0	–	–
	1986	0	–	–	0	–	–	–	0	–	–	0	–	–
	1986	35	1.00	0	37	1.00	0	0	35	1.00	0	0	–	–
	Total	235	1.00	0	241	1.00	0	0	239	1.00	0	0	–	–
District 102														
Eastern Prince of Wales Island														
G.	1983	79	1.00	0	79	0.99	0.01	0	79	1.00	0	0	–	–
H.	1982	50	1.00	0	50	1.00	0	0	50	1.00	0	0	–	–
	1983	100	1.00	0	100	1.00	0	0	100	1.00	0	0	–	–
	Total	150	1.00	0	150	1.00	0	0	150	1.00	0	0	–	–
I.	1988	48	1.00	0	52	1.00	0	0	52	1.00	0	50	1.00	0

Appendix 1.—Continued.

Location	Year	*PEPLT** N	*PEPLT** *100	*PEPLT** *92	*sMDH-A1,2** N	*sMDH-A1,2** *100	*sMDH-A1,2** *64	*sMDH-A1,2** *46	*sMDH-B1,2** N	*sMDH-B1,2** *100	*sMDH-B1,2** *65	*mMEP-1** N	*mMEP-1** *100	*mMEP-1** *125
J.	1982	100	1.00	0	100	1.00	0	0	100	1.00	0	0	–	–
	1983	100	1.00	0	100	1.00	0	0	100	1.00	0	0	–	–
	1986	0	–	–	0	–	–	–	0	–	–	0	–	–
	1988	17	1.00	0	43	1.00	0	0	43	1.00	0	42	1.00	0
	Total	217	1.00	0	243	1.00	0	0	243	1.00	0	42	1.00	0
District 103														
Western Prince of Wales Island														
K.	1983	100	1.00	0	100	1.00	0	0	100	1.00	0	0	–	–
	1986	0	–	–	0	–	–	–	0	–	–	0	–	–
	Total	100	1.00	0	100	1.00	0	0	100	1.00	0	0	–	–
L.	1986	0	–	–	0	–	–	–	0	–	–	0	–	–
M.	1983	99	1.00	0	99	1.00	0	0	99	1.00	0	0	–	–
	1988	56	1.00	0	59	1.00	0	0	59	1.00	0	54	1.00	0
	Total	155	1.00	0	158	1.00	0	0	158	1.00	0	54	1.00	0
N.	1986	0	–	–	0	–	–	–	0	–	–	0	–	–
	1987	0	–	–	0	–	–	–	0	–	–	0	–	–
	1988	44	1.00	0	50	1.00	0	0	50	1.00	0	49	1.00	0
	Total	44	1.00	0	50	1.00	0	0	50	1.00	0	49	1.00	0
O.	1986	0	–	–	0	–	–	–	0	–	–	0	–	–
	1987	0	–	–	0	–	–	–	0	–	–	0	–	–
	1988	44	0.99	0.01	43	1.00	0	0	43	1.00	0	43	1.00	0
	Total	44	0.99	0.01	43	1.00	0	0	43	1.00	0	43	1.00	0
District 105														
Northern Prince of Wales Island														
P.	1983	50	1.00	0	50	1.00	0	0	50	1.00	0	0	–	–
Q.	1986	0	–	–	0	–	–	–	0	–	–	0	–	–
District 106														
Northwestern Prince of Wales Island														
R.	1988	50	0.99	0.01	54	1.00	0	0	54	1.00	0	54	1.00	0

Appendix 1.—Continued.

Location	Year	PEPLT*			sMDH-A1,2*				sMDH-B1,2*			mMEP-1*		
		N	**100*	**92*	*N*	**100*	**64*	**46*	*N*	**100*	**65*	*N*	**100*	**125*
S.	1983	50	1.00	0	50	1.00	0	0	50	1.00	0	0	–	–
	1986	0	–	–	0	–	–	–	0	–	–	0	–	–
	1986	38	1.00	0	39	1.00	0	0	40	1.00	0	0	–	–
	1987	0	–	–	0	–	–	–	0	–	–	0	–	–
	1988	62	1.00	0	63	1.00	0	0	63	1.00	0	62	1.00	0
	Total	150	1.00	0	152	1.00	0	0	153	1.00	0	62	1.00	0
T.	1983	70	1.00	0	70	1.00	0	0	70	1.00	0	0	–	–
	1986	0	–	–	0	–	–	–	0	–	–	0	–	–
	1986	40	1.00	0	37	1.00	0	0	40	1.00	0	0	–	–
	Total	110	1.00	0	107	1.00	0	0	110	1.00	0	0	–	–
U.	1982	69	1.00	0	69	0.99	0.01	0	69	1.00	0	0	–	–
V.	1983	76	1.00	0	76	1.00	0	0	76	1.00	0	0	–	–
	1986	0	–	–	0	–	–	–	0	–	–	0	–	–
	Total	76	1.00	0	76	1.00	0	0	76	1.00	0	0	–	–
Kupreanof Island														
W.	1986	0	–	–	0	–	–	–	0	–	–	0	–	–
<u>District 107</u>														
Western Wrangell Island														
X.	1983	75	1.00	0	74	1.00	0	0	74	1.00	0	0	–	–
	1986	0	–	–	0	–	–	–	0	–	–	0	–	–
	1987	0	–	–	0	–	–	–	0	–	–	0	–	–
	Total	75	1.00	0	74	1.00	0	0	74	1.00	0	0	–	–
<u>District 108</u>														
Stikine River drainage														
Y.	1986	0	–	–	61	1.00	0	0	61	1.00	0	0	–	–
Z.	1986	0	–	–	0	–	–	–	0	–	–	0	–	–
a.	1990	97	0.99	0.01	97	1.00	0	0	99	1.00	0	100	1.00	0
b.	1986	0	–	–	0	–	–	–	0	–	–	0	–	–

Appendix 1.—Continued.

Location	Year	PEPLT* N	PEPLT* *100	PEPLT* *92	sMDH-A1,2* N	sMDH-A1,2* *100	sMDH-A1,2* *64	sMDH-A1,2* *46	sMDH-B1,2* N	sMDH-B1,2* *100	sMDH-B1,2* *65	mMEP-1* N	mMEP-1* *100	mMEP-1* *125
District 109														
Kuiu Island														
c.	1986	0	–	–	0	–	–	–	0	–	–	0	–	–
	1987	52	1.00	0	52	1.00	0	0	52	1.00	0	52	1.00	0
	Total	52	1.00	0	52	1.00	0	0	52	1.00	0	52	1.00	0
d.	1986	0	–	–	0	–	–	–	0	–	–	0	–	–
District 111														
North of Juneau														
e.	1986	0	–	–	0	–	–	–	0	–	–	0	–	–
	1988	0	–	–	0	–	–	–	0	–	–	0	–	–
	Total	0	–	–	0	–	–	–	0	–	–	0	–	–
Eastern Stephens Passage-Port Snettisham														
f.	1983	100	1.00	0	99	0.96	0.04	0	100	1.00	0	0	–	–
g.	1983	100	0.99	0.01	100	0.98	0.02	0	100	1.00	0	0	–	–
Herbert River drainage														
h.	1989	73	1.00	0	73	1.00	0	0	73	0.99	0.01	73	1.00	0
Mendenhall River drainage														
i.	1986	0	–	–	0	–	–	–	0	–	–	0	–	–
	1988	51	1.00	0	51	1.00	0	0	51	1.00	0	50	0.99	0.01
	1989	10	1.00	0	10	1.00	0	0	10	1.00	0	10	1.00	0
	Total	61	1.00	0	61	1.00	0	0	61	1.00	0	60	0.99	0.01
Taku River drainage														
j. (1)	1986	0	–	–	0	–	–	–	0	–	–	0	–	–
(2)	1986	31	1.00	0	40	1.00	0	0	40	1.00	0	0	–	–
	1989	20	1.00	0	20	1.00	0	0	20	1.00	0	19	1.00	0
	Total	51	1.00	0	60	1.00	0	0	60	1.00	0	19	1.00	0
k. (3)	1989	8	1.00	0	10	1.00	0	0	10	0.95	0.05	8	1.00	0
(4)	1986	0	–	–	0	–	–	–	0	–	–	0	–	–
	1987	0	–	–	0	–	–	–	0	–	–	0	–	–
(5)	1986	40	1.00	0	40	1.00	0	0	40	1.00	0	0	–	–
(6)	1986	40	1.00	0	40	1.00	0	0	40	1.00	0	40	1.00	0

Appendix 1.—Continued.

Location	Year	PEPLT* N	PEPLT* *100	PEPLT* *92	sMDH-A1,2* N	sMDH-A1,2* *100	sMDH-A1,2* *64	sMDH-A1,2* *46	sMDH-B1,2* N	sMDH-B1,2* *100	sMDH-B1,2* *65	mMEP-1* N	mMEP-1* *100	mMEP-1* *125
(7)	1986	29	1.00	0	40	1.00	0	0	40	1.00	0	0	–	–
	1986	0	–	–	0	–	–	–	0	–	–	0	–	–
	1987	0	–	–	0	–	–	–	0	–	–	0	–	–
(8)	1986	0	–	–	0	–	–	–	0	–	–	0	–	–
(9)	1986	30	1.00	0	40	1.00	0	0	0	–	–	0	–	–
	1987	32	1.00	0	33	1.00	0	0	40	1.00	0	0	–	–
(10)	1989	18	1.00	0	18	1.00	0	0	33	1.00	0	29	1.00	0
									18	1.00	0	18	1.00	0
	Total	197	1.00	0	221	1.00	0	0	221	0.997	0.003	95	1.00	0
m.	1990	66	1.00	0	66	1.00	0	0	65	1.00	0	67	1.00	0
n.	1990	99	1.00	0	100	1.00	0	0	100	1.00	0	100	1.00	0
o.	1988	89	0.99	0.01	89	1.00	0	0	89	1.00	0	89	1.00	0
p. Early	1986	0	–	–	0	–	–	–	0	–	–	0	–	–
	1986	0	–	–	0	–	–	–	0	–	–	0	–	–
	1987	0	–	–	0	–	–	–	0	–	–	0	–	–
	1989	30	1.00	0	30	1.00	0	0	30	1.00	0	29	1.00	0
	Total	30	1.00	0	30	1.00	0	0	30	1.00	0	29	1.00	0
q. Middle	1986	0	–	–	39	1.00	0	0	0	–	–	0	–	–
	1989	10	1.00	0	10	1.00	0	0	10	1.00	0	10	1.00	0
	Total	10	1.00	0	49	1.00	0	0	10	1.00	0	10	1.00	0
r. Late	1989	59	1.00	0	60	1.00	0	0	60	0.98	0.02	59	1.00	0
<u>District 113</u>														
Southern Chichagof Island														
s.	1984	93	1.00	0	97	1.00	0	0	97	1.00	0	0	–	–
	1987	98	1.00	0	99	1.00	0	0	99	1.00	0	92	1.00	0
	Total	191	1.00	0	196	1.00	0	0	196	1.00	0	92	1.00	0
<u>District 115</u>														
Chilkat River drainage														
t.	1983	100	1.00	0	100	1.00	0	0	100	1.00	0	0	–	–
u. Early	1983	100	1.00	0	100	1.00	0	0	100	1.00	0	0	–	–
Late	1983	100	1.00	0	100	1.00	0	0	99	1.00	0	0	–	–
	1990	44	1.00	0	45	1.00	0	0	45	1.00	0	45	1.00	0
	Total	244	1.00	0	245	1.00	0	0	244	1.00	0	45	1.00	0

Appendix 1.—Continued.

Location	Year	PEPLT*			sMDH-A1,2*				sMDH-B1,2*			mMEP-1*		
		N	*100	*92	*N*	*100	*64	*46	*N*	*100	*65	*N*	*100	*125
Chilkoot River drainage														
v.	1983	50	1.00	0	97	1.00	0	0	97	1.00	0	0	—	—
	1990	40	1.00	0	40	1.00	0	0	40	1.00	0	39	1.00	0
	Total	90	1.00	0	137	1.00	0	0	137	1.00	0	39	1.00	0
District 181														
Alsek River drainage														
w.	1987	45	1.00	0	44	1.00	0	0	44	0.91	0.09	40	1.00	0
Situk River drainage														
x.	1984	98	1.00	0	98	1.00	0	0	98	1.00	0	0	—	—

Appendix 1.—Extended.

Location	Year	*GPI-B1,2**					*GPI-A**				*MPI**		
		N	**100*	**132*	**143*	**61*	*N*	**100*	**88*	**Fast*	*N*	**100*	**107*
District 101													
Boca de Quadra													
A.	1982	50	1.00	0	0	0	50	0.97	0.03	0	0	–	–
	1983	96	1.00	0	0	0	96	1.00	0	0	0	–	–
	1986	0	–	–	–	–	0	–	–	0	0	–	–
	1988	48	1.00	0	0	0	50	0.98	0.02	0	49	1.00	0
	Total	194	1.00	0	0	0	196	0.99	0.01	0	49	1.00	0
George Inlet													
B.	1986	0	–	–	–	–	0	–	–	–	0	–	–
Western Behm Canal													
C.	1983	50	1.00	0	0	0	50	1.00	0	0	0	–	–
	1986	0	–	–	–	–	0	–	–	–	0	–	–
	1986	36	1.00	0	0	0	34	1.00	0	0	0	–	–
	Total	86	1.00	0	0	0	84	1.00	0	0	0	–	–
D.	1982	50	1.00	0	0	0	50	0.99	0.01	0	0	–	–
	1987	0	–	–	–	–	87	0.99	0.01	0	97	0.99	0.01
	Total	50	1.00	0	0	0	137	0.99	0.01	0	97	0.99	0.01
E.	1983	100	1.00	0	0	0	100	1.00	0	0	0	–	–
	1988	52	1.00	0	0	0	52	0.98	0.02	0	50	1.00	0
	Total	152	1.00	0	0	0	152	0.99	0.01	0	50	1.00	0
F.	1983	104	0.99	0.01	0	0	104	1.00	0	0	0	–	–
Early	1984	50	1.00	0	0	0	50	1.00	0	0	0	–	–
Late	1984	50	1.00	0	0	0	50	1.00	0	0	0	–	–
	1986	0	–	–	–	–	0	–	–	–	0	–	–
	1986	38	1.00	0	0	0	38	1.00	0	0	0	–	–
	Total	242	0.998	0.002	0	0	242	1.00	0	0	0	–	–
District 102													
Eastern Prince of Wales Island													
G.	1983	79	1.00	0	0	0	79	1.00	0	0	0	–	–
H.	1982	0	–	–	–	–	50	1.00	0	0	0	–	–
	1983	100	1.00	0	0	0	100	1.00	0	0	0	–	–
	Total	100	1.00	0	0	0	150	1.00	0	0	0	–	–
I.	1988	52	1.00	0	0	0	52	1.00	0	0	52	1.00	0

Appendix 1.—Continued.

Location	Year	*GPI-B1,2** *N*	**100*	**132*	**143*	**61*	*GPI-A** *N*	**100*	**88*	**Fast*	*MPI** *N*	**100*	**107*
J.	1982	100	1.00	0	0	0	100	1.00	0	0	0	—	—
	1983	100	1.00	0	0	0	100	1.00	0	0	0	—	—
	1986	0	—	—	—	—	0	—	—	—	0	—	—
	1988	45	1.00	0	0	0	45	1.00	0	0	46	1.00	0
	Total	245	1.00	0	0	0	245	1.00	0	0	46	1.00	0
District 103													
Western Prince of Wales Island													
K.	1983	100	1.00	0	0	0	100	1.00	0	0	0	—	—
	1986	0	—	—	—	—	0	—	—	—	0	—	—
	Total	100	1.00	0	0	0	100	1.00	0	0	0	—	—
L.	1986	0	—	—	—	—	0	—	—	—	0	—	—
M.	1983	99	1.00	0	0	0	99	1.00	0	0	0	—	—
	1988	54	0.99	0.01	0	0	54	0.99	0	0.01	58	1.00	0
	Total	153	0.997	0.003	0	0	153	0.997	0	0.003	58	1.00	0
N.	1986	0	—	—	—	—	0	—	—	—	0	—	—
	1987	0	—	—	—	—	0	—	—	—	0	—	—
	1988	50	1.00	0	0	0	50	1.00	0	0	50	1.00	0
	Total	50	1.00	0	0	0	50	1.00	0	0	50	1.00	0
O.	1986	0	—	—	—	—	0	—	—	—	0	—	—
	1987	0	—	—	—	—	0	—	—	—	0	—	—
	1988	43	1.00	0	0	0	43	1.00	0	0	43	1.00	0
	Total	43	1.00	0	0	0	43	1.00	0	0	43	1.00	0
District 105													
Northern Prince of Wales Island													
P.	1983	50	1.00	0	0	0	50	1.00	0	0	0	—	—
Q.	1986	0	—	—	—	—	0	—	—	—	0	—	—
District 106													
Northwestern Prince of Wales Island													
R.	1988	48	1.00	0	0	0	54	1.00	0	0	51	1.00	0

Appendix 1.—Continued.

Location	Year	GPI-B1,2* N	GPI-B1,2* *100	GPI-B1,2* *132	GPI-B1,2* *143	GPI-B1,2* *61	GPI-A* N	GPI-A* *100	GPI-A* *88	GPI-A* *Fast	MPI* N	MPI* *100	MPI* *107
S.	1983	50	1.00	0	0	0	50	1.00	0	0	0	—	—
	1986	0	—	—	—	—	0	—	—	—	0	—	—
	1986	40	1.00	0	0	0	39	1.00	0	0	0	—	—
	1987	0	—	—	—	—	0	—	—	—	0	—	—
	1988	63	1.00	0	0	0	63	1.00	0	0	64	1.00	0
	Total	153	1.00	0	0	0	152	1.00	0	0	64	1.00	0
T.	1983	70	1.00	0	0	0	70	1.00	0	0	0	—	—
	1986	0	—	—	—	—	0	—	—	—	0	—	—
	1986	40	1.00	0	0	0	32	1.00	0	0	0	—	—
	Total	110	1.00	0	0	0	102	1.00	0	0	0	—	—
U.	1982	69	1.00	0	0	0	69	1.00	0	0	0	—	—
V.	1983	76	0.99	0.01	0	0	76	1.00	0	0	0	—	—
	1986	0	—	—	—	—	0	—	—	—	0	—	—
	Total	76	0.99	0.01	0	0	76	1.00	0	0	0	—	—
Kupreanof Island													
W.	1986	0	—	—	—	—	0	—	—	—	0	—	—
<u>District 107</u>													
Western Wrangell Island													
X.	1983	74	1.00	0	0	0	75	1.00	0	0	0	—	—
	1986	0	—	—	—	—	0	—	—	—	0	—	—
	1987	0	—	—	—	—	0	—	—	—	0	—	—
	Total	74	1.00	0	0	0	75	1.00	0	0	0	—	—
<u>District 108</u>													
Stikine River drainage													
Y.	1986	0	—	—	—	—	0	—	—	—	18	1.00	0
Z.	1986	0	—	—	—	—	0	—	—	—	0	—	—
a.	1990	100	1.00	0	0	0	100	1.00	0	0	100	1.00	0
b.	1986	0	0	0	0	0	0	—	—	—	0	—	—

Appendix 1.—Continued.

Location	Year	GPI-B1,2* N	GPI-B1,2* *100	GPI-B1,2* *132	GPI-B1,2* *143	GPI-B1,2* *61	GPI-A* N	GPI-A* *100	GPI-A* *88	GPI-A* *Fast	MPI* N	MPI* *100	MPI* *107
District 109													
Kuiu Island													
c.	1986	0	–	–	–	–	0	–	–	–	0	–	–
	1987	52	1.00	0	0	0	52	1.00	0	0	45	1.00	0
	Total	52	1.00	0	0	0	52	1.00	0	0	45	1.00	0
d.	1986	0	–	–	–	–	0	–	–	–	0	–	–
District 111													
North of Juneau													
e.	1986	0	–	–	–	–	0	–	–	–	0	–	–
	1988	0	–	–	–	–	0	–	–	–	0	–	–
	Total	0	–	–	–	–	0	–	–	–	0	–	–
Eastern Stephens Passage-Port Snettisham													
f.	1983	100	1.00	0	0	0	50	1.00	0	0	0	–	–
g.	1983	100	1.00	0	0	0	50	1.00	0	0	0	–	–
Herbert River drainage													
h.	1989	73	1.00	0	0	0	73	1.00	0	0	73	1.00	0
Mendenhall River drainage													
i.	1986	0	–	–	–	–	0	–	–	–	0	–	–
	1988	51	1.00	0	0	0	51	1.00	0	0	0	–	–
	1989	10	1.00	0	0	0	10	1.00	0	0	10	1.00	0
	Total	61	1.00	0	0	0	61	1.00	0	0	10	1.00	0
Taku River drainage													
j. (1)	1986	0	–	–	–	–	0	–	–	–	0	–	–
(2)	1986	33	1.00	0	0	0	33	1.00	0	0	0	–	–
	1989	20	1.00	0	0	0	20	1.00	0	0	20	1.00	0
	Total	53	1.00	0	0	0	53	1.00	0	0	20	1.00	0
k. (3)	1989	10	1.00	0	0	0	10	1.00	0	0	8	1.00	0
(4)	1986	0	–	–	–	–	0	–	–	–	0	–	–
	1987	0	–	–	–	–	0	–	–	–	0	–	–
(5)	1986	40	1.00	0	0	0	40	1.00	0	0	0	–	–
(6)	1986	40	1.00	0	0	0	40	1.00	0	0	40	1.00	0

Appendix 1.—Continued.

Location	Year	GPI-B1,2* N	GPI-B1,2* *100	GPI-B1,2* *132	GPI-B1,2* *143	GPI-B1,2* *61	GPI-A* N	GPI-A* *100	GPI-A* *88	GPI-A* *Fast	MPI* N	MPI* *100	MPI* *107
(7)	1986	40	1.00	0	0	0	40	1.00	0	0	0	–	–
	1986	0	–	–	–	–	0	–	–	–	0	–	–
	1987	0	–	–	–	–	0	–	–	–	0	–	–
(8)	1986	0	–	–	–	–	0	–	–	–	0	–	–
(9)	1986	40	1.00	0	0	0	40	1.00	0	0	0	–	–
	1987	32	1.00	0	0	0	32	1.00	0	0	0	–	–
(10)	1989	18	1.00	0	0	0	18	1.00	0	0	32	1.00	0
	Total	220	1.00	0	0	0	220	1.00	0	0	17	1.00	0
											220	1.00	0
m.	1990	67	1.00	0	0	0	67	1.00	0	0	67	1.00	0
n.	1990	100	1.00	0	0	0	100	1.00	0	0	98	1.00	0
o.	1988	86	1.00	0	0	0	86	1.00	0	0	84	1.00	0
p. Early	1986	0	–	–	–	–	0	–	–	–	0	–	–
	1986	40	1.00	0	0	0	40	1.00	0	0	0	–	–
	1987	0	–	–	–	–	0	–	–	–	0	–	–
	1989	30	1.00	0	0	0	30	1.00	0	0	30	1.00	0
	Total	70	1.00	0	0	0	70	1.00	0	0	30	1.00	0
q. Middle	1986	38	1.00	0	0	0	40	1.00	0	0	39	1.00	0
	1989	10	1.00	0	0	0	10	1.00	0	0	10	1.00	0
	Total	48	1.00	0	0	0	50	1.00	0	0	49	1.00	0
r. Late	1989	60	1.00	0	0	0	60	1.00	0	0	59	1.00	0
District 113													
Southern Chichagof Island													
s.	1984	50	1.00	0	0	0	96	0.99	0.01	0	0	–	–
	1987	99	1.00	0	0	0	99	1.00	0	0	90	1.00	0
	Total	149	1.00	0	0	0	195	0.995	0.005	0	90	1.00	0
District 115													
Chilkat River drainage													
t.	1983	100	1.00	0	0	0	100	1.00	0	0	0	–	–
u. Early	1983	100	1.00	0	0	0	100	1.00	0	0	0	–	–
Late	1983	100	1.00	0	0	0	100	1.00	0	0	0	–	–
	1990	45	1.00	0	0	0	45	1.00	0	0	45	1.00	0
	Total	145	1.00	0	0	0	145	1.00	0	0	45	1.00	0

Appendix 1.—Continued.

Location	Year	GPI-B1,2*					GPI-A*				MPI*		
		N	**100*	**132*	**143*	**61*	*N*	**100*	**88*	**Fast*	*N*	**100*	**107*
Chilkoot River drainage													
v.	1983	97	0.99	0.01	0.01	0	97	1.00	0	0	0	–	–
	1990	40	0.96	0	0	0.04	40	1.00	0	0	40	1.00	0
	Total	137	0.978	0.007	0.004	0.011	137	1.00	0	0	40	1.00	0
<u>District 181</u>													
Alsek River drainage													
w.	1987	43	1.00	0	0	0	45	1.00	0	0	45	1.00	0
Situk River drainage													
x.	1984	96	0.98	0.02	0	0	96	1.00	0	0	0	–	–

Appendix 1.—Extended.

Location	Year	PEPD* N	PEPD* *100	PEPD* *121	LDH-B1* N	LDH-B1* *100	LDH-B1* *123	LDH-B1* *80	ESTD* N	ESTD* *100	ESTD* *120	ESTD* *slow	mAh-3* N	mAh-3* *100	mAh-3* *75
District 101															
Boca de Quadra															
A.	1982	0	–	–	50	0.99	0.01	0	0	–	–	–	0	–	–
	1983	0	–	–	96	1.00	0	0	0	–	–	–	0	–	–
	1986	0	–	–	0	–	–	–	0	–	–	–	0	–	–
	1988	50	1.00	0	50	0.99	0.01	0	50	1.00	0	0	50	1.00	0
	Total	50	1.00	0	196	0.99	0.01	0	50	1.00	0	0	50	1.00	0
George Inlet															
B.	1986	0	–	–	0	–	–	–	0	–	–	–	0	–	–
Western Behm Canal															
C.	1983	0	–	–	50	0.99	0.01	0	0	–	–	–	0	–	–
	1986	0	–	–	0	–	–	–	0	–	–	–	0	–	–
	1986	0	–	–	40	1.00	0	0	0	–	–	–	0	–	–
	Total	0	–	–	90	0.99	0.01	0	0	–	–	–	0	–	–
D.	1982	0	–	–	50	0.99	0.01	0	0	–	–	–	0	–	–
	1987	0	–	–	0	–	–	–	0	–	–	–	99	0.99	0.01
	Total	0	–	–	50	0.99	0.01	0	0	–	–	–	99	0.99	0.01
E.	1983	0	–	–	100	0.98	0.02	0	0	–	–	–	0	–	–
	1988	51	1.00	0	51	1.00	0	0	52	1.00	0	0	52	1.00	0
	Total	51	1.00	0	151	0.99	0.01	0	52	1.00	0	0	52	1.00	0
F.	1983	0	–	–	103	0.98	0.02	0	0	–	–	–	0	–	–
	1984	0	–	–	49	1.00	0	0	0	–	–	–	0	–	–
	1984	0	–	–	50	1.00	0	0	0	–	–	–	0	–	–
	1986	0	–	–	0	–	–	–	0	–	–	–	0	–	–
	1986	0	–	–	40	1.00	0	0	0	–	–	–	0	–	–
	Total	0	–	–	242	0.994	0.006	0	0	–	–	–	0	–	–
District 102															
Eastern Prince of Wales Island															
G.	1983	0	–	–	79	1.00	0	0	0	–	–	–	0	–	–
H.	1982	0	–	–	0	–	–	–	0	–	–	–	0	–	–
	1983	0	–	–	100	1.00	0	0	0	–	–	–	0	–	–
	Total	0	–	–	100	1.00	0	0	0	–	–	–	0	–	–
I.	1988	48	1.00	0	52	1.00	0	0	52	1.00	0	0	52	1.00	0

Appendix 1.—Continued.

Location	Year	PEPD*			LDH-B1*				ESTD*				mAh-3*		
		N	*100	*121	N	*100	*123	*80	N	*100	*120	*slow	N	*100	*75
J.	1982	0	–	–	100	1.00	0	0	0	–	–	–	0	–	–
	1983	0	–	–	100	1.00	0	0	0	–	–	–	0	–	–
	1986	0	–	–	0	–	–	–	0	–	–	–	0	–	–
	1988	43	1.00	0	17	1.00	0	0	17	0.96	0	0.04	42	1.00	0
	Total	43	1.00	0	117	1.00	0	0	17	0.96	0	0.04	42	1.00	0
District 103															
Western Prince of Wales Island															
K.	1983	0	–	–	100	1.00	0	0	0	–	–	–	0	–	–
	1986	0	–	–	0	–	–	–	0	–	–	–	0	–	–
	Total	0	–	–	100	1.00	0	0	0	–	–	–	0	–	–
L.	1986	0	–	–	0	–	–	–	0	–	–	–	0	–	–
M.	1983	0	–	–	99	1.00	0	0	0	–	–	–	0	–	–
	1988	57	1.00	0	59	1.00	0	0	57	1.00	0	0	55	1.00	0
	Total	57	1.00	0	158	1.00	0	0	57	1.00	0	0	55	1.00	0
N.	1986	0	–	–	0	–	–	–	0	–	–	–	0	–	–
	1987	0	–	–	0	–	–	–	0	–	–	–	0	–	–
	1988	49	1.00	0	50	1.00	0	0	50	1.00	0	0	40	1.00	0
	Total	49	1.00	0	50	1.00	0	0	50	1.00	0	0	40	1.00	0
O.	1986	0	–	–	0	–	–	–	0	–	–	–	0	–	–
	1987	0	–	–	0	–	–	–	0	–	–	–	0	–	–
	1988	44	0.95	0.05	39	0.95	0.05	0	44	1.00	0	0	42	1.00	0
	Total	44	0.95	0.05	39	0.95	0.05	0	44	1.00	0	0	42	1.00	0
District 105															
Northern Prince of Wales Island															
P.	1983	0	–	–	50	1.00	0	0	0	–	–	–	0	–	–
Q.	1986	0	–	–	0	–	–	–	0	–	–	–	0	–	–
District 106															
Northwestern Prince of Wales Island															
R.	1988	51	1.00	0	54	1.00	0	0	54	1.00	0	0	54	1.00	0

Appendix 1.—Continued.

Location	Year	PEPD*			LDH-B1*				ESTD*				mAh-3*		
		N	*100	*121	N	*100	*123	*80	N	*100	*120	*slow	N	*100	*75
S.	1983	0	–	–	50	1.00	0	0	0	–	–	–	0	–	–
	1986	0	–	–	0	–	–	–	0	–	–	–	0	–	–
	1986	0	–	–	0	–	–	–	0	–	–	–	0	–	–
	1986	0	–	–	40	1.00	0	0	0	–	–	–	0	–	–
	1987	0	–	–	0	–	–	–	0	–	–	–	0	–	–
	1988	63	1.00	0	64	1.00	0	0	62	1.00	0	0	59	1.00	0
	Total	63	1.00	0	154	1.00	0	0	62	1.00	0	0	59	1.00	0
T.	1983	0	–	–	70	1.00	0	0	0	–	–	–	0	–	–
	1986	0	–	–	0	–	–	–	0	–	–	–	0	–	–
	1986	0	–	–	40	1.00	0	0	0	–	–	–	0	–	–
	Total	0	–	–	110	1.00	0	0	0	–	–	–	0	–	–
U.	1982	0	–	–	69	0.92	0.08	0	0	–	–	–	0	–	–
V.	1983	0	–	–	75	0.90	0.10	0	0	–	–	–	0	–	–
	1986	0	–	–	0	–	–	–	0	–	–	–	0	–	–
	Total	0	–	–	75	0.90	0.10	0	0	–	–	–	0	–	–
Kupreanof Island															
W.	1986	0	–	–	0	–	–	–	0	–	–	–	0	–	–
<u>District 107</u>															
Western Wrangell Island															
X.	1983	0	–	–	74	0.99	0.01	0	0	–	–	–	0	–	–
	1986	0	–	–	0	–	–	–	0	–	–	–	0	–	–
	1987	0	–	–	0	–	–	–	0	–	–	–	0	–	–
	Total	0	–	–	74	0.99	0.01	0	0	–	–	–	0	–	–
<u>District 108</u>															
Stikine River drainage															
Y.	1986	0	–	–	0	–	–	–	0	–	–	–	0	–	–
Z.	1986	0	–	–	0	–	–	–	0	–	–	–	0	–	–
a.	1990	100	1.00	0	100	1.00	0	0	99	1.00	0	0	100	1.00	0
b.	1986	0	–	–	0	–	–	–	0	–	–	–	0	–	–

Appendix 1.—Continued.

Location	Year	PEPD* N	PEPD* *100	PEPD* *121	LDH-B1* N	LDH-B1* *100	LDH-B1* *123	LDH-B1* *80	ESTD* N	ESTD* *100	ESTD* *120	ESTD* *slow	mAh-3* N	mAh-3* *100	mAh-3* *75
District 109															
Kuiu Island															
c.	1986	0	–	–	0	–	–	–	0	–	–	–	0	–	–
	1987	52	1.00	0	52	1.00	0	0	52	1.00	0	0	52	1.00	0
	Total	52	1.00	0	52	1.00	0	0	52	1.00	0	0	52	1.00	0
d.	1986	0	–	–	0	–	–	–	0	–	–	–	0	–	–
District 111															
North of Juneau															
e.	1986	0	–	–	0	–	–	–	0	–	–	–	0	–	–
	1988	0	–	–	0	–	–	–	0	–	–	–	0	–	–
	Total	0	–	–	0	–	–	–	0	–	–	–	0	–	–
Eastern Stephens Passage-Port Snettisham															
f.	1983	0	–	–	99	1.00	0	0	0	–	–	–	0	–	–
g.	1983	0	–	–	47	0.99	0.01	0	0	–	–	–	0	–	–
Herbert River drainage															
h.	1989	73	1.00	0	73	1.00	0	0	73	0.99	0.01	0	73	1.00	0
Mendenhall River drainage															
i.	1986	0	–	–	0	–	–	–	0	–	–	–	0	–	–
	1988	47	1.00	0	47	1.00	0	0	47	1.00	0	0	43	1.00	0
	1989	10	1.00	0	10	1.00	0	0	10	1.00	0	0	10	1.00	0
	Total	57	1.00	0	57	1.00	0	0	57	1.00	0	0	10	1.00	0
Taku River drainage															
j. Lower main stem															
(1)	1986	0	–	–	0	–	–	–	0	–	–	–	0	–	–
(2)	1986	0	–	–	40	1.00	0	0	0	–	–	–	0	–	–
	1989	20	1.00	0	20	1.00	0	0	20	0.98	0.02	0	18	1.00	0
	Total	20	1.00	0	60	1.00	0	0	20	0.98	0.02	0	18	1.00	0
k. Upper main stem															
(3)	1989	9	1.00	0	10	1.00	0	0	9	1.00	0	0	8	1.00	0
(4)	1986	0	–	–	0	–	–	–	0	–	–	–	0	–	–
	1987	0	–	–	0	–	–	–	0	–	–	–	0	–	–
(5)	1986	0	–	–	40	1.00	0	0	0	–	–	–	0	–	–
(6)	1986	40	1.00	0	40	1.00	0	0	40	1.00	0	0	40	1.00	0

Appendix 1.—Continued.

Location	Year	PEPD*			LDH-B1*				ESTD*				mAh-3*		
		N	**100*	**121*	*N*	**100*	**123*	**80*	*N*	**100*	**120*	**slow*	*N*	**100*	**75*
(7)	1986	0	–	–	40	1.00	0	0	0	–	–	–	0	–	–
	1986	0	–	–	0	–	–	–	0	–	–	–	0	–	–
	1987	0	–	–	0	–	–	–	0	–	–	–	0	–	–
(8)	1986	0	–	–	0	–	–	–	0	–	–	–	0	–	–
(9)	1986	0	–	–	40	1.00	0	0	0	–	–	–	0	–	–
	1987	27	1.00	0	28	1.00	0	0	31	1.00	0	0	33	1.00	0
(10)	1989	18	1.00	0	18	1.00	0	0	18	1.00	0	0	18	1.00	0
	Total	94	1.00	0	216	1.00	0	0	98	1.00	0	0	98	1.00	0
m.	1990	67	1.00	0	67	1.00	0	0	67	1.00	0	0	67	1.00	0
n.	1990	99	1.00	0	100	1.00	0	0	100	1.00	0	0	100	1.00	0
o.	1988	85	0.99	0.01	86	1.00	0	0	89	1.00	0	0	89	1.00	0
p. Early	1986	0	–	–	0	–	–	–	0	–	–	–	0	–	–
	1986	0	–	–	0	–	–	–	0	–	–	–	40	1.00	0
	1987	0	–	–	0	–	–	–	0	–	–	–	0	–	–
	1989	30	1.00	0	30	1.00	0	0	30	1.00	0	0	30	1.00	0
	Total	30	1.00	0	30	1.00	0	0	30	1.00	0	0	70	1.00	0
q. Middle	1986	39	1.00	0	40	1.00	0	0	0	–	–	–	40	1.00	0
	1989	10	1.00	0	10	1.00	0	0	10	1.00	0	0	10	1.00	0
	Total	49	1.00	0	50	1.00	0	0	10	1.00	0	0	50	1.00	0
r. Late	1989	60	1.00	0	60	1.00	0	0	60	1.00	0	0	60	1.00	0
District 113															
Southern Chichagof Island															
s.	1984	0	–	–	96	0.89	0.07	0.05	0	–	–	–	0	–	–
	1987	94	1.00	0	98	0.81	0.10	0.09	99	1.00	0	0	98	1.00	0
	Total	94	1.00	0	194	0.85	0.09	0.07	99	1.00	0	0	98	1.00	0
District 115															
Chilkat River drainage															
t.	1983	0	–	–	100	1.00	0	0	0	–	–	–	0	–	–
u. Early	1983	0	–	–	99	1.00	0	0	0	–	–	–	0	–	–
Late	1983	0	–	–	100	1.00	0	0	0	–	–	–	0	–	–
	1990	45	1.00	0	45	1.00	0	0	45	1.00	0	0	45	1.00	0
	Total	45	1.00	0	244	1.00	0	0	45	1.00	0	0	45	1.00	0

Appendix 1.—Continued.

Location	Year	*PEPD**			*LDH-B1**				*ESTD**				*mAh-3**		
		N	**100*	**121*	*N*	**100*	**123*	**80*	*N*	**100*	**120*	**slow*	*N*	**100*	**75*
Chilkoot River drainage															
v.	1983	0	—	—	97	1.00	0	0	0	—	—	—	0	—	—
	1990	40	1.00	0	40	1.00	0	0	40	1.00	0	0	40	1.00	0
	Total	40	1.00	0	137	1.00	0	0	40	1.00	0	0	40	1.00	0
District 181															
Alsek River drainage															
w.	1987	45	1.00	0	45	1.00	0	0	45	0.90	0.10	0	45	1.00	0
Situk River drainage															
x.	1984	0	—	—	97	1.00	0	0	0	—	—	—	0	—	—

Appendix 1.—Extended.

Location	Year	mAH-4* N	mAH-4* *100	mAH-4* *87	mAH-4* *Fast	sAH* N	sAH* *100	sAH* *117	mIDHP-1* N	mIDHP-1* *100	mIDHP-1* *33	mIDHP-2* N	mIDHP-2* *100	mIDHP-2* *64
District 101														
Boca de Quadra														
A.	1982	0	—	—	—	50	1.00	0	50	1.00	0	50	1.00	0
	1983	0	—	—	—	79	1.00	0	96	1.00	0	96	1.00	0
	1986	0	—	—	—	0	—	—	0	—	—	0	—	—
	1988	49	1.00	0	0	0	—	—	49	1.00	0	49	1.00	0
	Total	49	1.00	0	0	129	1.00	0	195	1.00	0	195	1.00	0
George Inlet														
B.	1986	0	—	—	—	0	—	—	0	—	—	0	—	—
Western Behm Canal														
C.	1983	0	—	—	—	50	1.00	0	50	1.00	0	50	0.93	0.07
	1986	0	—	—	—	0	—	—	0	—	—	0	—	—
	1986	0	—	—	—	40	1.00	0	33	1.00	0	33	1.00	0
	Total	0	—	—	—	90	1.00	0	83	1.00	0	83	0.96	0.04
D.	1982	0	—	—	—	50	1.00	0	50	1.00	0	50	0.98	0.02
	1987	95	1.00	0	0	0	—	—	35	1.00	0	96	1.00	0
	Total	95	1.00	0	0	50	1.00	0	85	1.00	0	146	0.99	0.01
E.	1983	0	—	—	—	100	1.00	0	100	1.00	0	100	1.00	0
	1988	52	1.00	0	0	0	—	—	42	1.00	0	42	1.00	0
	Total	52	1.00	0	0	100	1.00	0	142	1.00	0	142	1.00	0
F.	1983	0	—	—	—	104	0.995	0.005	103	1.00	0	104	0.995	0.005
Early	1984	0	—	—	—	50	1.00	0	43	1.00	0	43	1.00	0
Late	1984	0	—	—	—	50	1.00	0	50	1.00	0	50	1.00	0
	1986	0	—	—	—	0	—	—	0	—	—	0	—	—
	1986	0	—	—	—	40	1.00	0	32	1.00	0	32	1.00	0
	Total	0	—	—	—	244	0.998	0.002	228	1.00	0	229	0.997	0.003
District 102														
Eastern Prince of Wales Island														
G.	1983	0	—	—	—	79	0.99	0.01	79	1.00	0	79	1.00	0
H.	1982	0	—	—	—	50	0.98	0.02	49	1.00	0	49	1.00	0
	1983	0	—	—	—	100	0.99	0.01	100	1.00	0	100	1.00	0
	Total	0	—	—	—	150	0.99	0.01	149	1.00	0	149	1.00	0
I.	1988	52	1.00	0	0	0	—	—	52	1.00	0	52	1.00	0

Appendix 1.—Continued.

Location	Year	mAH-4*				sAH*			mIDHP-1*			mIDHP-2*		
		N	*100	*87	*Fast	N	*100	*117	N	*100	*33	N	*100	*64
J.	1982	0	–	–	–	100	0.97	0.03	100	1.00	0	100	0.98	0.02
	1983	0	–	–	–	100	1.00	0	100	1.00	0	100	1.00	0
	1986	0	–	–	–	0	–	–	0	–	–	0	–	–
	1988	41	1.00	0	0	0	–	–	43	1.00	0	43	1.00	0
	Total	41	1.00	0	0	200	0.99	0.01	243	1.00	0	243	0.99	0.01
District 103														
Western Prince of Wales Island														
K.	1983	0	–	–	–	100	1.00	0	100	1.00	0	100	1.00	0
	1986	0	–	–	–	0	–	–	0	–	–	0	–	–
	Total	0	–	–	–	100	1.00	0	100	1.00	0	100	1.00	0
L.	1986	0	–	–	–	0	–	–	0	–	–	0	–	–
M.	1983	0	–	–	–	99	0.93	0.07	97	1.00	0	97	1.00	0
	1988	53	0.99	0	0.01	0	–	–	53	1.00	0	53	1.00	0
	Total	53	0.99	0	0.01	99	0.93	0.07	150	1.00	0	150	1.00	0
N.	1986	0	–	–	–	0	–	–	0	–	–	0	–	–
	1987	0	–	–	–	0	–	–	0	–	–	0	–	–
	1988	40	1.00	0	0	0	–	–	50	1.00	0	50	1.00	0
	Total	40	1.00	0	0	0	–	–	50	1.00	0	50	1.00	0
O.	1986	0	–	–	–	0	–	–	0	–	–	0	–	–
	1987	0	–	–	–	0	–	–	0	–	–	0	–	–
	1988	42	1.00	0	0	0	–	–	43	1.00	0	43	1.00	0
	Total	42	1.00	0	0	0	–	–	43	1.00	0	43	1.00	0
District 105														
Northern Prince of Wales Island														
P.	1983	0	–	–	–	50	1.00	0	50	1.00	0	50	1.00	0
Q.	1986	0	–	–	–	0	–	–	0	–	–	0	–	–
District 106														
Northwestern Prince of Wales Island														
R.	1988	54	1.00	0	0	0	–	–	52	1.00	0	52	1.00	0

Appendix 1.—Continued.

Location	Year	mAH-4*				sAH*			mIDHP-1*			mIDHP-2*		
		N	*100	*87	*Fast	*N*	*100	*117	*N*	*100	*33	*N*	*100	*64
S.	1983	0	–	–	–	50	0.92	0.08	50	1.00	0	50	1.00	0
	1986	0	–	–	–	0	–	–	0	–	–	0	–	–
	1986	0	–	–	–	40	1.00	0	40	1.00	0	40	1.00	0
	1987	0	–	–	–	0	–	–	0	–	–	0	–	–
	1988	59	1.00	0	0	0	–	–	63	1.00	0	63	1.00	0
	Total	59	1.00	0	0	90	0.96	0.04	153	1.00	0	153	1.00	0
T.	1983	0	–	–	–	70	0.993	0.007	70	1.00	0	70	1.00	0
	1986	0	–	–	–	0	–	–	0	–	–	0	–	–
	1986	0	–	–	–	40	1.00	0	40	1.00	0	40	1.00	0
	Total	0	–	–	–	110	0.9955	0.0045	110	1.00	0	110	1.00	0
U.	1982	0	–	–	–	69	0.99	0.01	69	1.00	0	69	1.00	0
V.	1983	0	–	–	–	76	1.00	0	75	1.00	0	75	1.00	0
	1986	0	–	–	–	0	–	–	0	–	–	0	–	–
	Total	0	–	–	–	76	1.00	0	75	1.00	0	75	1.00	0
Kupreanof Island														
W.	1986	0	–	–	–	0	–	–	0	–	–	0	–	–
District 107														
Western Wrangell Island														
X.	1983	0	–	–	–	75	0.98	0.02	0	–	–	74	0.98	0.02
	1986	0	–	–	–	0	–	–	0	–	–	0	–	–
	1987	0	–	–	–	0	–	–	0	–	–	0	–	–
	Total	0	–	–	–	75	0.98	0.02	0	–	–	74	0.98	0.02
District 108														
Stikine River drainage														
Y.	1986	0	–	–	–	0	–	–	0	–	–	0	–	–
Z.	1986	0	–	–	–	0	–	–	0	–	–	0	–	–
a.	1990	100	1.00	0	0	100	1.00	0	100	1.00	0	100	1.00	0
b.	1986	0	–	–	–	0	–	–	0	–	–	0	–	–

Appendix 1.—Continued.

Location	Year	mAH-4* N	mAH-4* *100	mAH-4* *87	mAH-4* *Fast	sAH* N	sAH* *100	sAH* *117	mIDHP-1* N	mIDHP-1* *100	mIDHP-1* *33	mIDHP-2* N	mIDHP-2* *100	mIDHP-2* *64
District 109														
Kuiu Island														
c.	1986	0	–	–	–	0	–	–	0	–	–	0	–	–
	1987	52	1.00	0	0	0	–	–	52	1.00	0	52	1.00	0
	Total	52	1.00	0	0	0	–	–	52	1.00	0	52	1.00	0
d.	1986	0	–	–	–	0	–	–	0	–	–	0	–	–
District 111														
North of Juneau														
e.	1986	0	–	–	–	0	–	–	0	–	–	0	–	–
	1988	0	–	–	–	0	–	–	0	–	–	0	–	–
	Total	0	–	–	–	0	–	–	0	–	–	0	–	–
Eastern Stephens Passage-Port Snettisham														
f.	1983	0	–	–	–	100	1.00	0	95	1.00	0	95	1.00	0
g.	1983	0	–	–	–	100	1.00	0	94	1.00	0	94	1.00	0
Herbert River drainage														
h.	1989	73	1.00	0	0	73	1.00	0	73	1.00	0	73	1.00	0
Mendenhall River drainage														
i.	1986	0	–	–	–	0	–	–	0	–	–	0	–	–
	1988	43	1.00	0	0	0	–	–	51	1.00	0	51	1.00	0
	1989	10	1.00	0	0	10	1.00	0	10	1.00	0	10	1.00	0
	Total	53	1.00	0	0	10	1.00	0	61	1.00	0	10	1.00	0
Taku River drainage														
j. Lower main stem														
(1)	1986	0	–	–	–	0	–	–	0	–	–	0	–	–
(2)	1986	0	–	–	–	40	1.00	0	40	1.00	0	40	1.00	0
	1989	18	1.00	0	0	0	–	–	20	1.00	0	20	1.00	0
	Total	18	1.00	0	0	40	1.00	0	60	1.00	0	60	1.00	0
k. Upper main stem														
(3)	1989	10	1.00	0	0	10	1.00	0	8	1.00	0	8	1.00	0
(4)	1986	0	–	–	–	0	–	–	0	–	–	0	–	–
	1987	0	–	–	–	0	–	–	0	–	–	0	–	–
(5)	1986	0	–	–	–	40	1.00	0	0	–	–	0	–	–
(6)	1986	40	1.00	0	0	40	1.00	0	40	1.00	0	40	1.00	0

Appendix 1.—Continued.

Location	Year	mAH-4* N	mAH-4* *100	mAH-4* *87	mAH-4* *Fast	sAH* N	sAH* *100	sAH* *117	mIDHP-1* N	mIDHP-1* *100	mIDHP-1* *33	mIDHP-2* N	mIDHP-2* *100	mIDHP-2* *64
(7)	1986	0	–	–	–	40	1.00	0	40	1.00	0	40	1.00	0
	1986	0	–	–	–	0	–	–	0	–	–	0	–	–
	1987	0	–	–	–	0	–	–	0	–	–	0	–	–
(8)	1986	0	–	–	–	0	–	–	0	–	–	0	–	–
(9)	1986	0	–	–	–	30	1.00	0	40	1.00	0	40	1.00	0
	1987	33	1.00	0	0	0	–	–	32	1.00	0	32	1.00	0
(10)	1989	18	1.00	0	0	18	1.00	0	17	1.00	0	17	1.00	0
	Total	101	1.00	0	0	178	1.00	0	217	1.00	0	217	1.00	0
m.	1990	67	1.00	0	0	67	1.00	0	67	1.00	0	67	1.00	0
n.	1990	100	1.00	0	0	100	1.00	0	97	1.00	0	97	1.00	0
o.	1988	89	0.99	0.01	0	0	–	–	76	1.00	0	76	1.00	0
p. Early	1986	0	–	–	–	0	–	–	0	–	–	0	–	–
	1986	40	1.00	0	0	0	–	–	0	–	–	0	–	–
	1987	0	–	–	–	0	–	–	0	–	–	0	–	–
	1989	30	1.00	0	0	30	1.00	0	30	1.00	0	30	1.00	0
	Total	70	1.00	0	0	30	1.00	0	30	1.00	0	30	1.00	0
q. Middle	1986	40	1.00	0	0	0	–	–	0	–	–	0	–	–
	1989	10	1.00	0	0	10	1.00	0	10	1.00	0	10	1.00	0
	Total	10	1.00	0	0	10	1.00	0	10	1.00	0	10	1.00	0
r. Late	1989	60	1.00	0	0	60	1.00	0	59	1.00	0	59	1.00	0
District 113														
Southern Chichagof Island														
s.	1984	0	–	–	–	97	1.00	0	46	1.00	0	46	1.00	0
	1987	98	0.99	0.01	0	0	–	–	90	1.00	0	90	1.00	0
	Total	98	0.99	0.01	0	97	1.00	0	136	1.00	0	136	1.00	0
District 115														
Chilkat River drainage														
t.	1983	0	–	–	–	100	1.00	0	100	1.00	0	100	1.00	0
u. Early	1983	0	–	–	–	100	1.00	0	99	1.00	0	100	1.00	0
Late	1983	0	–	–	–	100	1.00	0	97	1.00	0	97	1.00	0
	1990	45	1.00	0	0	45	1.00	0	45	1.00	0	45	1.00	0
	Total	45	1.00	0	0	245	1.00	0	245	1.00	0	245	1.00	0

Appendix 1.—Continued.

Location	Year	mAH-4*				sAH*			mIDHP-1*			mIDHP-2*		
		N	**100*	**87*	**Fast*	*N*	**100*	**117*	*N*	**100*	**33*	*N*	**100*	**64*
Chilkoot River drainage														
v.	1983	0	—	—	—	95	1.00	0	94	1.00	0	97	1.00	0
	1990	40	1.00	0	0	40	1.00	0	40	1.00	0	40	1.00	0
	Total	40	1.00	0	0	135	1.00	0	135	1.00	0	135	1.00	0
District 181														
Alsek River drainage														
w.	1987	45	1.00	0	0	45	1.00	0	44	1.00	0	44	1.00	0
Situk River drainage														
x.	1984	0	—	—	—	98	0.99	0.01	89	0.99	0.01	87	1.00	0

Appendix 1.—Extended.

Location	Year	LDH-C* N	LDH-C* *100	LDH-C* *109	FBALD-3* N	FBALD-3* *100	FBALD-3* *Fast	sSOD* N	sSOD* *100	sSOD* *150	sSOD* *48
District 101											
Boca de Quadra											
A.	1982	50	1.00	0	0	–	–	0	–	–	–
	1983	94	1.00	0	0	–	–	0	–	–	–
	1986	0	–	–	0	–	–	0	–	–	–
	1988	20	1.00	0	20	1.00	0	50	1.00	0	0
	Total	164	1.00	0	20	1.00	0	50	1.00	0	0
George Inlet											
B.	1986	0	–	–	0	–	–	0	–	–	–
Western Behm Canal											
C.	1983	50	1.00	0	0	–	–	0	–	–	–
	1986	0	–	–	0	–	–	0	–	–	–
	1986	40	1.00	0	0	–	–	0	–	–	–
	Total	90	1.00	0	0	–	–	0	–	–	–
D.	1982	50	1.00	0	0	–	–	0	–	–	–
	1987	0	–	–	0	–	–	0	–	–	–
	Total	50	1.00	0	0	–	–	0	–	–	–
E.	1983	99	1.00	0	0	–	–	0	–	–	–
	1988	0	–	–	0	–	–	52	1.00	0	0
	Total	99	1.00	0	0	–	–	52	1.00	0	0
F.	1983	99	1.00	0	0	–	–	0	–	–	–
Early	1984	50	1.00	0	0	–	–	0	–	–	–
Late	1984	50	0.98	0.02	0	–	–	0	–	–	–
	1986	0	–	–	0	–	–	0	–	–	–
	1986	40	1.00	0	0	–	–	0	–	–	–
	Total	239	0.996	0.004	0	–	–	0	–	–	–
District 102											
Eastern Prince of Wales Island											
G.	1983	76	1.00	0	0	–	–	0	–	–	–
H.	1982	0	–	–	0	–	–	0	–	–	–
	1983	100	1.00	0	0	–	–	0	–	–	–
	Total	100	1.00	0	0	–	–	0	–	–	–
I.	1988	20	1.00	0	20	1.00	0	52	1.00	0	0

Appendix 1.—Continued.

Location	Year	*LDH-C**			*FBALD-3**			*sSOD**			
		N	**100*	**109*	*N*	**100*	**Fast*	*N*	**100*	**150*	**48*
J.	1982	50	1.00	0	0	–	–	0	–	–	–
	1983	100	1.00	0	0	–	–	0	–	–	–
	1986	0	–	–	0	–	–	0	–	–	–
	1988	0	–	–	0	–	–	47	0.96	0	0.04
	Total	100	1.00	0	0	–	–	47	0.96	0	0.04
District 103											
Western Prince of Wales Island											
K.	1983	100	1.00	0	0	–	–	0	–	–	–
	1986	0	–	–	0	–	–	0	–	–	–
	Total	100	1.00	0	0	–	–	0	–	–	–
L.	1986	0	–	–	0	–	–	0	–	–	–
M.	1983	99	1.00	0	0	–	–	0	–	–	–
	1988	0	–	–	0	–	–	52	1.00	0	0
	Total	99	1.00	0	0	–	–	52	1.00	0	0
N.	1986	0	–	–	0	–	–	0	–	–	–
	1987	0	–	–	0	–	–	0	–	–	–
	1988	0	–	–	0	–	–	0	–	–	–
	Total	0	–	–	0	–	–	0	–	–	–
O.	1986	0	–	–	0	–	–	0	–	–	–
	1987	0	–	–	0	–	–	0	–	–	–
	1988	39	1.00	0	38	0.95	0.05	0	–	–	–
	Total	39	1.00	0	38	0.95	0.05	0	–	–	–
District 105											
Northern Prince of Wales Island											
P.	1983	48	1.00	0	0	–	–	0	–	–	–
Q.	1986	0	–	–	0	–	–	0	–	–	–
District 106											
Northwestern Prince of Wales Island											
R.	1988	23	1.00	0	22	1.00	0	52	1.00	0	0

Appendix 1.—Continued.

Location	Year	LDH-C*			FBALD-3*			sSOD*			
		N	*100	*109	N	*100	*Fast	N	*100	*150	*48
S.	1983	50	1.00	0	0	–	–	0	–	–	–
	1986	0	–	–	0	–	–	0	–	–	–
	1986	40	1.00	0	0	–	–	0	–	–	–
	1987	0	–	–	0	–	–	0	–	–	–
	1988	0	–	–	0	–	–	0	–	–	–
	Total	90	1.00	0	0	–	–	0	–	–	–
T.	1983	70	1.00	0	0	–	–	0	–	–	–
	1986	0	–	–	0	–	–	0	–	–	–
	1986	40	1.00	0	0	–	–	0	–	–	–
	Total	110	1.00	0	0	–	–	0	–	–	–
U.	1982	69	1.00	0	0	–	–	0	–	–	–
V.	1983	75	1.00	0	0	–	–	0	–	–	–
	1986	0	–	–	0	–	–	0	–	–	–
	Total	75	1.00	0	0	–	–	0	–	–	–
Kupreanof Island											
W.	1986	0	–	–	0	–	–	0	–	–	–
<u>District 107</u>											
Western Wrangell Island											
X.	1983	75	1.00	0	0	–	–	0	–	–	–
	1986	0	–	–	0	–	–	0	–	–	–
	1987	0	–	–	0	–	–	0	–	–	–
	Total	75	1.00	0	0	–	–	0	–	–	–
<u>District 108</u>											
Stikine River drainage											
Y.	1986	0	–	–	0	–	–	0	–	–	–
Z.	1986	0	–	–	0	–	–	0	–	–	–
a.	1990	100	1.00	0	100	1.00	0	100	1.00	0	0
b.	1986	0	–	–	0	–	–	0	–	–	–

Appendix 1.—Continued.

Location	Year	LDH-C* N	LDH-C* *100	LDH-C* *109	FBALD-3* N	FBALD-3* *100	FBALD-3* *Fast	sSOD* N	sSOD* *100	sSOD* *150	sSOD* *48
District 109											
Kuiu Island											
c.	1986	0	—	—	0	—	—	0	—	—	—
	1987	0	—	—	0	—	—	52	1.00	0	0
	Total	0	—	—	0	—	—	52	1.00	0	0
d.	1986	0	—	—	0	—	—	0	—	—	—
District 111											
North of Juneau											
e.	1986	0	—	—	0	—	—	0	—	—	—
	1988	0	—	—	0	—	—	0	—	—	—
	Total	0	—	—	0	—	—	0	—	—	—
Eastern Stephens Passage-Port Snettisham											
f.	1983	99	1.00	0	0	—	—	0	—	—	—
g.	1983	99	1.00	0	0	—	—	0	—	—	—
Herbert River drainage											
h.	1989	73	1.00	0	73	1.00	0	73	1.00	0	0
Mendenhall River drainage											
i.	1986	0	—	—	0	—	—	0	—	—	—
	1988	26	1.00	0	25	1.00	0	45	1.00	0	0
	1989	10	1.00	0	10	1.00	0	10	1.00	0	0
	Total	10	1.00	0	10	1.00	0	10	1.00	0	0
Taku River drainage											
j. Lower main stem											
(1)	1986	0	—	—	0	—	—	0	—	—	—
(2)	1986	40	1.00	0	0	—	—	0	—	—	—
	1989	20	1.00	0	20	1.00	0	20	1.00	0	0
	Total	60	1.00	0	20	1.00	0	20	1.00	0	0
k. Upper main stem											
(3)	1989	10	1.00	0	10	0.95	0.05	9	1.00	0	0
(4)	1986	0	—	—	0	—	—	0	—	—	—
	1987	0	—	—	0	—	—	0	—	—	—
(5)	1986	40	1.00	0	0	—	—	0	—	—	—
(6)	1986	0	—	—	0	—	—	0	—	—	—

Appendix 1.—Continued.

Location	Year	LDH-C*			FBALD-3*			sSOD*			
		N	**100*	**109*	*N*	**100*	**Fast*	*N*	**100*	**150*	**48*
(7)	1986	40	1.00	0	0	—	—	0	—	—	—
	1986	0	—	—	0	—	—	0	—	—	—
	1987	0	—	—	0	—	—	0	—	—	—
(8)	1986	0	—	—	0	—	—	0	—	—	—
(9)	1986	40	1.00	0	0	—	—	0	—	—	—
	1987	0	—	—	0	—	—	0	—	—	—
(10)	1989	18	1.00	0	18	1.00	0	18	1.00	0	0
	Total	148	1.00	0	28	1.00	0	27	1.00	0	0
m.	1990	67	1.00	0	67	1.00	0	67	1.00	0	0
n.	1990	100	1.00	0	100	1.00	0	100	1.00	0	0
o.	1988	0	—	—	0	—	—	88	0.99	0.01	0
p. Early	1986	0	—	—	0	—	—	0	—	—	—
	1986	0	—	—	0	—	—	0	—	—	—
	1987	0	—	—	0	—	—	0	—	—	—
	1989	30	1.00	0	29	1.00	0	30	1.00	0	0
	Total	30	1.00	0	29	1.00	0	30	1.00	0	0
q. Middle	1986	39	1.00	0	0	—	—	0	—	—	—
	1989	10	1.00	0	10	1.00	0	10	1.00	0	0
	Total	49	1.00	0	10	1.00	0	10	1.00	0	0
r. Late	1989	60	1.00	0	60	1.00	0	60	1.00	0	0
District 113											
Southern Chichagof Island											
s.	1984	97	0.98	0.02	0	—	—	0	—	—	—
	1987	96	0.99	0.01	96	1.00	0	81	1.00	0	0
	Total	193	0.99	0.01	96	1.00	0	81	1.00	0	0
District 115											
Chilkat River drainage											
t.	1983	100	1.00	0	0	—	—	0	—	—	—
u.	1983	100	1.00	0	0	—	—	0	—	—	—
	1983	98	1.00	0	0	—	—	0	—	—	—
	1990	45	1.00	0	45	1.00	0	45	1.00	0	0
	Total	243	1.00	0	45	1.00	0	45	1.00	0	0

Appendix 1.—Continued.

Location	Year	LDH-C*			FBALD-3*			sSOD*			
		N	**100*	**109*	*N*	**100*	**Fast*	*N*	**100*	**150*	**48*
Chilkoot River drainage											
v.	1983	97	1.00	0	0	–	–	0	–	–	–
	1990	40	1.00	0	40	1.00	0	40	1.00	0	0
	Total	137	1.00	0	40	1.00	0	40	1.00	0	0
District 181											
Alsek River drainage											
w.	1987	0	–	–	0	–	–	45	1.00	0	0
Situk River drainage											
x.	1984	67	1.00	0	0	–	–	0	–	–	–

[a]Yehring Creek early 1986 (1) samples were collected on 8/29/86 & 9/15/86.
[b]Yehring Creek early 1986 (2) samples were collected on 9/11/86 & 9/13/86.
[c]Yehring Creek early 1989 (1) samples were collected on 9/18/89.
[d]Yehring Creek middle 1986 (3) samples were collected on 9/30/86 & 10/01/86.
[e]Yehring Creek middle 1989 (2) samples were collected on 9/28/89.
[f]Yehring Creek late 1989 (3) samples were collected on 10/13/89.

Appendix 2.—Sample sizes of monomorphic loci.

Location	Year	*sIDHP-1** N	*PEPA** N	*ADA-2** N	*mMEP-2** N	*PGDH** N	*αMAN** N
District 101							
Boca de Quadra							
A. Hugh Smith Lake	1982	50	50	50	0	0	0
	1983	96	96	95	0	0	0
	1986	10	10	0	0	0	0
	1988	50	50	50	50	50	0
	Total	206	206	195	50	50	0
George Inlet							
B. Leask Lake	1986	25	25	0	0	0	0
Western Behm Canal							
C. Helm Lake	1983	50	50	50	0	0	0
	1986	10	10	0	0	0	0
	1986	40	40	40	0	0	0
	Total	100	100	100	0	0	0
D. McDonald Lake (i)	1982	50	50	50	0	0	0
	1987	106	103	0	0	0	0
	Total	156	153	50	0	0	0
E. McDonald Lake (ii)	1983	100	100	0	0	0	0
	1988	52	52	52	52	52	52
	Total	152	152	52	52	52	52
F. Naha River	1983	104	101	50	0	0	0
Early	1984	50	50	0	0	0	0
Late	1984	50	50	0	0	0	0
	1986	40	37	0	0	0	0
	1986	39	40	40	0	0	0
	Total	283	278	90	0	0	0
District 102							
Eastern Prince of Wales Island							
G. Johnson Lake	1983	79	76	50	0	0	0
H. Karta River (i)	1982	50	50	50	0	0	0
	1983	100	100	99	0	0	0
	Total	150	150	149	0	0	0
I. Karta River (ii)	1988	52	48	48	52	48	0
J. Kegan Lake	1982	100	100	100	0	0	0
	1983	100	100	100	0	0	0
	1986	37	37	0	0	0	0
	1988	50	46	4	43	45	0
	Total	287	283	204	43	45	0
District 103							
Western Prince of Wales Island							
K. Chuck Lake	1983	100	100	100	0	0	0
	1986	32	27	0	0	0	0
	Total	132	127	100	0	0	0
L. Hetta Lake	1986	48	47	0	0	0	0

Appendix 2.—Continued.

Location	Year	*sIDHP-1** *N*	*PEPA** *N*	*ADA-2** *N*	*mMEP-2** *N*	*PGDH** *N*	*αMAN** *N*
M. Klakas Lake	1983	99	99	56	0	0	0
	1988	59	59	59	59	54	0
	Total	158	158	117	59	54	0
N. Klawock Lake	1986	48	47	0	0	0	0
	1987	50	50	0	0	0	0
	1988	50	47	50	50	50	0
	Total	148	144	50	50	50	0
O. Upper Sarkar Lake	1986	32	29	0	0	0	0
	1987	42	40	0	0	0	0
	1988	43	40	44	44	43	38
	Total	117	109	44	44	43	38
District 105							
Northern Prince of Wales Island							
P. Shipley Creek	1983	50	50	50	0	0	0
Q. Sutter Creek	1986	19	1	0	0	0	0
District 106							
Northwestern Prince of Wales Island							
R. Galea Lake	1988	54	54	54	41	46	54
S. Luck Lake	1983	50	50	50	0	0	0
	1986	9	7	0	0	0	0
	1986	40	39	38	0	0	0
	1987	50	50	0	0	0	0
	1988	64	64	63	64	63	0
	Total	213	210	151	64	63	0
T. Red Bay Lake	1983	70	70	50	0	0	0
	1986	13	13	0	0	0	0
	1986	40	40	40	0	0	0
	Total	123	123	90	0	0	0
U. Salmon Bay Lake	1982	69	69	50	0	0	0
V. Salmon Bay Lake	1983	76	74	48	0	0	0
	1986	50	49	0	0	0	0
	Total	126	123	48	0	0	0
Kupreanof Island							
W. Petersburg Lake	1986	49	48	0	0	0	0
District 107							
Western Wrangell Island							
X. Thoms Lake	1983	75	75	75	0	0	0
	1986	50	47	0	0	0	0
	1987	60	57	0	0	0	0
	Total	185	179	75	0	0	0
District 108							
Stikine River drainage							
Y. Chutine Lake	1986	64	57	0	0	0	0
Z. Chutine River	1986	48	47	0	0	0	0

Appendix 2.—Continued.

Location	Year	sIDHP-1* N	PEPA* N	ADA-2* N	mMEP-2* N	PGDH* N	αMAN* N
a. Tahltan Lake	1990	100	100	100	100	98	100
b. Stikine River	1986	50	50	0	0	0	0
District 109							
Kuiu Island							
c. Alecks Lake	1986	50	50	0	0	0	0
	1987	54	53	51	52	52	0
	Total	104	103	51	52	52	0
d. Kutlaku Lake	1986	49	49	0	0	0	0
District 111							
North of Juneau							
e. Auke Creek	1986	12	12	0	0	0	0
	1988	113	113	0	0	0	0
	Total	115	115	0	0	0	0
Eastern Stephens Passage-Port Snettisham							
f. Crescent Lake	1983	100	99	99	0	0	0
g. Speel Lake	1983	100	100	98	0	0	0
Herbert River drainage							
h. Windfall Lake	1989	73	72	72	73	73	73
Mendenhall River drainage							
i. Steep Creek	1986	18	18	0	0	0	0
	1988	53	52	51	42	51	45
	1989	10	10	10	10	10	10
	Total	81	80	61	52	61	55
Taku River drainage							
j. Lower main stem							
Fish Creek	1986	20	20	0	0	0	0
South Fork Slough	1986	40	34	29	0	0	0
	1989	20	20	20	19	20	20
	Total	80	74	49	19	20	20
k. Upper main stem							
Chuunk Mountain Slough	1989	10	10	8	8	10	10
Coffee Slough	1986	37	37	0	0	0	0
	1987	33	33	0	0	0	0
Honakta Slough	1986	40	40	30	0	0	0
Nakina River	1986	51	49	40	40	40	0
Shustahini Creek	1986	40	37	24	0	0	0
	1986	60	57	0	0	0	0
	1987	35	31	0	0	0	0
Takwahoni Slough	1986	20	20	0	0	0	0
Tuskwa Slough	1986	40	39	40	0	0	0
	1987	37	37	32	29	32	0
Yonakina Slough	1989	18	18	18	18	18	18
	Total	421	408	192	87	100	28
m. Little Tatsemenie Lake	1990	67	67	67	67	67	67
n. Little Trapper Lake	1990	98	100	100	96	100	99

Appendix 2.—Continued.

Location	Year	sIDHP-1* N	PEPA* N	ADA-2* N	mMEP-2* N	PGDH* N	αMAN* N
o. Turner Lake	1988	89	85	86	89	84	89
p. Yehring Creek, early	1986(1)[a]	22	22	0	0	0	0
	1986(2)[b]	48	45	40	0	0	0
	1987	7	6	0	0	0	0
	1989(1)[c]	30	30	30	30	30	30
	Total	107	103	70	30	30	30
q. Yehring Creek, middle	1986(3)[d]	40	40	40	0	19	0
	1989(2)[e]	10	10	10	9	10	10
	Total	50	50	50	9	29	10
r. Yehring Creek, late	1989(3)[f]	60	60	59	59	59	60
District 113							
South Chichagof Island							
s. Sitkoh Lake	1984	97	97	0	0	0	0
	1987	100	98	97	98	73	99
	Total	197	195	97	98	73	99
District 115							
Chilkat River drainage							
t. Chilkat River	1983	100	100	50	0	0	0
u. Chilkat Lake, early	1983	100	100	90	0	0	0
late	1983	100	97	98	0	0	0
	1990	45	45	45	45	45	45
	Total	245	242	233	45	45	45
Chilkoot River drainage							
v. Chilkoot River	1983	95	97	62	0	0	0
	1990	40	40	40	40	40	40
	Total	135	137	102	40	40	40
District 181							
Alsek River drainage							
w. East Alsek River	1987	50	49	41	40	45	0
Situk River drainage							
x. Situk River	1984	98	98	98	0	0	0

[a]Yehring Creek early 1986(1) samples were collected on 8/29/86 & 9/15/86.
[b]Yehring Creek early 1986(2) samples were collected on 9/11/86 & 9/13/86.
[c]Yehring Creek early 1989(1) samples were collected on 9/18/89.
[d]Yehring Creek middle 1986(3) samples were collected on 9/30/86 & 10/01/86.
[e]Yehring Creek middle 1989(2) samples were collected on 9/28/89.
[f]Yehring Creek late 1989(3) samples were collected on 10/13/89.

Appendix 3.—Log-likelihood ratio analysis comparisons of collections from the same site but at different times. Where subdivision of samples at a site are made for subsequent analyses, both the total heterogeneity at the site and the heterogeneity within the subdivision are presented. The total includes the heterogeneity within and among collections at that site. A blank at a site (with a value for "between") indicates one collection only.

Collection	*PGM-1**		*PGM-2**		*LDH-B2**		*PEPC**		*ALAT**		*mAAT-1**		*LDH-B1**		Total	
	df	*G*	df	*G*	df	*G*	df	*G*	df	*G*	df	*G*	df	*G*	df	*G*
A. Hugh Smith Lake	2	0.21	2	0.56	2	7.21*			3	6.18					9	14.15
C. Helm Lake	1	1.45	1	0.03	1	0.11			2	4.97					5	6.56
D. McDonald Lake (i)	1	0.95	1	0.09	1	1.12	1	1.15	1	0.68					5	3.99
E. McDonald Lake (ii)	1	0.58	1	0.22	1	0.62	1	0.17	2	2.32					6	3.91
Between D & E	1	0.23	1	0.97	1	0.16	1	0.13	1	12.24**	1	6.15*			6	19.88*
F. Naha River	4	2.98	4	10.45*	4	7.10			4	3.41					16	23.94
H. Karta River (i)	1	0.24	1	0.50											2	0.74
I. Karta River (ii)																
Between H & I	1	1.33	1	0.09	1	1.18	1	5.91	2	16.63***					6	25.14**
J. Kegan Lake	3	0.22	3	0.54					2	7.17					8	7.93
K. Chuck Lake	1	0.01	1	2.67											2	2.68
M. Klakas Lake	1	0.00	1	0.00											2	0.00
N. Klawock Lake	2	2.91	2	2.46	2	0.47	1	0.01	4	4.11					11	9.96
O. Upper Sarkar Lake	2	1.84	2	6.30*			1	1.92	4	2.23					9	12.29
S. Luck Lake	3	0.81	3	2.47	3	4.78			6	8.88					15	16.94
T. Red Bay Lake	2	4.11	2	4.72											4	8.83
U. Salmon Bay (i)	1	0.01	1	0.75			1	1.01	2	1.88					4	3.65
V. Salmon Bay (ii)																
Between U & V	1	0.01	1	0.05			2	10.51**	2	2.51			1	0.35	6	13.43
X. Thoms Lake	2	2.19	2	3.19			2	3.98	4	7.46					10	16.82
c. Alecks Lake	1	2.99	1	1.34					1	4.19*					3	8.52*
e. Auke Creek	1	1.20							1	0.31					2	1.51

Appendix 3.—Continued.

Collection	*PGM-1** df	*PGM-1** *G*	*PGM-2** df	*PGM-2** *G*	*LDH-B2** df	*LDH-B2** *G*	*PEPC** df	*PEPC** *G*	*ALAT** df	*ALAT** *G*	*mAAT-1** df	*mAAT-1** *G*	*LDH-B1** df	*LDH-B1** *G*	Total df	Total *G*
i. Steep Creek	2	0.02					2	2.07	2	4.29	1	0.17			7	6.55
j. Lower main-stem Taku River																
Fish Creek																
South Fork Slough	1	0.52	1	1.27					2	2.29					4	4.08
Between	1	0.09	1	0.20	1	4.92			2	0.08					5	5.29
k. Upper main-stem Taku River																
Chuunk Slough																
Coffee Slough	1	0.01	1	1.63	1	2.35	1	2.27	2	4.90					6	11.16
Honakta Slough																
Nakina River																
Shustahini Slough																
1986																
1986																
1987																
Among	2	0.07	2	3.59	2	9.06*			4	3.31					10	16.03
Takwahoni Slough																
Tuskwa Slough	1	0.04	1	1.16	1	0.11			2	2.18					5	3.49
Yonakina Slough																
Among	9	14.52	9	5.96	9	14.60			18	18.70	3	0.74			48	54.52
Yehring Creek																
p. Early	3	5.63	3	3.25					3	9.74					9	18.62
q. Middle	1	0.73	1	0.47					1	0.52					3	1.73
r. Late																
Among p, q, & r	2	17.40***	2	4.00	2	0.33	2	9.33**	4	5.41	2	0.29			14	36.76***
s. Sitkoh Lake	1	1.33	1	1.60			1	0.48	2	5.79			2	4.89	7	14.09
t. Chilkat River																
u. Chilkat Lake	2	3.38	2	0.76			2	10.45**							6	14.59*
Between t & u	3	3.76	3	0.93	3	23.11***	3	12.68	6	19.20**					18	59.68***
v. Chilkoot Lake	1	0.38	1	0.01	1	0.01									3	0.40

* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$

Appendix 4.—Allozyme variation in collections of juvenile sockeye salmon from the Taku River in Southeast Alaska and northern British Columbia. Allelic frequencies and collection sizes (*N*) are designated as in Table 2. Alleles are designated by their mobility relative to the most common allele (**100*) and as described in Shaklee et. al. (1990).

Location	*PGM-1**			*PGM-2**					*LDH-B2**		
	N	**-100*	**Null*	*N*	**-100*	**-77*	**-20*	**-93*	*N*	**100*	**115*
AA. Little Tatsemenie Lake	87	0.14	0.86	84	0.81	0.16	0.03	0.00	81	0.76	0.24
BB. Taku River, lower main stem											
Backwater, early	38	0.16	0.84	36	0.71	0.28	0.01	0.00	37	0.96	0.04
Backwater, late	29	0.11	0.89	28	0.80	0.20	0.00	0.00	29	0.90	0.10
Braided flow	35	0.11	0.89	36	0.86	0.14	0.00	0.00	34	0.85	0.15
Canyon Island, braided flow	38	0.22	0.78	37	0.84	0.16	0.00	0.00	38	0.89	0.11
Channel edge	53	0.12	0.88	52	0.75	0.25	0.00	0.00	51	0.86	0.14
Moose Creek Slough	52	0.24	0.76	53	0.74	0.25	0.01	0.00	52	0.91	0.09
Side slough, early	66	0.23	0.77	67	0.84	0.15	0.01	0.01	67	0.92	0.08
Side slough, late	51	0.23	0.77	52	0.80	0.20	0.00	0.00	47	0.90	0.10
Tributary mouth	50	0.16	0.84	50	0.85	0.14	0.01	0.00	50	0.88	0.12
Upper main channel	33	0.16	0.84	33	0.88	0.12	0.00	0.00	33	0.83	0.17
Yellow Bluff	52	0.10	0.90	51	0.82	0.18	0.00	0.00	52	0.80	0.20
Total	497	0.31	0.69	495	0.806	0.189	0.004	0.001	490	0.88	0.12
CC. Fish Creek, beaver ponds	45	0.16	0.84	46	0.79	0.20	0.01	0.00	46	0.84	0.16
DD. Sockeye Creek, beaver ponds	37	0.13	0.87	38	0.86	0.14	0.00	0.00	37	0.92	0.08
EE. Yehring Creek	50	0.16	0.84	50	0.88	0.11	0.01	0.00	50	0.86	0.14

Appendix 4.—Extended.

Location	sIDHP-2*			PEPC*			ALAT*					sAAT-3*		
	N	*100	*125	N	*100	*105	N	*100	*95	*91	*108	N	*100	117*
AA.	88	1.00	0.00	78	0.98	0.02	54	0.42	0.11	0.46	0.01	73	0.99	0.01
BB.	37	1.00	0.00	24	0.98	0.02	28	0.25	0.18	0.57	0.00	37	0.99	0.01
	28	1.00	0.00	24	0.94	0.06	18	0.47	0.19	0.31	0.03	29	1.00	0.00
	35	1.00	0.00	26	0.98	0.02	35	0.44	0.07	0.49	0.00	36	0.99	0.01
	28	1.00	0.00	33	0.97	0.03	32	0.36	0.23	0.41	0.00	37	1.00	0.00
	53	1.00	0.00	43	0.98	0.02	45	0.34	0.29	0.36	0.01	53	0.99	0.01
	51	0.99	0.01	50	0.93	0.07	51	0.39	0.21	0.40	0.00	53	0.99	0.01
	66	1.00	0.00	63	0.92	0.08	61	0.42	0.11	0.46	0.02	68	0.98	0.02
	51	1.00	0.00	44	0.93	0.07	48	0.46	0.21	0.32	0.01	51	1.00	0.00
	48	1.00	0.00	18	0.97	0.03	46	0.42	0.21	0.37	0.00	50	0.99	0.01
	33	1.00	0.00	23	0.78	0.22	31	0.40	0.13	0.47	0.00	33	1.00	0.00
	52	1.00	0.00	45	0.98	0.02	44	0.49	0.09	0.42	0.00	52	0.99	0.01
Total	491	0.999	0.001	393	0.94	0.06	439	0.41	0.17	0.41	0.01	499	0.99	0.01
CC.	45	1.00	0.00	43	0.92	0.08	45	0.38	0.12	0.50	0.00	46	1.00	0.00
DD.	37	1.00	0.00	36	0.96	0.04	38	0.46	0.12	0.41	0.01	37	1.00	0.00
EE.	50	1.00	0.00	46	0.92	0.08	50	0.46	0.09	0.45	0.00	50	1.00	0.00

Appendix 4.—Extended.

Location	*sAAT-1,2**				*mAAT-1**			*sIDHP-1**		*PEPA**	
	N	*100	*77	*64	*N*	*-100	*-82	*N*	*100	*N*	*100
AA.	79	0.99	0.01	0.01	82	0.89	0.11	88	1.00	78	1.00
BB.	33	1.00	0.00	0.00	38	0.89	0.11	37	1.00	24	1.00
	28	1.00	0.00	0.00	22	0.89	0.11	28	1.00	24	1.00
	36	1.00	0.00	0.00	33	0.85	0.15	35	1.00	26	1.00
	36	1.00	0.00	0.00	37	0.86	0.14	37	1.00	24	1.00
	53	1.00	0.00	0.00	51	0.88	0.12	53	1.00	43	1.00
	51	1.00	0.00	0.00	52	0.84	0.16	51	1.00	50	1.00
	68	1.00	0.00	0.00	66	0.88	0.12	66	1.00	63	1.00
	51	1.00	0.00	0.00	52	0.86	0.14	51	1.00	44	1.00
	51	1.00	0.00	0.00	44	0.92	0.08	48	1.00	18	1.00
	33	1.00	0.00	0.00	33	0.86	0.14	33	1.00	33	1.00
	52	1.00	0.00	0.00	52	0.81	0.19	52	1.00	45	1.00
Total	492	1.00	0.00	0.00	480	0.87	0.13	491	1.00	393	1.00
CC.	46	1.00	0.00	0.00	44	0.82	0.18	45	1.00	43	1.00
DD.	38	1.00	0.00	0.00	38	0.92	0.08	37	1.00	36	1.00
EE.	50	1.00	0.00	0.00	50	0.88	0.12	50	1.00	46	1.00

Appendix 5.—Log-likelihood ratio analysis (*G*-test) of the genetic heterogeneity between adult and juvenile sockeye salmon from the Taku River drainage.

Population	*PGM-1**		*PGM-2**		*LDH-B2**		*PEPA**		*ALAT**		*sAAT-3**		*mAAT-1**		Total	
	df	*G*	df	*G*	df	*G*	df	*G*	df	*G*	df	*G*	df	*G*	df	*G*
Fish Creek	1	0.77	1	0.06	1	0.26			2	4.77					5	5.86
Tatsemenie Lake	1	0.00	2	1.29	1	0.42			2	17.29***	1	0.30	1	0.69	8	19.99*
Yehring Creek																
Early, middle, & late	3	10.36*	3	4.13	3	1.29	3	11.55**	6	6.78					18	34.11*
Early	1	0.02	1	0.51	1	0.50	1	2.70	2	0.80			1	0.06	7	4.59
Middle	1	6.15*	1	0.67	1	0.51	1	0.56	2	2.56					6	10.45
Late	1	2.61	1	0.81	1	1.26	1	4.68*	2	2.42			1	0.07	7	11.85

* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$

Appendix 6a.—Log-likelihood ratio comparisons of adult and juvenile (age-0 rearing) sockeye salmon from sites on the main-stem Taku River in Southeast Alaska and northern British Columbia.

Collection	*PGM-1**		*PGM-2**		*LDH-B2**		*PEPC**		*ALAT**		*mAAT-1**		Total	
	df	*G*	df	*G*	df	*G*	df	*G*	df	*G*	df	*G*	df	*G*
Adults	9	13.36	9	5.89	9	16.81	4	1.82	18	20.60	3	0.69	52	59.17
Juveniles	10	18.69	10	15.86	10	17.35	4	6.43	20	40.11**	10	7.50	64	105.95***
Between adults & juv.	1	7.64	1	0.00	1	0.26	1	0.11	2	0.90	1	1.12	7	10.03
Total	20	39.69**	20	21.75	20	34.42*	9	8.36	40	61.61*	14	9.31	123	175.15

Appendix 6b.—Log-likelihood ratio comparisons of adult and juvenile (age-0 rearing) sockeye salmon from sites on lower tributaries of the Taku River in Southeast Alaska.

Collection	*PGM-1**		*PGM-2**		*LDH-B2**		*PEPC**		*ALAT**		*mAAT-1**		Total	
	df	*G*	df	*G*	df	*G*	df	*G*	df	*G*	df	*G*	df	*G*
Adults	3	11.92**	3	6.23	3	3.15	3	9.52	6	16.57*	2	0.29	20	47.68***
Juveniles	2	0.37	2	2.78	2	2.68	2	1.23	4	2.52	2	3.98	14	13.56
Between adults & juv.	1	1.19	1	0.32	1	0.54	1	6.37*	2	4.28	1	0.20	7	12.90
Total	6	13.48*	6	9.33	6	6.37	6	17.12**	12	23.37*	5	4.47	41	74.14**

* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$

Appendix 7.—Log-likelihood ratio analysis (*G*-test) of genetic structure among collections of Southeast Alaska and northern British Columbia sockeye salmon based on Alaska Department of Fish and Game statistical districts.

District	*PGM-1**		*PGM-2**		*PEPC**		*ALAT**		*mAAT-1**		Total	
	df	*G*	df	*G*	df	*G*	df	*G*	df	*G*	df	*G*
101	4	10.32*	4	46.29***	4	22.58***	8	56.25***	2	6.96*	22	142.40***
102	3	49.17***	3	39.49***	3	17.32***	6	101.92***	1	6.14*	16	214.04***
103	4	64.50***	4	63.29***	4	52.62***	8	57.60***	2	9.82**	22	247.83***
105	–	–	–	–	–	–	–	–	–	–	–	–
106	5	23.54***	5	106.32***	5	173.11***	10	271.29***	1	8.75**	26	583.01***
107	–	–	–	–	–	–	–	–	–	–	–	–
108	3	29.84***	3	32.17***	3	6.96	6	94.23***	1	6.57*	16	169.77***
109	1	3.93*	1	10.25***	1	6.33*	2	94.36***	–	–	5	114.87***
111	10	160.46***	10	86.05***	10	574.65***	20	409.62***	7	249.51***	57	1480.29***
113	–	–	–	–	–	–	–	–	–	–	–	–
115	2	11.15**	2	0.18	2	3.15	4	15.91**	1	36.95***	11	67.34***
181	–	–	–	–	–	–	–	–	–	–	–	–
183	–	–	–	–	–	–	–	–	–	–	–	–
Within	32	352.91***	32	384.04***	32	856.72***	64	1101.18***	15	324.70***	17	3019.55***
Among	12	319.86***	12	431.20***	12	791.66***	24	790.26***	9	258.57***	6	2591.56***
Total	44	672.77***	44	815.24***	44	1648.38***	88	1891.44***	24	583.27***	24	5611.11***
F	2.42		2.99		2.46		1.91		1.33		2.18	
(df)	(12,32)		(12,32)		(12,32)		(24,64)		(9,15)		(69,175)	
P	0.0236		0.0066		0.0208		0.0207		0.3016		<0.0001	

*$P < 0.05$, **$P < 0.01$, ***$P < 0.001$

Appendix 8.—Log-likelihood ratio analysis (*G*-test) of genetic structure of Southeast Alaska and northern British Columbia sockeye salmon based on migratory route of returning adults.

Entry route	*PGM-1** df	*PGM-1** *G*	*PGM-2** df	*PGM-2** *G*	*PEPC** df	*PEPC** *G*	*ALAT** df	*ALAT** *G*	*mAAT-1** df	*mAAT-1** *G*	Total df	Total *G*
Northern outside	1	0.07	1	2.43	1	14.43	2	14.16	–	–	5	31.09
Cross Sound												
Sitkoh Lake	–	–	–	–	–	–	–	–	–	–	–	–
Northern Lynn Canal	2	11.15**	2	0.18	2	3.15	4	15.91**	1	36.95***	11	67.33***
Southern Lynn Canal	2	52.62***	2	49.48***	2	254.63***	4	67.13***	1	6.26*	11	430.12***
Stephens Passage												
Taku River	4	34.06***	4	9.46	4	48.89***	8	124.80***	4	9.18	24	226.39***
Port Snettisham	1	1.99	1	11.13***	1	8.56***	2	4.02	–	–	5	25.70***
Stephens Passage, within	5	36.05***	5	20.59***	5	57.44***	10	128.82***	4	9.18	29	252.10***
Stephens Passage, between	1	1.17	1	10.77***	1	23.07***	2	68.00***	–	–	5	103.03***
Stephens Passage, total	6	37.22***	6	31.36***	6	80.52***	12	196.82***	4	9.18	34	355.22***
Cross Sound, within areas	10	100.99***	10	81.02***	10	338.30***	20	279.86***	6	52.39***	56	852.67***
Cross Sound, among areas	3	63.28***	3	64.48***	3	556.99***	6	315.01***	3	319.56***	18	1319.33***
Cross Sound, total	13	164.27***	13	145.50***	13	895.29***	26	594.87***	9	371.95***	74	2171.88***
Northern Chatham Strait	2	5.60	2	11.36**	2	6.46*	4	115.64***	–	–	10	139.06***
Sumner Strait												
Clarence Strait	3	19.33***	3	9.89*	3	115.60***	6	186.24***	1	7.25**	16	338.31***
Upper Stikine	2	29.28***	2	22.59***	2	6.96*	4	80.33***	1	6.57*	11	145.73***
Northern Prince of Wales Island	4	19.21***	4	102.78***	4	37.70***	8	185.04***	–	–	20	344.73***
Sumner Strait, within areas	9	67.82***	9	135.26***	9	160.26***	18	451.61***	2	13.82***	47	828.77***
Sumner Strait, among areas	2	27.03***	2	66.82***	2	42.94***	4	211.50***	2	35.68***	12	383.97***
Sumner Strait, total	11	94.85***	11	202.08***	11	203.20***	22	663.11***	4	49.50***	59	1212.74***
Turner Lake	–	–	–	–	–	–	–	–	–	–	–	–

Appendix 8.—Continued.

Entry route	*PGM-1** df	*PGM-1** *G*	*PGM-2** df	*PGM-2** *G*	*PEPC** df	*PEPC** *G*	*ALAT** df	*ALAT** *G*	*mAAT-1** df	*mAAT-1** *G*	Total df	Total *G*
Outside Prince of Wales Island	3	63.16***	3	111.38***	3	162.50***	6	98.81***	1	6.26*	16	442.11***
Dixon Entrance												
Dixon Entrance, outside	3	39.91***	3	9.33*	3	5.04	6	42.70***	1	1.10	16	98.08***
Dixon Entrance, inside	4	10.32*	4	46.29***	4	22.58***	8	56.25***	2	6.96*	22	142.39***
Dixon Entrance, within areas	7	50.23***	7	55.62***	7	27.62***	14	98.95***	3	8.06*	38	240.48***
Dixon Entrance, among areas	1	121.48***	1	164.19***	1	9.54**	2	0.03	1	13.80***	6	309.02***
Dixon Entrance, total	8	171.71***	8	219.81***	8	37.16***	16	98.98***	4	21.86***	44	549.52***
Total within entry routes	38	499.66***	38	692.56***	38	1319.04***	76	1585.57***	18	449.57***	208	4546.40***
Among entry routes	6	173.13***	6	122.56***	6	329.35***	12	305.85***	6	133.69***	36	1064.58***
Total	44	672.79***	44	815.12***	44	1648.39***	88	1891.42***	24	583.26***	244	5610.98***
F		2.19		1.12		1.58		1.22		0.89		1.35
(df)		(6,38)		(6,38)		(6,38)		(12,76)		(6,18)		(38,208)
P		0.0647		0.369		0.1797		0.2841		0.5213		0.0997

$^{*}P < 0.05$ $^{**}P < 0.01$ $^{***}P < 0.001$

Appendix 9.—Log-likelihood ratio analysis (*G*-test) of genetic structure of Southeast Alaska and northern British Columbia sockeye salmon based on surface area of rearing lake.

Habitat	*PGM-1** df	*PGM-1** *G*	*PGM-2** df	*PGM-2** *G*	*LDH-B2** df	*LDH-B2** *G*	*PEPC** df	*PEPC** *G*	*ALAT** df	*ALAT** *G*	*mAAT-1** df	*mAAT-1** *G*	Total df	Total *G*
Small lakes	24	406.03***	24	536.20***	24	625.00***	24	1111.05***	48	1032.32	10	383.27***	154	4093.87***
Medium lakes	7	86.71***	7	40.53***	7	478.17***	7	350.08***	14	423.66***	5	122.57***	47	1501.72***
Large lakes	4	129.98***	4	3.05	4	32.01***	4	112.35***	8	140.46***	3	20.20***	27	438.05***
Rivers	6	44.99***	6	18.55**	6	5.74	6	46.74***	12	84.27***	3	3.73	39	204.02***
Within sizes	41	667.71***	41	598.33***	41	1140.92***	41	1620.22***	82	1680.71***	21	529.77***	267	6237.66***
Among sizes	3	5.04	3	216.83***	3	94.56***	3	28.16**	6	210.73***	3	53.49***	21	608.81***
Total	44	672.75***	44	815.16***	44	1235.48***	44	1648.38***	88	1891.44***	24	583.26***	288	6846.47***
F		0.10		4.95		1.13		0.24		1.71		0.70		1.241
(df)		(3,41)		(3,41)		(3,41)		(3,41)		(6,82)		(3,21)		(21,267)
P		0.9578		0.005023		0.3471		0.8697		0.1282		0.5587		0.2166

* $P < 0.05$, ** $P < 0.01$ ***, $P < 0.001$