DRAFT

Marine Bird Populations of Prince William Sound, Alaska, Before and After the *Exxon Valdez* Oil Spill

Bird Study Number 2

Final Report

April 18, 1994

Steven P. Klosiewski and Karen. K. Laing

U.S. Fish and Wildlife Service
Migratory Bird Management
Marine and Coastal Bird Project
1011 E. Tudor Road
Anchorage, Alaska 99503

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

represents results from simulations in which there were 5 years of pre- and 1 year of post-perturbation data.

Figure 5. Estimated power of using regression analysis to detect population trends, expressed as a proportion of the population, for hypothetical populations estimated with precision, i.e., *cv(N)*, between 0.1-0.5. Upper graph (a) represents results from Monte-Carlo simulations in which there were 5 years of data collected every other year over a 9-year period. Lower graph (b) represents results from simulations in which there were 9 years of data collected every year.

EXECUTIVE SUMMARY

We estimated the summer (July and August) and winter (March) abundance of marine birds in Prince William Sound (Sound), Alaska, following the 1989 *Exxon Valdez* oil spill, examined changes in population size between pre-spill and post-spill surveys, and compared pre- to post-oil spill population trends in the oiled zone of the Sound relative to trends in the unoiled zone.

Post-oil spill and 1972-1973 pre-oil spill surveys were whole population, i.e., shoreline and offshore, surveys of the Sound, whereas the more recent 1984-1985 pre-oil spill survey was of the shoreline only. Post-oil spill and 1972-1973 pre-oil spill surveys were done in March, July, and August. Because of the 1984-1985 survey design, we only made comparisons to data collected during July 1984 and which covered only a portion of the western Sound.

Ninety-nine species of birds were observed on surveys. Not all species were equally vulnerable to the oil spill because of their seasonal and geographic distribution in the Sound. Data for some species were analyzed by species group because of the large number of unidentified birds within a group; other species were excluded from analyses because they did not specifically relate to the marine environment or were never found in the oiled zone in pre-spill surveys.

Estimated populations of 15 of 29 species/species groups declined between 1972-1973 and the years after the oil spill; the largest declines occurred for scoters (*Melanitta* spp.) (58%), arctic tern (*Sterna paradisaea*) (80%) and *Brachyramphus* murrelets (68%). However, because of the long period of time, 17-19 years,

between pre- and post-oil spill surveys, we could not directly associate overall population declines with the oil spill.

Thus, we analyzed 1972-1973 data in a different way, by asking if there were fewer birds than expected in the oiled zone after the oil spill given the trends in the unoiled zone pre- to post-oil spill. Using one-tailed t-tests, we detected fewer black oystercatchers and pigeon guillemots (*Cepphus columba*) than expected in the oiled zone after the oil spill during winter. Similarly, we detected fewer cormorants (*Phalacrocorax* spp.), harlequin ducks (*Histrionicus histrionicus*), black oystercatchers, and northwestern crows (*Corvus caurinus*) than expected in the oiled zone after the oil spill during summer.

Using the more recent 1984 survey data, we estimated net loss in populations within shoreline habitats in the oiled zone relative to the unoiled zone, pre- to post-oil spill for the portion of the Sound surveyed during July 1984. We detected losses for 6 of 20 species/species groups, including loons (*Gavia* spp.), harlequin duck, scoters, black oystercatcher, mew gull (*Larus canus*), and arctic tern.

We think that populations of birds present in Prince William Sound during March were most at risk to the immediate effects of the oil spill, but we detected declines for only 2 species during this time of year, presumably because of a lack of statistical power. We also detected an oil spill effect for summer populations. We concluded that oiled zone populations of nearshore species, including harlequin duck, black oystercatcher, pigeon guillemot and northwestern crow, showed the

most injury from the oil spill because of their prolonged exposure to oil along the oiled beaches.

We demonstrated the feasibility of using sampling from small, fast boats to estimate marine bird populations of a relatively protected coastal waterbody. This technique can be used to illuminate long-term population trends if surveys are repeated often enough. The lack of power of statistical tests in this study occurred because there were few baseline or post-spill surveys conducted, and because the baseline surveys were too distant in time to the oil spill. Because of the low population growth rates of marine birds in the Sound, we suggest that statistical power associated with detecting recovery of injured species would be uncompromised if population size was estimated every other year rather than yearly.

KEY WORDS: *Exxon Valdez*; oil spill; survey design; avian populations; marine birds; damage assessment; Alaska; Prince William Sound

INTRODUCTION

Prince William Sound (Sound), a large estuarine embayment of the Gulf of Alaska, supports a diverse and abundant avifuana (Isleib and Kessel 1973). The terminus of the Trans-Alaska Pipeline System is located in the northeastern corner of the Sound, and supertankers have regularly plied the waters of the Sound enroute to west coast and gulf coast refineries since 1978. On March 24, 1989, the *T/V Exxon Valdez* ran aground on Bligh Reef, in northeastern Prince William Sound, and spilled about 260,000 barrels of Prudhoe Bay crude oil. The oil spread southwest, covering about one-third the surface area and oiling > 500 km of shoreline of the Sound. The oil eventually spread to the Gulf of Alaska and travelled for another 750 km, oiling the south side of the Kenai Peninsula, the Kodiak Archipelago, and the south side of the Alaska Peninsula. The impact on avifauna was marked; 30,000 dead birds were retrieved from beaches, 3,400 of which were recovered within Prince William Sound (Piatt et al. 1990). Estimated total losses for the spill range from 100,000-600,000 birds killed (Piatt et al. 1990, Ecological Consulting, Inc. 1991). The number of dead birds recovered from beaches is the highest recorded to date from an oil spill (Piatt and Lensink 1989).

To assess injury to marine birds from oil spills or other pollution events, population size before and after the perturbation must be known (Wiens et al. 1984, Dunnet 1987, Piatt et al. 1991). However, populations of marine birds are difficult to enumerate. Breeding populations of colonially nesting seabirds are

typically monitored by colony censuses, but this method cannot be applied to dispersed nesters such as marbled murrelets, black oystercatchers or harlequin ducks, nor to wintering populations of any marine species. Colony censuses also neglect the nonbreeding portions of the population which can represent a substantial proportion of the total population. Birds can be counted at sea, but marine environments are generally too large to census completely.

Thus, in practice, little pre-oil spill information exists to assess injury to marine birds from oil spills (Piatt et al. 1990). Usually the best estimate of injury to seabird populations is represented by the number of birds retrieved from beaches (Piatt et al. 1990). In this regard, a number of elaborate modelling exercises have been employed to correct these numbers upwards (Ford et al.1987, Page et al 1990). One such exercise was done for the *Exxon Valdez* oil spill (Ecological Consulting, Inc. 1991), though it was focused on estimating mortality in the Gulf of Alaska, rather than Prince William Sound.

In this study, we evaluated the effects of the *Exxon Valdez* oil spill on the marine bird populations of Prince William Sound by comparing estimates of pre- and post-oil spill populations. We sampled the study area from small, fast boats, employing methods used in pre-oil spill surveys. We determined seasonal and geographic distribution of marine birds to define the populations that were most at risk due to the oil spill. We compared pre- to post-oil spill population estimates to determine how post-oil spill populations deviated from expected. Finally, we evaluated the feasibility of using sampling of marine bird populations to detect

further declines, or recovery, of Prince William Sound avifauna resulting from this or future perturbations. We detected Sound-wide population declines for 15 species/species groups pre- to post-oil spill, but concluded that losses for only 9 species/species groups were consistent with an oil spill effect. We demonstrated that our methods provide the kinds of data needed to detect long-term trends and declines in marine bird populations from other perturbations, including oil spills, within protected coastal waters.

OBJECTIVES

1. Determine distribution and estimate abundance of marine birds in Prince William Sound following the *Exxon Valdez* oil spill.

2. Determine if marine bird abundance in Prince William Sound declined as a result of the *Exxon Valdez* oil spill.

3. Estimate the short- and long-term post-spill trends of marine bird populations in Prince William Sound.

4. Determine the probability of detecting further declines, or recovery, of marine bird populations in Prince William Sound.

METHODS

Study Area

Prince William Sound (approximately 60° 30' N, 147° W) is a large estuarine embayment of the northern Gulf of Alaska (Fig. 1). The rugged coastline is dominated by the Chugach Mountains which drop precipitously to the shoreline in an intricate pattern of bays and fjords. Including the mainland and more than 150 islands, the Sound contains over 5000 km of shoreline. The depth of the Sound varies from less than 1 fathom (2 m) on the Middle Ground Shoal to more than 475 fathoms (870 m) east of Lone Island. The study area included all water within the Sound, as well as land within 100 m of the shoreline; waters on the Gulf side of Montague, Hinchinbrook and Hawkins Islands, as well as Orca Inlet, were not part of the study area.

Sampling Methods

We determined the distribution and abundance of marine birds by counting the number of birds on transects distributed throughout the Sound. We employed techniques used in pre-oil spill surveys. Observers counted all birds on land, in the water, and in the air within transect boundaries and a 50-m viewing window ahead of the boat. Observations were made from 7-7.7 m boats travelling at about 5-10 knots. Observers used binoculars to aid in bird identification and enumeration.

Study Design

In addition to determining distribution and estimating marine bird abundance after the oil spill, we re-analyzed data collected in 2 pre-oil spill studies (Dwyer et al. ND, Irons et al. ND) and made comparisons with these pre-oil spill data. Because of the obscurity of the reports documenting the pre-oil spill studies, we first provide a description of their designs.

Pre-Oil Spill Surveys (1972-1973).-- A winter and summer survey were conducted each year (Dwyer et al. ND). Surveys were completed over a 2-week period. The study area was divided into shoreline and pelagic strata. The shoreline stratum included waters within 200 m of shore, plus some entire bays, and land within 100 m of the shoreline (M.E. (Pete) Isleib, pers. commun.); the pelagic stratum included the remaining area. The shoreline stratum was divided into transects by overlaying it with a USGS township grid. Transects in the pelagic stratum consisted of 200 m wide strips spaced at 3-mile (4.8-km) intervals and oriented in a southeast to northwest direction at 315° (true north). We assumed that bird densities for each transect in the pelagic stratum were representative of the area 1.5 miles on each side of the transect, and hereafter refer to this area, including the transect, as a plot. During 1972, surveyed shoreline transects were randomly chosen; pelagic transects were systematically chosen. In 1973, the shoreline stratum was divided into two substrata, one consisting of transects in bays and fjords and the other, characterized by less protected waters, included the remaining area; the pelagic stratum was divided

into open water and nearshore substrata. Thus, a new set of shoreline and pelagic transects was chosen for sampling in 1973. In our use of the data from these surveys, we poststratified 1972 data by the 1973 stratification scheme.

Pre-Oil Spill Surveys (1984-1985).-- A complete survey of birds along the Prince William Sound shoreline was completed over the summers of 1984 and 1985 (Irons et al. ND). The survey area included waters within 200 m of shore and land within 100 m of the shoreline. The survey area was divided into 742 transects; in general, transects consisted of small islands, entire bays, or the exposed shoreline between bays. The western half of the Sound was surveyed in May, July and August 1984, and the eastern half was surveyed in July and August 1985. Offshore areas were not surveyed.

Post-Oil Spill Surveys (1989-1991).-- Post-spill surveys were conducted in July and August 1989, March, July and August 1990 and March and July 1991. Surveys were completed over a 2-week period. The study area was divided into shoreline, coastal-pelagic, and pelagic strata. The shoreline stratum consisted of the same 742 transects used in the 1984-1985 surveys; remaining waters were divided into coastal-pelagic, which were nearshore, and pelagic, which were offshore, strata. Coastal-pelagic and pelagic strata were sampled using a two-stage cluster design. The study area was divided into plots, i.e., primary units, by overlaying the study area with a grid of 5' x 5' cells (latitude x longitude). Plots including more than 1 nm (nautical mile) of shoreline were assigned to the coastal-pelagic stratum (N = 206); the remaining plots were

assigned to the pelagic stratum (N = 86). Transects, i.e., secondary units, were 200 m wide and extended the length of the plot in a north-south direction. Usually, we sampled two transects units per plot.

Shoreline transects and coastal-pelagic and pelagic plots to be sampled were randomly chosen. Transects within coastal-pelagic and pelagic plots were systematically chosen. The number of shoreline transects and coastal-pelagic and pelagic plots to be sampled was limited to the number that could be sampled in about 14 working days. We surveyed 25% of the shoreline transects during 1989. In July and August 1990 and July 1991 we surveyed all shoreline transects surveyed in 1989, and we added 25 transects randomly selected from the population of transects surveyed during 1984 in the western Sound to increase sample size in the oiled area. For March surveys, we *a priori* chose to sample only 13% of the total shoreline transects because of the difficulties of working under winter weather conditions. Twenty-nine percent of 86 pelagic plots were surveyed in all surveys; 22% of 206 coastal-pelagic plots were surveyed during summer surveys, and 14% were surveyed during March surveys. Sample sizes in individual surveys varied because some transects could not be surveyed due to the presence of glacial ice.

Data Analysis

Poststratification by Oiling.--To determine if the oil spill affected marine bird populations in Prince William Sound, we poststratified each stratum into

oiled and unoiled zones. We examined all available datasets on the distribution of oil from the spill (Exxon Valdez Oil Spill Damage Assessment Geoprocessing Group 1991). We drew a line around the part of the Sound considered oiled in most or all datasets (Fig. 1). Although unoiled habitat was present within the oiled zone, we assumed that because birds are mobile, birds on an unoiled transect surrounded by oil were likely to be affected by oil. If birds observed on unoiled transects within the oiled zone were not affected by the oil spill, then tests for an oil spill effect would be conservative. We did not include the area between Bligh Reef and Naked Island in the oiled zone, even though oil passed through this area, because (1) the oil moved rapidly out of the area immediately after the spill, (2) there was controversy about where the oiling boundary in this area should be, and (3) shorelines on Bligh Island, Valdez Arm and the area west of Bligh Island were apparently not oiled.

Population Estimates and Variances.-- Population estimates and variances for oiled and unoiled zones in each stratum were calculated using the formula for a ratio estimator and two-stage cluster sample (Cochran 1977). Shoreline data were treated as a simple random sample, whereas coastal-pelagic and pelagic strata were treated as two-stage cluster samples with units of unequal size. Because some transects were partially oiled, i.e., the oiled zone boundary divided a transect or plot, the number of birds on a transect or plot within each zone was estimated as the number of birds observed times the proportion of the plot that was oiled or unoiled. Population estimates for oiled and unoiled zones were

calculated by adding estimates generated for each stratum (shoreline, coastal-pelagic and pelagic) for each zone. We calculated confidence intervals for each zone by adding variances for all strata within a zone. Satterthwaite's method was used to estimate the number of degrees of freedom (Satterthwaite 1946, cited in Cochran 1977: 96). Estimates and confidence intervals for total Prince William Sound populations were calculated by adding stratum estimates and variances.

Tests for Population Declines Pre- to Post-oil Spill.--We used pre- and post-oil spill data in two ways: (1) we compared Sound-wide, pre-oil spill population estimates to post-oil spill population estimates, and (2) we determined if population estimates in the oiled zone after the spill were less than expected given the changes in the unoiled zone pre- to post-oil spill.

First, we used t-tests to determine if significant overall population changes, regardless of an oil spill effect, occurred between 1972-1973 and 1989-1991. Because 1984-1985 surveys included only the shoreline stratum, and because only a portion of the Sound, e.g., the northwest corner, was surveyed during a given month/year during the 1984-1985 surveys, we were unable to use 1984-1985 data in this analysis. We performed separate tests for each survey month (March, July, and August) because of seasonal differences in bird abundance among months. For July and August comparisons, we used outlier t-tests because there was only one pre-oil spill survey; for March, we used a two-sample t-test.

However, because of the amount of time between pre- and post-oil spill surveys, we were skeptical about attributing Sound-wide population declines to the oil spill rather than some other cause. Thus, we performed tests to determine if population changes in the unoiled zone were less than expected given the changes in the unoiled zone pre- to post-oil spill. Because of the study design differences between the two pre-spill studies and the study design differences between the pre-spill studies and our study, we had to make two different types of comparisons.

First, we used t-tests to determine if

$$E\left[\frac{\hat{N}_{oiled,post-spill}}{\hat{N}_{unoiled,post-spill}}\right] < E\left[\frac{\hat{N}_{oiled,pre-spill}}{\hat{N}_{unoiled,pre-spill}}\right] \quad (1)$$

where

$\hat{N}$= population estimate in the oiled or unoiled zone, pre- (1972-1973), or post-oil spill (1989-1991).

Data from 1984-1985 surveys could not be used in this analysis because the 1984-1985 study included only the shoreline stratum and only a portion of the shoreline stratum, e.g., shoreline in northwest corner of the Sound, was surveyed during a given month/year during the 1984-1985 study. In equation (1), we are in essence testing if population estimates in the oiled zone after the oil spill were less than expected, given the changes that occurred in the unoiled zone, pre- to post-oil

spill. Although $E[x/y] \neq E[x]/E[y]$, what we are doing in equation (1), with some algebraic manipulation, is similar to testing if

$$\hat{N}_{oiled,post-spill} < \left(\frac{\hat{N}_{unoiled,post-spill}}{\hat{N}_{unoiled,pre-spill}} \cdot \hat{N}_{oiled,pre-spill} \right) \quad (2)$$

or

$$\hat{N}_{oiled,post-spill} < \hat{N}_{oiled,expected}$$

where

$\hat{N}_{oiled,expected}$ = the expected population estimate in the oiled zone if the oil spill did not occur.

We make two implied assumptions in using this test: (1) populations in the oiled zone changed at the same rate as populations in the unoiled zone before the spill, and (2) populations in the unoiled zone were not affected by the oil spill. For July and August comparisons, we performed outlier t-tests because there were data for only one pre-oil spill year. Analyses were limited to species observed in the unoiled zone, both before and after the spill, and in the oiled zone before the spill.

Next, we used the most recent pre-oil spill data, i.e., those collected during 1984-1985 study, and post-oil spill data to determine if there were fewer birds than expected in the oiled zone given the changes in the unoiled zone, pre- to post-oil spill. We estimated the net loss of birds in the shoreline stratum that was surveyed during 1984. We limited our tests to the part of the shoreline stratum

surveyed during July 1984, rather than all of the shoreline stratum censused during 1984-1985, because (1) we wanted to prevent any confounding effects of year-to-year variation and (2) we were concerned about month-to-month variation. The western half of the Prince William Sound shoreline stratum was surveyed in 1984, and the eastern half was surveyed in 1985. Because almost all oiled transects were in the western half of the Sound, a separate test using 1985 data could not be conducted; too few transects were oiled in the eastern half of the Sound. We used only July 1984 data because there were enough pre-oil spill transects (245) surveyed for comparison with post-spill data (72 transects) for July; there were not enough transects surveyed in August 1984 to make August comparisons. Data from the 1972-1973 study could not be used in this analysis because entire bays were included in the shoreline stratum during the 1972-1973 study whereas, the shoreline stratum in the 1984-1985 study and our study included only water within 200 m of shore.

We estimated the net loss of birds from the oiled area due to the oil spill as

$$\hat{N}_{loss} = \left(\hat{D}_{actual,oiled} - \hat{D}_{expected,oiled}\right) \cdot X_{oiled} \qquad (3)$$

where $\hat{D}_{actual,oiled}$ = estimated density of birds in the oiled zone after the oil spill,

$\hat{D}_{expected,oiled}$ = expected density of birds in the oiled zone if the oil spill did not occur, and

X_{oiled} = area of the oiled zone surveyed during July 1984.

Variance of $\hat{N}_{loss}$ was estimated as

$$v(\hat{N}_{loss}) = \left[v(\hat{D}_{actual,oiled}) + v(\hat{D}_{expected,oiled})\right] \cdot X_{oiled}^{2} \quad (4)$$

If we assume, as we did for the previous test, that populations in the oiled zone changed at the same rate as populations in the unoiled zone before the oil spill, and that populations in the unoiled zone were not affected by the oil spill, $\hat{D}_{expected,oiled}$ was estimated as

$$\hat{D}_{Expected,oiled} = \hat{R} \cdot \hat{D}_{pre-spill,oiled} \quad (5)$$

where $\hat{R}$ = rate of change in the unoiled zone, and

$\hat{D}_{pre-spill,oiled}$ = pre-spill bird density in the unoiled zone.

Variance of $\hat{D}_{expected,oiled}$ was estimated as

$$V(\hat{D}_{expected,oiled}) = \hat{D}^{2}_{pre-spill,oiled} \cdot v(\hat{R}) + \hat{R}^{2} \cdot v(\hat{D}_{pre-spill,oiled}) - v(\hat{R}) \cdot v(\hat{D}_{pre-spill,oiled}) \quad (6)$$

The rate of change in the unoiled area, $\hat{R}$ is

$$\hat{R} = \frac{\hat{D}_{post\text{-}spill,unoiled}}{\hat{D}_{pre\text{-}spill,unoiled}} \quad (7)$$

where $\hat{D}_{post\text{-}spill,unoiled}$ = estimated post-spill density of birds in the unoiled zone, and

$\hat{D}_{pre\text{-}spill,unoiled}$ = estimated pre-spill density of birds in the unoiled zone.

The variance of $\hat{R}$ was estimated as

$$v(\hat{R}) = v\left(\frac{\hat{D}_{post\text{-}spill,unoiled}}{\hat{D}_{pre\text{-}spill,unoiled}}\right)$$

$$= \left(\frac{\hat{D}_{post\text{-}spill,unoiled}}{\hat{D}_{pre\text{-}spill,unoiled}}\right)^2 \cdot \left[\frac{v(\hat{D}_{post\text{-}spill,unoiled})}{\hat{D}^2_{post\text{-}spill,unoiled}} + \frac{v(\hat{D}_{pre\text{-}spill,unoiled})}{\hat{D}^2_{pre\text{-}spill,unoiled}} \right. \quad (8)$$

$$\left. -2 \cdot \frac{cov(\hat{D}_{pre\text{-}spill,unoiled}\ \hat{D}_{post\text{-}spill,unoiled})}{\hat{D}_{pre\text{-}spill unoiled} \cdot \hat{D}_{post\text{-}spill,unoiled}}\right]$$

The formula for a ratio estimator was used to estimate all densities and their variances. For (8), $cov(\hat{D}_{pre\text{-}spill,unoiled}\ \hat{D}_{post\text{-}spill,unoiled})$ was estimated as

$$cov(\hat{D}_{pre\text{-}spill,unoiled}\hat{D}_{post\text{-}spill,unoiled}) = \left[\frac{n_1}{(n_1+n_2)(n_1+n_3)} - \frac{1}{N}\right]\frac{1}{(n_1-1)\bar{x}^2}\left(\Sigma y_{pre\text{-}spill}y_{post\text{-}spill}\right.$$
$$-\hat{D}_{pre\text{-}spill,unoiled}\Sigma y_{post\text{-}spill}x \quad (9)$$
$$-\hat{D}_{post\text{-}spill,unoiled}\Sigma y_{pre\text{-}spill}x$$
$$\left.+\hat{D}_{pre\text{-}spill,unoiled}\hat{D}_{post\text{-}spill,unoiled}\Sigma x^2\right)$$

where n_1 = number of transects in the unoiled zone that were surveyed both during July 1984 and July post-spill,

n_2 = number of transects surveyed during July 1984 but not surveyed during July of post-spill,

n_3 = number of transects surveyed during July post-spill but not surveyed during July 1984.

The pre-spill and post-spill variances, $v(\hat{D}_{pre\text{-}spill,unoiled})$ and $v(\hat{D}_{post\text{-}spill,unoiled})$, were calculated using all transects in the July 1984 survey area in a given year.

We tested if $\hat{N}_{loss}$ was significantly < 0 by comparing the statistic

$$t = \frac{\hat{N}_{loss}}{\sqrt{v(\hat{N}_{loss})}}$$

to the lower tail of the t-distribution. Degrees of freedom were defined as the minimum number of degrees of freedom for any of the estimated parameters. Analyses were limited to species/species groups that were found in the unoiled zone both before and after the spill, and in the oiled zone before the spill.

Determining the Probability of Detecting Further Population Declines or Recovery.-- We addressed the applicability of using this method of population estimation for detecting further population declines or recovery by running Monte-Carlo simulations to estimate power associated with various statistical tests. First, we ran Monte-Carlo simulations to estimate power associated with using an outlier t-test, such as we used in our analyses, to detect population declines. We modeled two situations. In the first, we generated 2 years of pre- and 1 year of post-perturbation data, and in the second, we generated 5 years of pre- and 1 year of post-perturbation data. We assumed population abundance was

constant before the perturbation, and that populations, before and after the perturbation, were estimated with error. Thus, estimated number of birds at time i was

$$\hat{N}_i = N_i + e_i \quad (10)$$

where N_i = actual or "known" number of birds as time i, and

e_i = measurement error at time i.

Measurement error was calculated as

$$e_i = N_i \cdot cv(N) \cdot d_i \quad (11)$$

where $cv(N)$ = modelled coefficient of variation of estimate of population size, and

d_i = normal deviate i of a normal random variable with mean 0 and variance 1.

We varied the decline, pre- to post-perturbation, between 10 and 80%, and $cv(N)$ between 10 and 50%. Simulations were run 1000 times for each level of decline and cv. Power was estimated as the proportion of times the result from an outlier t-test was significant at α=0.05.

We also ran Monte Carlo simulations to estimate power associated with using regression analysis to determine population trends. We modeled a population showing a monotonic and constant rate of decline or increase. We assumed that populations were estimated with error as in equations (10) and (11).

We varied the rate of population increase or decrease between 2 and 20% per year and $cv(N)$ between 10 and 50%. We modeled two sampling designs. In the first, we estimated populations every year over a 9-year period, and in the second, we estimated populations every other year over a 9-year period. Simulations were run 1000 times for each level of rate of change and *cv*. Power was estimated as the proportion of times the regression of *ln (estimated number of birds)* over time was significant at α=0.05.

RESULTS

Ninety-nine species of birds were observed on transects and identified to species (Appendix I). Data for loons, grebes, cormorants, scaups, scoters, goldeneyes, mergansers, murres, and *Brachyramphus* murrelets were analyzed by species group, because of the large number of unidentified birds within each group (Appendix I). Most shorebirds were similarly unidentified to species and were therefore treated as a group. However, we analyzed data for black oystercatcher and red-necked phalarope as individual species, because we felt they were usually identified to species. Data for gulls were analyzed by individual species and as a group. Species that were observed on transect, but that we felt did not specifically relate to the marine environment, including great blue heron, northern harrier, hawks, golden eagle, falcons, ptarmigans, owls, hummingbirds, belted kingfisher, and passerines (except northwestern crow), were excluded from analyses. Sound-wide population estimates for excluded species were low, generally < 200 birds.

Seasonal Distribution and Abundance of Marine Birds in Prince William Sound

Populations at risk varied seasonally. The greatest abundance and diversity of birds occurred during summer months. Summer (July and August) estimates of the total bird population ranged from 238,000-629,000 birds during summer; winter estimates ranged from 142,000-328,000 birds. Species belonged to one of three groups: (1) those that were more abundant during winter than summer, (2) those that were more abundant, or only present, during summer, and (3) those that were equally abundant in winter and summer. Over half the species were observed both winter and summer; 35 species were seen only during summer surveys, whereas 10 species were seen only during winter surveys. All of the winter-only species were rare.

Those species that were more abundant in winter than summer included grebes, cormorants, all duck species except mergansers, and murres (Appendix I). Except for harlequin duck and scoters, these species were uncommon during summer. For most species in this group, August estimates were higher than July estimates presumably due to the influx of fall migrants. Species in this group were at immediate risk at the time of the oil spill.

Species more abundant during summer than winter included Canada goose, black oystercatcher, Bonaparte's gull, glaucous winged-gull, pigeon guillemot, *Brachyramphus* murrelets and northwestern crow (Appendix I). For these species, the populations at risk at the time of the oil spill differed from those in the Sound during the summer months after the spill. For the species equally abundant in

both winter and summer, including loons, mergansers, and bald eagles, we do not know if these were the same or different populations.

Some species probably were not at immediate risk at the time the tanker ran aground because they were not present or were rare in the Sound in March at the time of the spill. This group included fork-tailed storm-petrel, red-necked phalarope, jaegers, arctic tern, puffins, and parakeet auklet (Appendix I). Caution must be used, however, in assessing the risks to these species, because we do not have data pinpointing the time of spring migration.

Six to ten species/species groups accounted for >85% of the estimated total number of birds during each survey period; however, the composition of the dominant species/species groups varied seasonally (Fig. 2). Sea ducks (mostly scoters, goldeneyes, harlequin duck, and oldsquaw) were numerically important during winter, but were (except for harlequin duck and scoters) conspicuously absent during summer (Appendix I). The phenology for grebes was similar to that of sea ducks (Appendix I). *Brachyramphus* murrelets, i.e., marbled and Kittlitz's murrelets, and gulls, mostly glaucous-winged gull, black-legged kittiwake, and mew gulls, were among the most abundant birds in both winter and summer, though their summer abundance, relative to the total, was twice their winter abundance. Population estimates for *Brachyramphus* murrelets and gulls were generally more than 3 times greater during summer than during winter. Marbled murrelets accounted for the largest percentage of *Brachyramphus* murrelets identified to species (Appendix I). Glaucous-winged gulls were the most abundant

gull during winter surveys, whereas, black-legged kittiwakes were the most abundant gull during summer surveys (Appendix I).

Birds were not evenly distributed throughout the Sound, and thus, were not equally vulnerable to the oil spill. About 40% of the study area was in the oiled zone. Overall, about 30-50% of the estimated total number of birds were found in the oiled zone, but the distribution of individual species/species groups differed markedly. Species disproportionately distributed in the unoiled zone included loons (Fig. 3a), bald eagle (Fig. 3n), most gull species (Fig. 3s-x), and most waterfowl (Fig. 3e-m), excluding harlequin duck (Fig. 3h). Species disproportionately found in the oiled zone included murres (Fig. 3z), parakeet auklet (Fig. 3cc), and tufted puffin (Fig. 3dd). Before the oil spill, almost all of the overwintering population of black oystercatchers was in the oiled zone (Fig. 3o). Thus, from a population standpoint, some species were more at risk because of their distribution in the oiled compared to unoiled zone.

Population Trends Between Pre- (1972-1973) and Post-oil Spill (1989-1991) Surveys

Sound-wide population estimates for 15 species/species groups declined from 1972-1973 to 1989-1991 (Table 1, t-test, $p \leq 0.05$); for the species/species groups tested. Populations showing significant declines during March included scoters, black oystercatcher, glaucous-winged gull, total gulls, and black-legged kittiwake; populations showing significant declines during summer included cormorants,

scaups, scoters, harlequin duck, mergansers, black oystercatcher, total shorebirds, Bonaparte's gull, glaucous-winged gull, black-legged kittiwake, total gulls, arctic tern, pigeon guillemots, *Brachyramphus* murrelets, and horned puffin. For most species, the declines were > 50% (see Appendix I). For example, during March, estimated populations of scoters declined from 56,600 to 14,800 birds, and the glaucous-winged gull population declined from 30,000 to 9,200 birds between 1972-1973 and 1989-1990. Losses for summer populations of some species were just as substantial. July population estimates for scoters declined from 13,000 to 5,400 birds, arctic tern declined from 33,200 to 6,600 birds, and *Brachyramphus* murrelets declined from 304,400 to 98,400 birds between 1972 and 1989-1991. August population estimates for cormorants declined from 6,800 to 900 birds, scaups declined from 3,300 to 20 birds, black-legged kittiwake declined from 140,300 to 60,300 birds, and pigeon guillemot declined from 15,700 to 4,000 between 1973 and 1989-1990. Species not seen during pre-oil spill surveys, during a given month, were excluded from analyses. Additionally, four species, i.e., emperor goose, golden eagle, caspian tern, and crested auklet, were observed in 1989-1991 but not 1972-1973 and thus were excluded from analyses; mean population estimates for these species were all < 10 birds.

Because of the 17-19 year gap between pre- and post-oil spill surveys, we could not directly associate overall population declines with the oil spill. However, by making the assumption that populations in the oiled zone changed at the same rate as populations in the oiled zone prior to the oil spill, and that birds in the

unoiled zone were unaffected by the oil spill, we determined if there were fewer birds than expected in the oiled zone after the oil spill.

Population estimates for cormorants, harlequin duck, black oystercatcher, pigeon guillemot, and northwestern crow declined in the oiled zone, pre-(1972-1973) to post-oil spill, relative to population trends in the unoiled zone (Table 2, one-tailed t-test, $p \leq 0.05$). The estimated number of pigeon guillemots in the oiled zone during March, after the oil spill, was 66% of that expected, given the pre- to post-oil spill trend in the unoiled area. Essentially none of the expected March population of black oystercatcher was found in the oiled zone after the oil spill (Fig. 3o). Population estimates for cormorants, harlequin duck, and northwestern crow in the oiled zone during July, after the oil spill, were 60%, 17%, and 41% of that expected. Estimated numbers of harlequin duck and black oystercatcher in the oiled zone during August, after the oil spill, were 12% and 44% of that expected given the pre- to post-oil spill trends in the unoiled zone.

Many of the same species exhibited declines when we compared our post-oil spill data to data collected during July 1984. The estimated number of loons, harlequin duck, scoters, black oystercatcher, mew gull, and arctic terns in the oiled zone of the July 1984 shoreline survey area, after the oil spill, was less than expected, given the trend in the unoiled zone of the same survey area (Table 3, t-test [*actual estimate - expected estimate* < 0], $p \leq 0.05$). None of the estimated losses was significant, $p \leq 0.05$, when we compared July 1989 data to July 1984 data. The number of species with estimates less than expected increased from

1989 to 1990 and from 1990 to 1991. The estimated loss for black oystercatcher during 1990 was more than 25% of the population estimate for the whole Sound; only about 41% of the expected number of oystercatchers was found in the oiled zone that year. Similarly, estimates of black oystercatchers were 56% of that expected during July 1991. Estimates for harlequin duck during July 1990 and 1991 were only about 23% of that expected; the estimated loss, approximately 1,500 birds, represented about 15% of the Sound-wide, post-oil spill population estimate. Although estimated losses for scoters were statistically significant, from a population standpoint they seem inconsequential because the losses accounted for only about 1% of the total estimated population.

Short- and Long-term Population Trends after the Spill

In the short-term, i.e., during the first year after the oil spill, the data demonstrate either that (1) birds were not completely eliminated from the oiled zone due to the oil spill, or (2) birds migrated into the oiled zone after much of the oil was gone from the water's surface. Birds were in the oiled zone by July 1989, and, in general, most species normally found in Prince William Sound during winter were found in the oiled zone during March 1990. A notable exception was the paucity of black oystercatchers observed in the oiled zone during March of 1990 and 1991. The number of post-oil spill surveys is too few to determine long-term losses or recovery of populations. We expect that year-to-year declines due to chronic effects of oiling, or population increases due to recovery, would be

relatively small. In this regard, populations of no species exhibited large declines or increases since 1989.

Probability of Detecting Declines, or Recovery, of Marine Bird Populations

Results from Monte-Carlo simulations demonstrated the lack of power associated with performing tests using too few data such as we had for our assessment of injury to marine bird populations from the *Exxon Valdez* oil spill. When we generated data for a sampling regime that included 2 years of pre- and 1 year of post-perturbation data, estimated power was low regardless of effect size, i.e., decline expressed as a proportion of the population, or sampling precision, i.e., $cv(\hat{N})$ (Fig. 4a). We estimated that such a sampling regime would give us a 20-40% chance of detecting a 50% decline for *Brachyramphus* murrelets, the species/species group that we estimated with the highest precision (i.e., $cv(\hat{N}) \approx$ .1 - .2); estimated power would be significantly worse for other species/species groups. Estimated power increased substantially when we generated datasets with 5 years of pre- and 1 year of post-perturbation data (Fig. 4b). For example, such a sampling regime would give us a 60-100% chance of detecting a 50% decline for *Brachyramphus* murrelets. The above results reveal the importance of having sample sizes above what we had in this study to detect population declines due to environmental perturbations, and suggests the utility of monitoring to detect population declines.

Using Monte-Carlo simulations, we found that for species that can be estimated with a high level of precision, or for species whose populations increase or decrease at a fast rate, we would have a high probability of detecting a population decrease, or recovery, using regression analysis (Fig. 5). Estimated power was higher for simulated sampling regimes in which data were collected every year over a 9-year period (Fig. 5b) than for the design where populations were sampled every other year over the same period (Fig. 5a). Note that for populations estimated with low precision or for populations whose numbers change slowly over time, there was little advantage to sampling every year rather than every other year, i.e., estimated power was similar for either design.

DISCUSSION

The *Exxon Valdez* ran aground on Bligh Reef on March 24, 1989, and over the next two months about 3,400 bird carcasses were retrieved from the beaches of Prince William Sound (Piatt et al. 1990). We believe that the majority of these birds belonged to March populations rather than July or August populations. We estimated the number of birds in Prince William Sound in the path of the oil, at the time of the oil spill, was between 30,000 (based on post-oil spill surveys) and 60,000 birds (based on pre-oil spill surveys). Because the oil spill occurred during spring migration, conceivably even more birds were exposed to oiling during this time. We expected that March populations would most clearly reflect any losses due to direct contact with oil.

We demonstrated spill related losses in winter,i.e., March, populations for only 2 species, the black oystercatcher and pigeon guillemot. These results seem equivocal given that other species/species groups, including grebes, cormorants, murres and *Brachyramphus* murrelets, made up a much larger proportion of the birds retrieved from beaches (Piatt et al. 1990). However, we had data from only 2 pre- and 2 post-oil spill surveys, thus giving us little statistical power to detect spill effects. Even though power increased with magnitude of effect and precision, results from our Monte-Carlo simulations demonstrated the lack of power associated with performing tests using data from such few years. The magnitude of the estimated losses undoubtedly contributed to our finding a significant effect for black oystercatcher and pigeon guillemot, whereas the large pre-spill year-to-year variation in estimated numbers of grebes, cormorants, murres, and *Brachyramphus* murrelets could have contributed to our failure to detect pre- to post-oil spill differences in their populations.

Detecting losses in summer populations may be even more difficult. Summer populations in Prince William Sound may have been affected by the oil spill while wintering outside of Prince William Sound. We provided evidence that, for some species, different populations inhabit the Sound during winter and summer. Our definition of oiled and unoiled zones in Prince William Sound, however, would fail to correctly classify areas as oiled and unoiled for summer populations that overwinter outside of the Sound, but were exposed to the oil spill in the Gulf of Alaska. We do not have any data to determine if this occurred.

This problem could be eliminated by comparing total population estimates, pre- to post-oil spill, instead of using an oiled zone definition as we did.

We compared total population estimates, pre- to post-oil spill, but because our pre-spill data predated the spill by almost 20 years, interpreting total population declines as an oil spill effect is suspect. We find it unlikely that these declines were caused only by the oil spill. For example, the March population of scoters declined from 56,400 to 14,600 birds between 1972-1973 and 1989-1991, yet we estimated that at most 10,000 scoters were in the oiled zone before the oil spill, leaving about 30,000 scoters unaccounted for with respect to losses due to oiling. Similarly, the *Brachyramphus* murrelet population during July declined from an estimated 304,000 to 97,000 birds, pre- to post-oil spill. If this difference of 207,000 birds was the result of the spill, then the 641 murrelets retrieved from the entire spill area (Piatt et al. 1990) represented a 0.3% recovery rate. The estimated recovery rate of dead birds from beaches in the *Exxon Valdez* oil spill, however, was at least 25 times greater, i.e., 8-35% (Ecological Consulting, Inc. 1991), thus these losses were probably not due to the oil spill.

We demonstrated losses consistent with an oil spill effect for 9 species/species groups. Most species for which we documented spill-related losses are ecologically tied to the shoreline and intertidal area, and these species were most likely exposed to more oil for a longer period of time than were offshore species. Immediately after the oil spill, both nearshore and offshore species in western Prince William Sound were equally vulnerable to the oil spill because oil

was present everywhere. By the end of April, much of the oil had moved out of the Sound, and the species most susceptible to oiling were those using oiled shorelines and small bays with entrained surface oil. Cleanup of the oiled shorelines in Prince William Sound continued over four summers, attesting to the presence of oil in the nearshore areas. Thus, many of the nearshore species received prolonged contact with oil. In addition, some species, particularly black oystercatcher, harlequin duck, and northwestern crow, feed extensively in the intertidal, thus subjecting themselves to long-term exposure to oil. That we demonstrated losses related to the spill for nearshore species may argue for the importance of removing oil from the beaches.

The number of species or groups for which shoreline losses were estimated to have occurred increased from none in 1989 to five in 1991 suggests a lingering effect of the spill. Populations might have continued to contact oil directly or through ingestion of contaminated food. The increase in number of species showing a decline is consistent with expected effects due to chronic exposure to oil. Alternatively, the increase in number of species showing a decline since the spill, could be due to shifts in bird distribution from the oiled to the unoiled zone because of the effect of the oil spill on habitat in the oiled zone.

How do we account for the survival of so many birds following this pollution event? Birds may have avoided the oil during the early days of the spill. Piatt et al. (1990) observed that during the first few weeks after the spill, the number of birds in the oiled area decreased in abundance whereas numbers in unoiled areas

increased. That birds may have avoided oil is also suggested by the Ecological Consulting, Inc. (1991) estimate of total number of birds killed by direct contact with the oil spill in Prince William Sound (≈ 9,700 birds) and our estimate of birds present in the oiled zone in Prince William Sound during March (30,000-60,000 birds). We think that researchers should make a concerted effort to quantify this avoidance behavior in future oil spills.

Avoidance behavior has implications for interpretation of our results. We assumed that populations in the unoiled zone were not affected by the oil spill. If birds avoided the oil by moving from the oiled to unoiled zone, this assumption would be violated, and we would overestimate the loss of birds relative to the expected. However, we would still interpret such a situation as an oil spill effect, but the implication for bird populations becomes more dubious. Alternatively, if birds moved into areas vacated by birds killed by the oil spill, we would underestimate the oil spill's effect on bird populations. Because the Sound is not a closed system, making Sound-wide comparisons would reduce, though not completely eliminate, the influence of bird avoidance and movement.

Except for black oystercatcher, we found no evidence that a large proportion of any population was killed in Prince William Sound. Piatt et al. (1990, 1991) suggested that local populations of some species, including loons, grebes, harlequin ducks, and marbled murrelets, were decimated by the oil spill, meaning that more than 10% were killed (John Piatt, National Biological Survey, Anchorage, AK, personal communication). For the Sound, we think that total direct mortality

represented about 25% of the total number of birds overwintering in the oiled zone, or about 10% of the estimated total number of birds in the Sound at the time of the oil spill. We came by these estimates by dividing the 3,358 birds retrieved from beaches in Prince William Sound (Piatt et al. 1990) by the beached bird recovery rate (35%) estimated for Prince William Sound (Ecological Consulting, Inc. 1991) and then by comparing these estimates to our March post-oil spill population estimates.

We demonstrated the utility of using small, fast boats to conduct marine bird surveys in relatively protected coastal waters. Most boat-based marine bird surveys have been conducted opportunistically from large ships. The disadvantages of most ship-board surveys are that ships are expensive, and movement of the ship is typically dictated by needs of other researchers. These constraints necessitate opportunistic observations of birds (Bartonek and Gibson 1972, Sanger 1972, Nygard et al. 1988, Gould and Forsell 1989, Petersen and Petersen 1991). Ships also move too slowly to reach a large number of randomly selected transects in a reasonable period, and most oceanographic research vessels obviously cannot operate in shallow water along shorelines. Survey windows on shipboard surveys are often as wide as 300 m on each side of the ship (Hunt et al. 1981, Gould and Forsell 1989), and the large area covered by observers has precipitated a literature on handling bird movements through the survey window (Tasker et al. 1984, Gould and Forsell 1989, Spear et al. 1992).

In our study, and the pre-spill surveys which preceded it, the relatively sheltered waters of Prince William Sound allowed the use of small (7.7 m) power boats which could travel at velocities over 30 knots between transects, and which were maneuverable in shallow water along the rocky shoreline. The use of small, fast boats made it feasible to use a statistically rigorous design to sample such a large geographic area and obtain population estimates with relatively small confidence intervals. Our narrow survey window (100 m on each side) minimized the problem of bird movements through the window. The successful completion of 9 surveys in the 3 years after the spill (7 of which are reported here), and the reasonable confidence limits obtained for many species of management interest, such as the marbled murrelet (Appendix I), suggest that this survey method deserves consideration for other coastal areas.

The use of sampling to estimate populations can illuminate long-term trends if surveys are repeated often enough. Simulations have shown that the number of surveys conducted has a large influence on whether a decline or trend can be detected, although the number of samples collected within a survey, the magnitude of population change and the distribution of animals also affect the ability to detect trends (Smith 1978, Cox 1990). Results from our simulations clearly illustrated the importance of the precision of an estimate as well as the number of estimates in determining statistical power. The lack of power of statistical tests to detect trends in this study occurred because few baseline or post-spill surveys were conducted, and because the baseline surveys were distant

in time to the oil spill. Statistical methods developed to assess impacts of unreplicated perturbations require long time series of data (Jassby and Powell 1990, Reckhow 1990, Stewart-Oaten et al. 1992), but this does not necessarily mean that sampling every year is the optimal approach (Gerrodette 1987). We, like Gerrodette 1987, found that for populations whose numbers change slowly over time, sampling frequency can be reduced with little loss of power. Models of seabird population growth predict most species increase no more than 12% per year (Nur and Ainley 1992). Assuming that recovery of injured populations in the Sound comes from births rather than immigration, there seems to be little advantage to conducting surveys in the Sound every year rather than every other year to detect recovery. However, there are tradeoffs between monetary costs and costs of not knowing what the population size was every other year (Gerrodette 1987). We hope that this study will provide scientists and policy makers with the information needed to make decisions about marine bird population surveys for species of management concern.

CONCLUSIONS

Fifteen species/species groups showed Sound-wide population declines, pre- to post-oil spill, though the losses were unlikely the result of the oil spill. We found evidence of oil spill damage for loons, cormorants, harlequin duck, scoters, black oystercatcher, mew gull, arctic tern, pigeon guillemot, and northwestern crow. Most injured species were ecologically tied to the intertidal and nearshore

areas. Injury was conceivably due to their prolonged exposure to oil. We suggest that removing oil from beaches is of utmost importance for nearshore species. We demonstrated that marine bird populations of large geographic regions can be estimated using small, fast boats and standard sampling designs. Results from our Monte-Carlo simulations demonstrated that population declines, or trends, can be detected with the implementation of routine monitoring. The probability of detecting changes in populations increases with the number of years of data, though for slowly changing populations, there may be economies associated with less frequent sampling intensity and with little loss of statistical power.

LITERATURE CITED

Bartonek, J.C. and D.D. Gibson. 1972. Summer distribution of pelagic birds in Bristol Bay. Condor 74:416-422.

Cochran, W.G. 1977. Sampling techniques. Third edition. John Wiley and Sons, New York.

Cox, J. 1990. Evaluation of the sensitivity of breeding bird surveys using a stochastic simulation model. Pages 114-119. *in*: J.R. Sauer and S. Droege, eds. Survey designs and statistical methods for the estimation of avian population trends. U.S. Fish and Wildlife Service Biological Report 90(1).

Dunnet, G.M. 1987. Seabirds and North Sea oil. Phil. Trans. R. Soc. Lond. B 316:513-524.

Dwyer, T.J., P. Isleib, D.A. Davenport and J.L. Haddock. No Date. Marine bird populations in Prince William Sound, Alaska. U.S. Fish and Wildlife Service, Anchorage, Alaska. Unpub. report, 21 pp.

Exxon Valdez Oil Spill Damage Assessment Geoprocessing Group. 1991. The *Exxon Valdez* oil spill natural resource damage assessment and restoration:

A report on oiling to environmentally sensitive shoreline. Draft. pp. 1-31 *In* Exxon Valdez Oil Spill Damage Assessment Geoprocessing Group. Exxon Valdez Oil Spill Technical Services #3, GIS Mapping and Statistical Analysis. Alaska Department of Natural Resources and U.S. Fish and Wildlife Service, Anchorage.

Ford, R.G., G.W. Page, and H.R. Carter. 1987. Estimating mortality of seabirds from oil spills. Proceedings of the 1987 Oil Spill Conference, Washington D.C., American Petroleum Institute.

Eberhardt, L.L. 1976. Quantitative ecology and impact assessment. J. of Environs. Manage. 4:27-70.

Ecological Consulting, Inc. 1991. Assessment of direct seabird mortality in Prince William Sound and the western Gulf of Alaska resulting from the *Exxon Valdez* oil spill. Confidential Report.

Gerrodette, T. 1987. A power analysis for detecting trends. Ecology 68:1364-1372.

Gould, P.J. and D.J. Forsell. 1989. Techniques for shipboard surveys of marine birds. Fish and Wildlife Service Technical Report 25. U.S. Fish and Wildlife Service, Washington, D.C. 22 pp.

Hunt, G.L., Jr., P.J. Gould, D.J. Forsell and H. Peterson. 1981. Pelagic distribution of marine birds in the eastern Bering Sea. pages 689-718. *in* D.W. Hood and J.A. Calders, eds. The Eastern Bering Sea Shelf; Oceanography and Resources. Vol. 2. NOAA, Office of Marine Pollution Assessment.

Irons, D.B., D.R. Nysewander and J.L. Trapp. ND. Prince William Sound waterbird distributions in relation to habitat type. U.S. Fish and Wildlife Service. Anchorage, Alaska. Unpubl. report, 24 pp.

Isleib, M.E., and B. Kessel. 1973. Birds of the North Gulf Coast - Prince William Sound Region, Alaska. Biological Papers of the University of Alaska Number 14. University of Alaska Press. 149 pp.

Jassby, A.D. and T.M. Powell. 1990. Detecting changes in ecological time series. Ecol. 71:2044-2052.

Nur, N., and D.G. Ainley. 1992. Comprehensive review and critical synthesis of the literature on recovery of marine bird populations from environmental perturbations. Final Report to *Exxon Valdez* Restoration and Planning Work Group.

Nygard, T., B.H. Larsen, A. Follestad and K.B. Strann. 1988. Numbers and distribution of wintering waterfowl in Norway. Wildfowl 39:164-176.

Page, G.W., H.R. Carter, and R.G. Ford. 1990. Numbers of seabirds killed or debilitated in the 1986 *Apex Houston* oil spill in central California. Studies in Avian Biology 14:164-174.

Petersen, A., and I.K. Petersen. 1991. Seabirds at sea between Iceland, Jan Mayen and Greenland. Bliki 10:57-60.

Piatt, J.F., and C.J. Lensink. 1989. *Exxon Valdez* bird toll. Nature 342:865-866.

Piatt, J.F., C.J. Lensink, W. Butler, M. Kendziorek and D.K. Nysewander. 1990. Immediate impact of the *Exxon Valdez* oil spill on marine birds. Auk 107(2):387-397.

_____, H.R. Carter and D.N. Nettleship. 1991. Effects of oil pollution on marine bird populations. pages 125-140. *in* Proceedings from The Oil Symposium. Herndon, Virginia, October 16-18, 1990.

Reckhow, K.H. 1990. Bayesian inference in non-replicated ecological studies. Ecology 71:2053-2059.

Sanger, G.A. 1972. Preliminary standing stock and biomass of seabirds in the subarctic Pacific region. Pages 581-611. *in* Takenouti, A.Y. ed., Biological Oceanography of the Northern North Pacific Ocean.

Smith, W. 1978. Environmental survey design: a time series approach. Estuarine and Coastal Mar. Sci. 6:217-224.

Spear, L., N. Nur and D.G. Ainley. 1992. Estimating absolute densities of flying seabirds using analyses of relative movement. Auk 109:385-389.

Stewart-Oaten, A., J.R. Bence and C.W. Osenberg. 1992. Assessing effects of unreplicated perturbations: no simple solutions. Ecol. 73:1396-1404.

Tasker, M.L., P.H. Jones, T. Dixon and B.F. Blake. 1984. Counting seabirds at sea from ships: a review of methods employed and a suggestion for a standardized approach. Auk 101:567-577.

Wiens, J.A., R.G. Ford and D. Heinemann. 1984. Information needs and priorities for assessing the sensitivity of marine birds to oil spills. Biol. Cons. 28:21-49.

Table 1. T- and p-values from t-tests used to compare total population estimates of marine birds in Prince William Sound, Alaska, during March, July, and August, before (1972-1973) and after (1989-1991) the *Exxon Valdez* oil spill. Dashes (-) denote times when species/species group was not observed.

	March[a]			July[b]		August[c]	
Species	df	t	p	t	p	t	p
Loons	1.3	-4.79	0.11	-2.17	0.16	-3.61	0.17
Grebes	1.1	-2.80	0.20	-3.24	0.08	0.49	0.71
Fork-tailed storm petrel	-	-	-	0.63	0.59	1.54	0.37
Cormorants	1.0	-1.21	0.44	-42.34	0.0006	-81.01	0.008
Canada goose	1.3	-1.52	0.34	-	-	1.27	0.42
Mallard	2.0	0.17	0.88	0.16	0.89	-5.27	0.12
Scaup	1.8	-1.20	0.37	0.87	0.48	-4844.29	0.0001
Harlequin duck	1.0	-1.92	0.30	1.08	0.39	-18.91	0.03
Oldsquaw	1.8	-1.97	0.21	-0.82	0.50	-	-
Scoters	1.6	-10.01	0.03	-8.72	0.01	-2.16	0.28
Goldeneyes	1.3	0.28	0.82	0.18	0.87	-6.75	0.09
Bufflehead	1.9	-2.32	0.16	-	-	-	-
Mergansers	1.5	-0.33	0.79	-4.25	0.05	-2.89	0.21
Bald eagle	1.2	0.25	0.84	0.65	0.58	-0.10	0.94
Black oystercatcher	1.2	-13.17	0.04	0.50	0.66	-1.51	0.37
Red-necked phalarope	-	-	-	0.85	0.49	0.83	0.56
Shorebirds	1.5	-0.79	0.55	0.49	0.67	-41.30	0.02
Jaegers	-	-	-	0.31	0.79	3.24	0.19
Bonaparte's gull	1.3	-1.46	0.35	-8.60	0.01	-1.56	0.36
Mew gull	1.9	-0.01	0.99	-1.00	0.42	-3.60	0.17
Herring gull	1.2	-1.67	0.32	-	-	0.57	0.67
Glaucous-winged gull	1.4	-8.84	0.05	-4.10	0.05	-0.18	0.89
Black-legged kittiwake	1.1	-4.26	0.14	-4.36	0.05	-27.83	0.02
Gulls	2.0	-5.17	0.04	-11.72	0.007	-31.39	0.02
Arctic tern	-	-	-	-38.08	0.0007	-7.56	0.08
Murres	1.0	0.76	0.58	-0.67	0.57	-0.24	0.85
Pigeon guillemot	1.3	-1.58	0.33	-5.08	0.04	-28.47	0.02
Brachyramphus murrelets	1.0	-0.60	0.66	-12.08	0.007	-13.40	0.05
Parakeet auklet	-	-	-	-2.97	0.10	-5.67	0.11
Tufted puffin	-	-	-	-3.68	0.07	-2.95	0.21
Horned puffin	-	-	-	-5.43	0.03	-0.002	1.00
Northwestern crow	1.1	-6.02	0.10	-1.00	0.42	-0.73	0.60

[a] Based on 2 pre- and 2 post-oil spill surveys.
[b] Based on 1 pre- and 3 post-oil spill surveys. Df = 2.
[c] Based on 1 pre- and 2 post-oil spill surveys. Df = 1.

Table 2. Summary of one-tailed t-tests used to determine if marine bird populations in the oiled zone of Prince William Sound, Alaska, after the *Exxon Valdez* oil spill (1989-1991) were less than expected given the changes that occurred in the unoiled zone between 1972-1973 and 1989-1991. Separate tests were done for March, July, and August data. For March there were 2 years of pre- and 2 years of post-spill data; for July there was 1 year of pre- and 3 years of post-spill data, df = 2; for August there was 1 year of pre- and 2 years of post-spill data, df = 1.

	March			July		August	
Species	df	t	p	t	p	t	p
Loons	1.6	1.22	0.81	0.54	0.68	0.58	0.67
Grebes	1.0	-1.21	0.22	-	-	0.17	0.55
Fork-tailed storm-petrel	-	-	-	-0.06	0.48	0.86	0.73
Cormorants	1.4	0.50	0.65	-2.95	0.05	0.59	0.67
Harlequin duck	1.0	-2.07	0.14	-8.18	0.007	-12.36	0.03
Oldsquaw	1.4	0.10	0.53	-	-	-	-
Scoters	1.8	1.60	0.86	2.39	0.93	0.53	0.65
Goldeneyes	1.5	29.88	0.99	0.57	0.69	0.59	0.67
Bufflehead	1.3	0.08	0.53	-	-	-	-
Mergansers	1.0	4.15	0.92	2.32	0.93	0.63	0.68
Bald eagle	1.2	-0.25	0.42	0.91	0.77	-1.82	0.16
Black oystercatcher	1.0	-928.50[a]	0.0004	0.73	0.73	-6.06	0.05
Red-necked phalarope	-	-	-	1.72	0.89	-0.09	0.47
Shorebirds	1.2	-0.48	0.35	-0.53	0.32	0.24	0.57
Jaegers	-	-	-	1.98	0.91	-5.72	0.06
Bonaparte's gull	-	-	-	0.78	0.74	1.03	0.76
Mew gull	1.7	0.86	0.75	-1.78	0.11	1.52	0.82
Herring gull	1.8	1.32	0.83	-	-	0.59	0.67
Glaucous-winged gull	1.9	0.93	0.77	2.24	0.92	0.68	0.69
Black-legged kittiwake	1.0	2.33	0.87	2.89	0.95	23.14	0.99
Gulls	1.0	0.73	0.70	3.18	0.96	3.54	0.91
Arctic tern	-	-	-	-0.50	0.33	1.63	0.82
Murres	1.1	-1.94	0.14	-1.48	0.14	-0.18	0.44
Pigeon guillemot	1.9	-3.60	0.04	-0.06	0.52	1.26	0.79
Murrelets	1.9	-1.87	0.11	1.76	0.89	1.39	0.80
Parakeet auklet	-	-	-	-2.41	0.07	-	-
Tufted puffin	-	-	-	-1.38	0.15	0.46	0.64
Horned puffin	-	-	-	0.53	0.68	-0.20	0.44
Northwestern crow	1.4	-1.00	0.24	-8.81	0.006	-0.43	0.37

[a] Only one year of pre-oil spill data were used because black oystercatchers were not observed in the unoiled zone during 1972.

Table 3. Summary of tests used to determine if marine bird populations within 200 m of shore (shoreline stratum) in the oiled zone of Prince William Sound during July 1989-1991 after the *Exxon Valdez* oil spill were less than expected given the changes that occurred in the shoreline stratum of the unoiled zone between 1984 and 1989-1991. Separate tests were done for 1989, 1990 and 1991. N = actual estimate - expected estimate. For 1989 df = 27; otherwise df = 31.

	1989			1990			1991		
Species	N	t	p	N	t	p	N	t	p
Loons	1	0.05	0.52	1	0.16	0.56	-65	-2.45	0.01
Cormorants	-	-	-	54	1.85	0.96	-	-	
Harlequin duck	278	1.22	0.88	-1422	-2.06	0.02	-1550	-2.48	0.01
Scoters	11	0.80	0.79	-21	-1.69	0.05	-66	-2.09	0.02
Goldeneyes	22	1.58	0.94	12	1.27	0.89	-	-	-
Mergansers	367	2.81	1.00	84	1.32	0.90	-39	-0.39	0.35
Bald eagle	72	2.14	0.98	-38	-1.16	0.13	120	2.69	0.99
Black oystercatcher	-88	-1.58	0.06	-225	-2.97	0.003	-39	-1.00	0.16
Red-necked phalarope	-71	-1.14	0.13	-1	-1.20	0.12	-	-	-
Shorebirds	-1638	-1.12	0.14	140	0.67	0.75	507	1.20	0.88
Bonaparte's gull	11	1.97	0.97	3	1.14	0.87	5	1.13	0.87
Mew gull	82	0.99	0.83	-235	-1.25	0.11	-212	-2.61	0.01
Glaucous-winged gull	-650	-0.65	0.26	66	0.06	0.52	709	0.55	0.71
Black-legged kittiwake	2558	3.96	1.00	3075	2.12	0.98	3399	4.67	1.00
Gulls	4476	2.20	0.98	4633	2.14	0.98	4376	3.00	1.00
Arctic tern	-302	-0.46	0.33	317	0.88	0.81	-411	-1.80	0.04
Murres	-	-	-	-	-	-	-1070	-1.50	0.07
Pigeon guillemot	-297	-1.18	0.12	-79	-0.29	0.39	110	0.55	0.71
Brachyramphus murrelets	-652	-1.22	0.12	971	2.55	0.99	566	0.87	0.80
Horned puffin	95	1.29	0.90	27	1.56	0.94	-	-	-

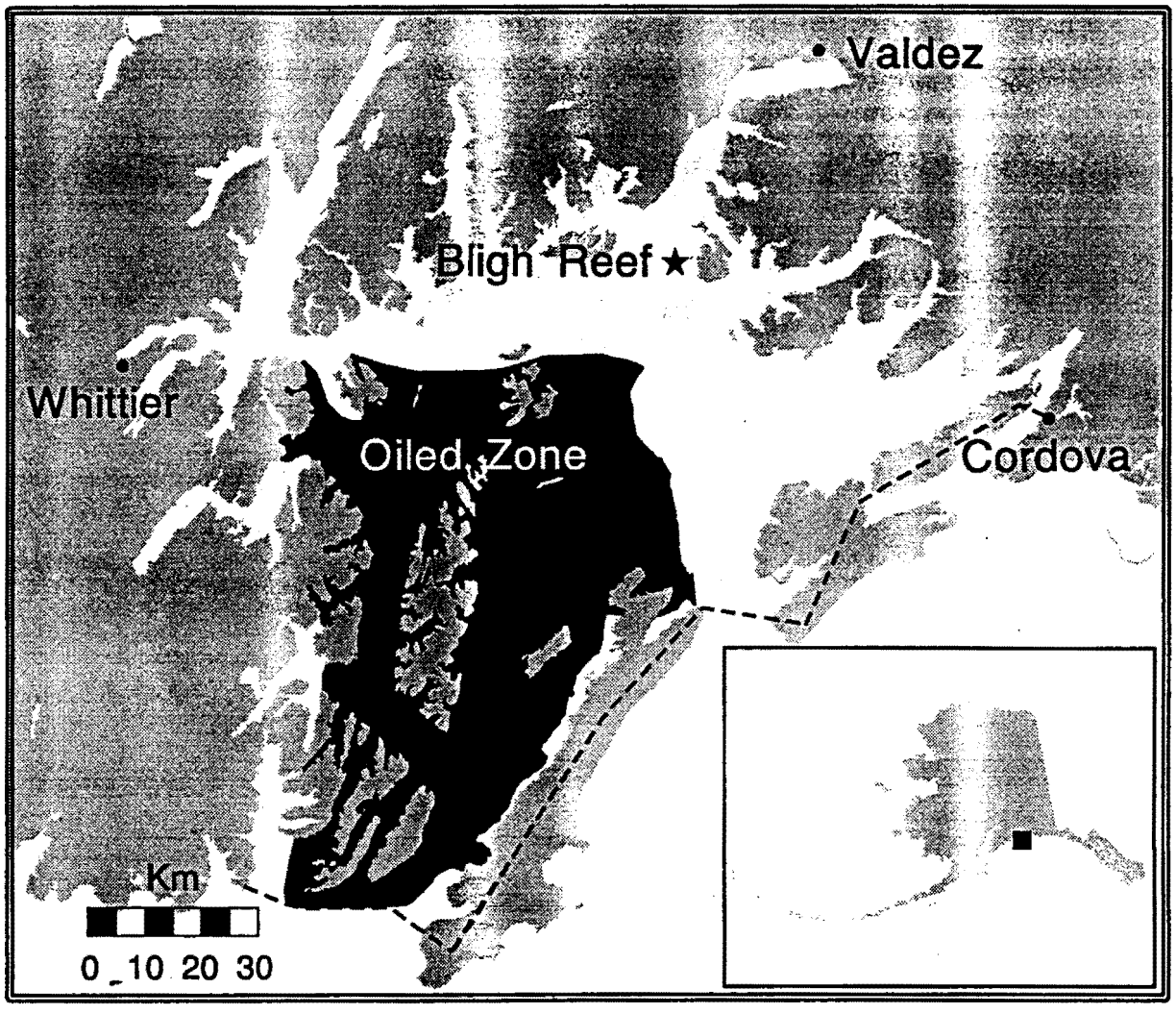


Figure 1. Prince William Sound, Alaska, showing location of the study area. Oiled zone is marked by dark stippling; unoiled zone included remaining area. Dashed line denotes southern boundary of study area.

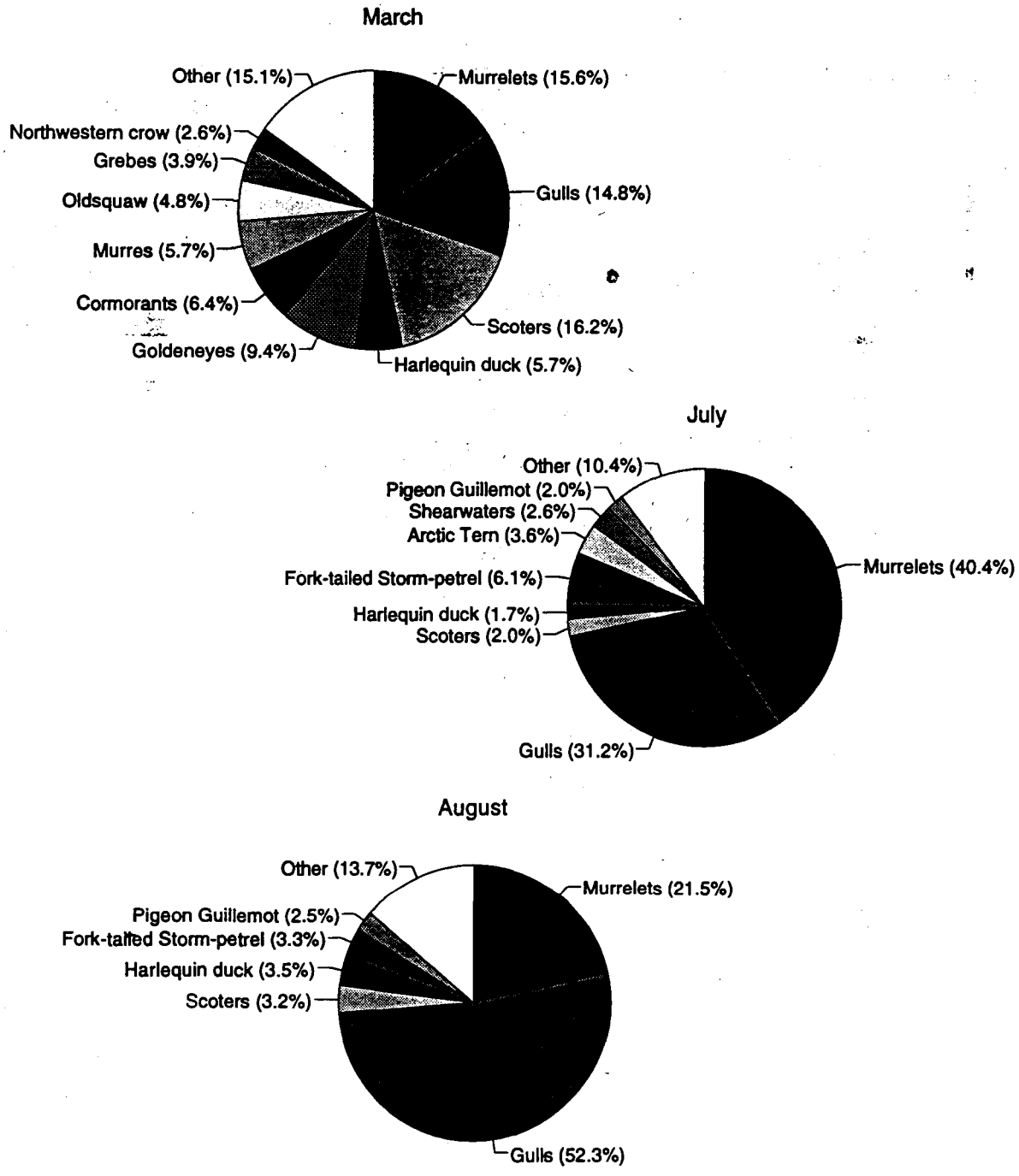


Figure 2. Relative abundance of the most common bird species/species groups in Prince William Sound, during March, July, and August, 1972-1991.

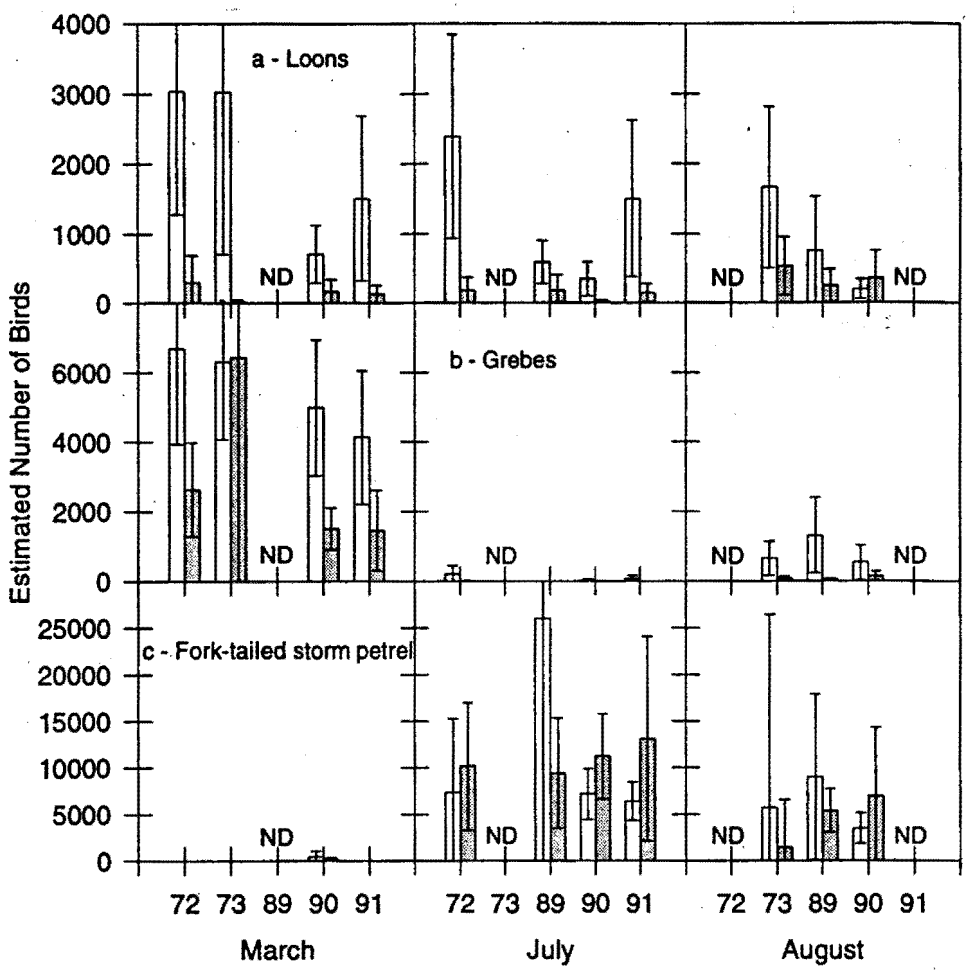


Figure 3. Estimated number of birds in the oiled and unoiled zones of Prince William Sound, Alaska, during March, July, and August, before (1972-1973) and after (1989-1991) the *Exxon Valdez* oil spill. Crosshatched bars represent estimates for oiled zone populations; open bars represent estimates for unoiled zone populations. Vertical lines represent 95% confidence limits. ND = no data.

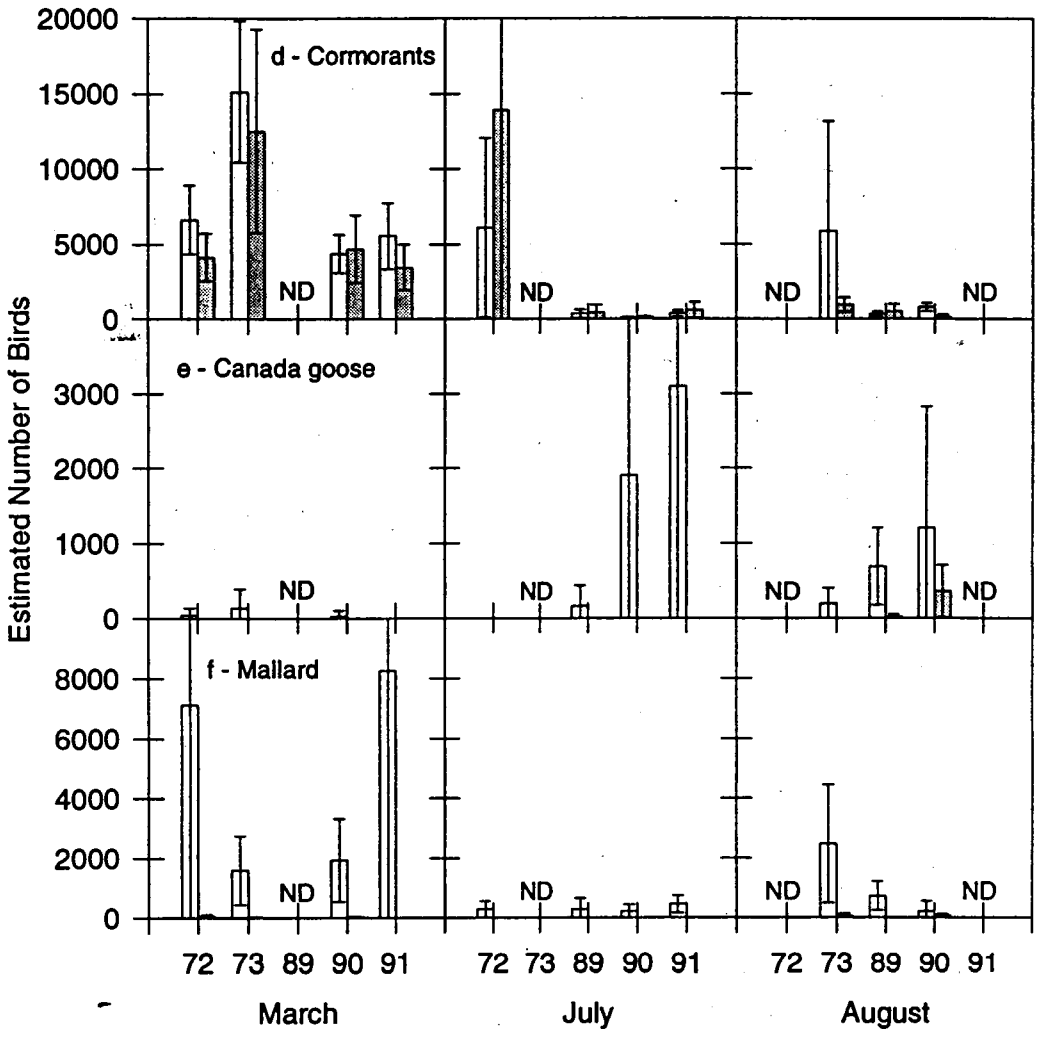


Figure 3 (continued).

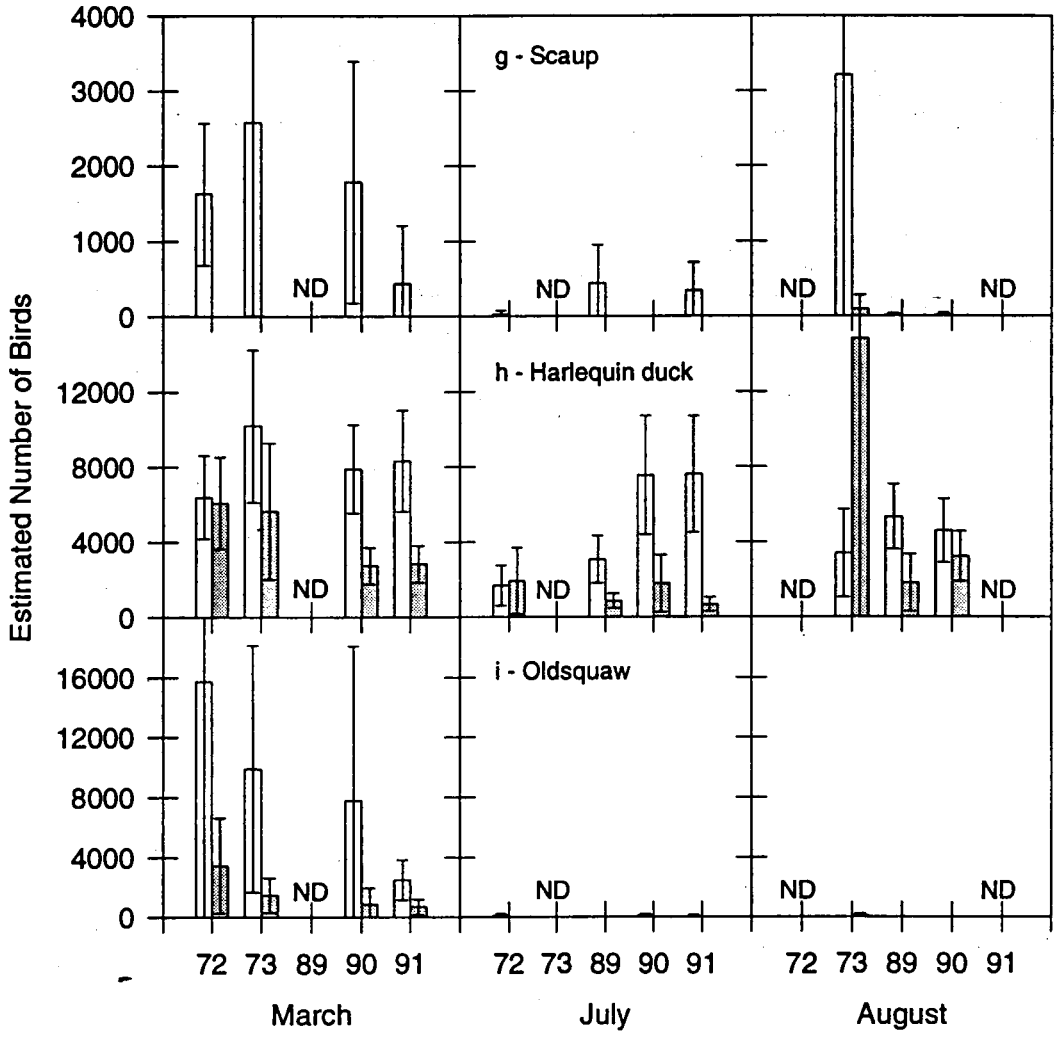


Figure 3 (continued).

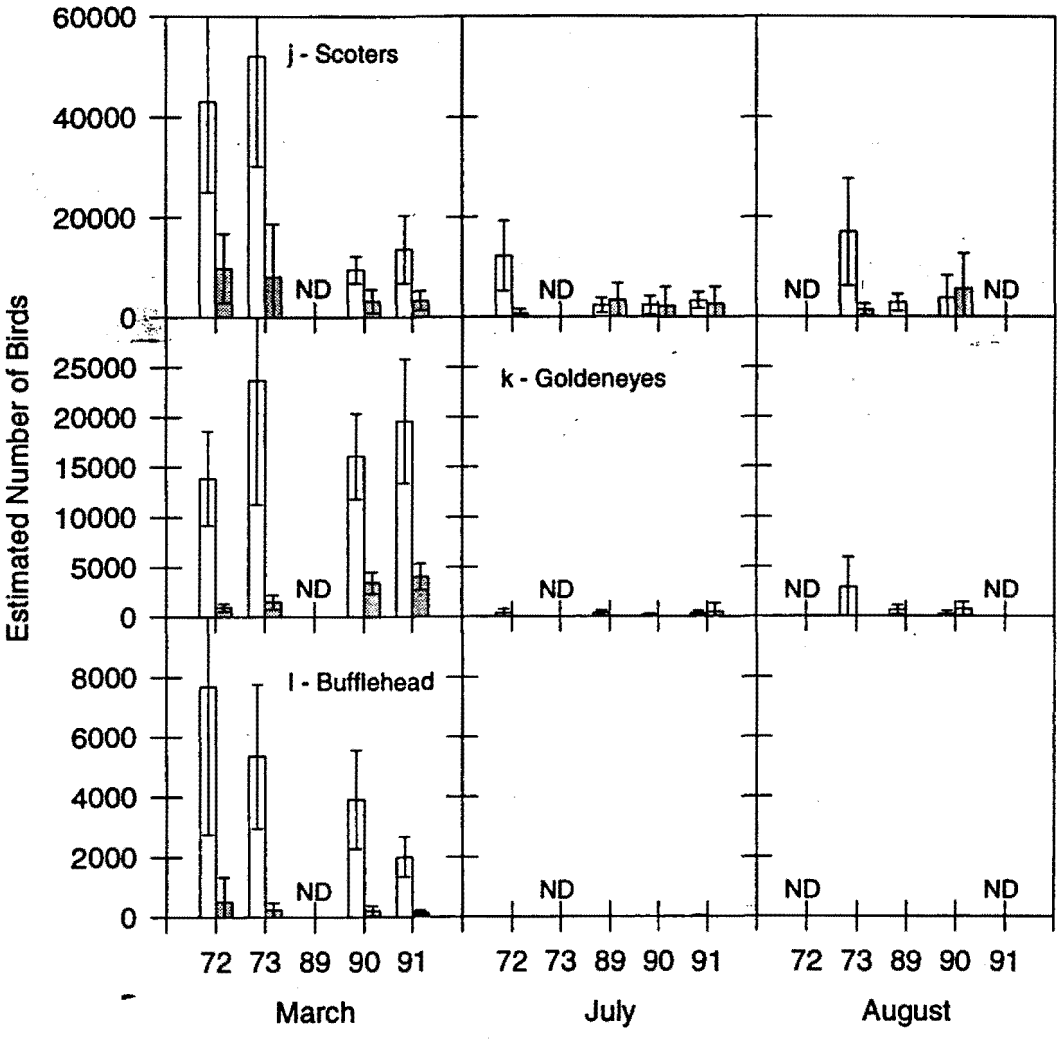


Figure 3 (continued).

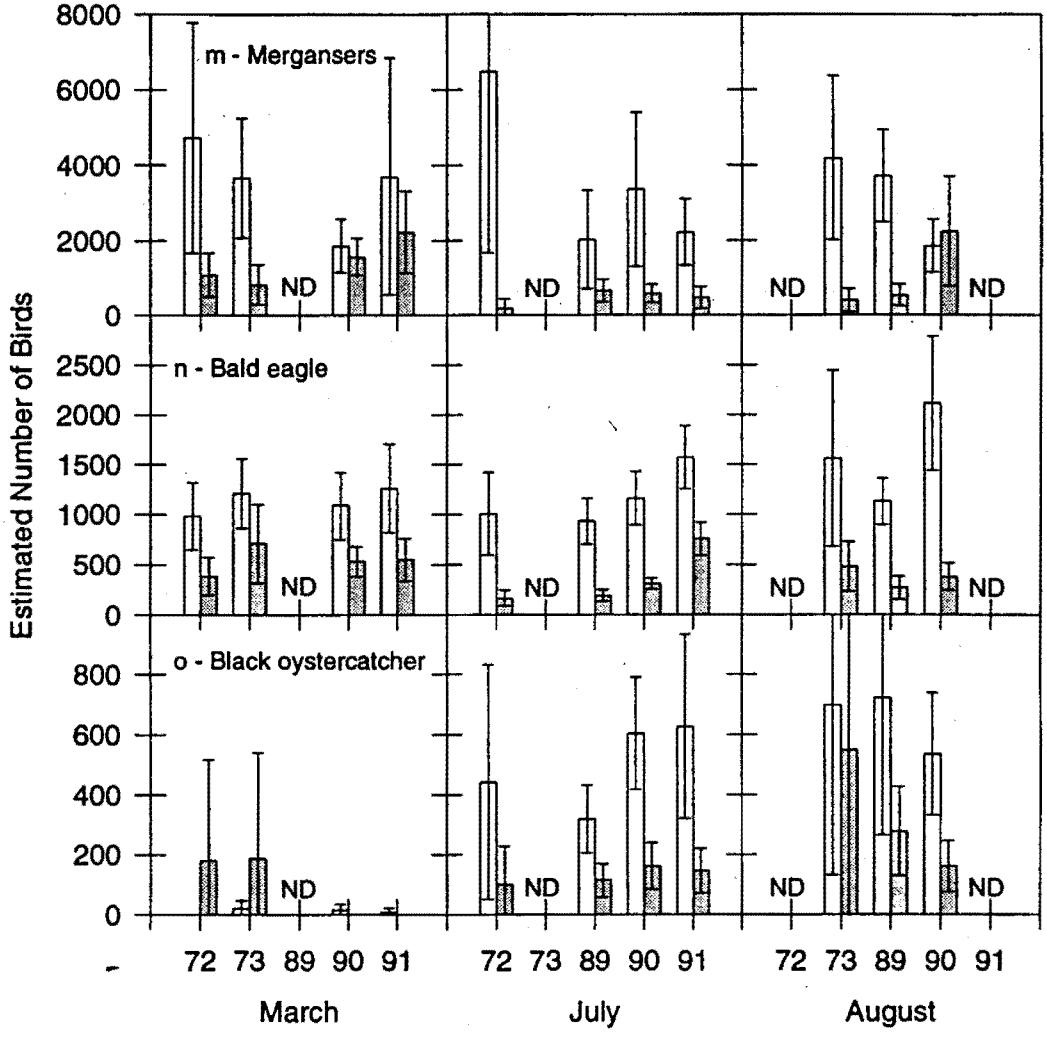


Figure 3 (continued).

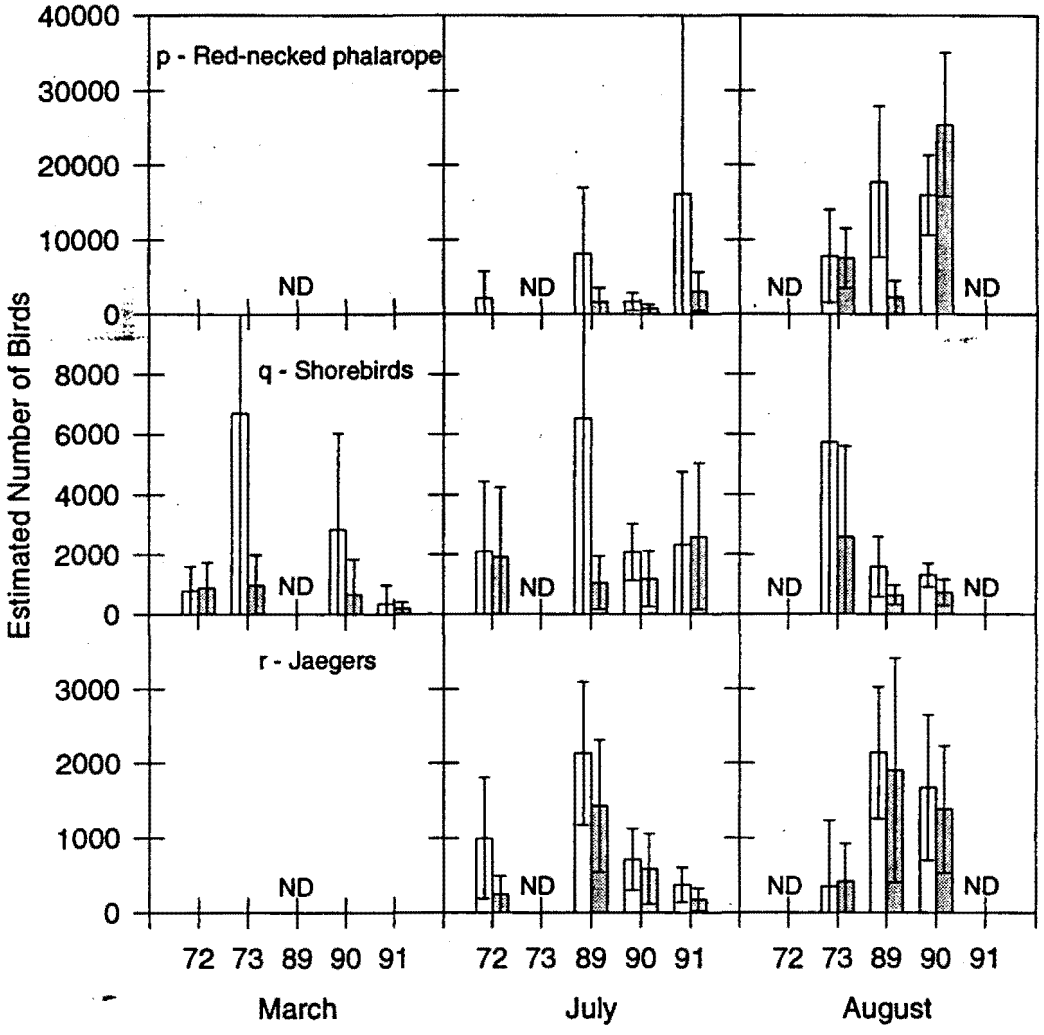


Figure 3 (continued).

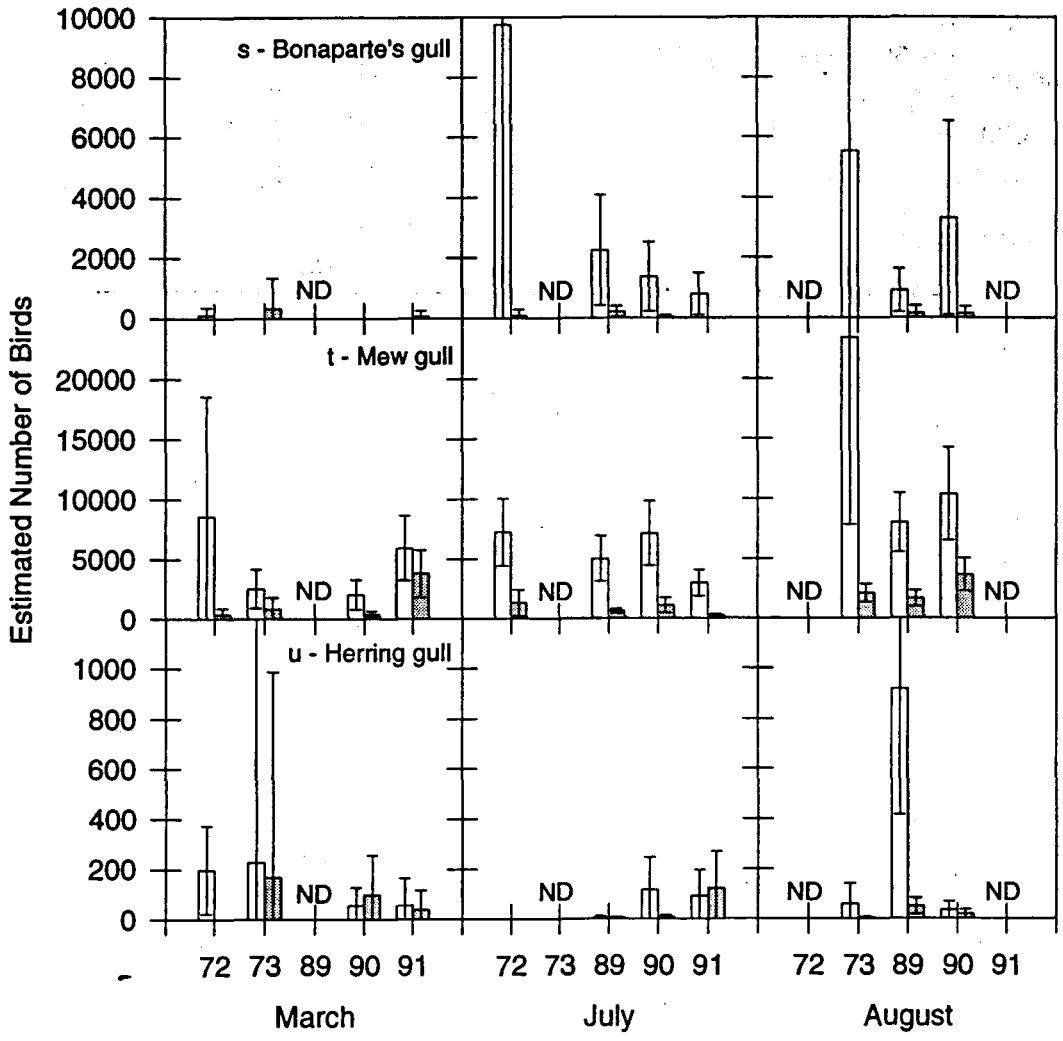


Figure 3 (continued).

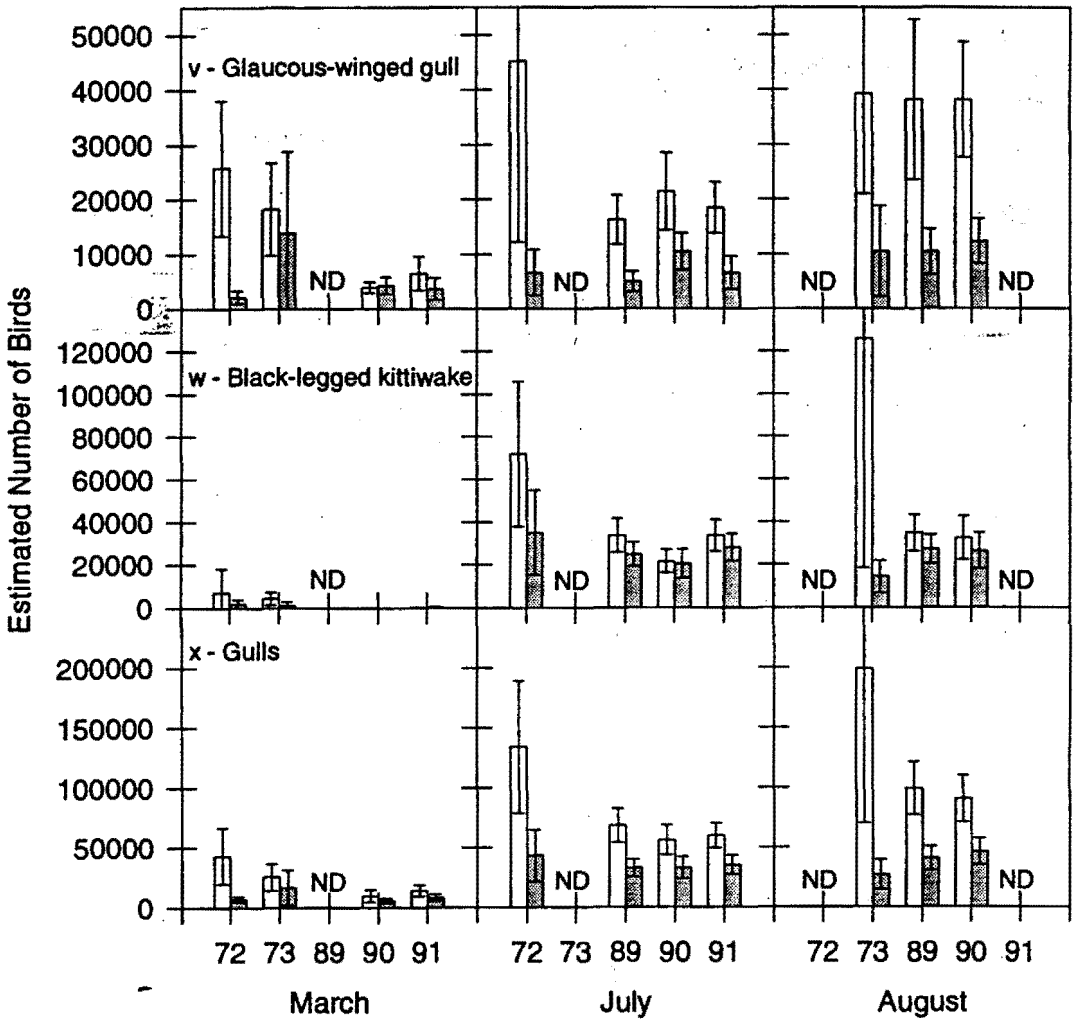


Figure 3 (continued).

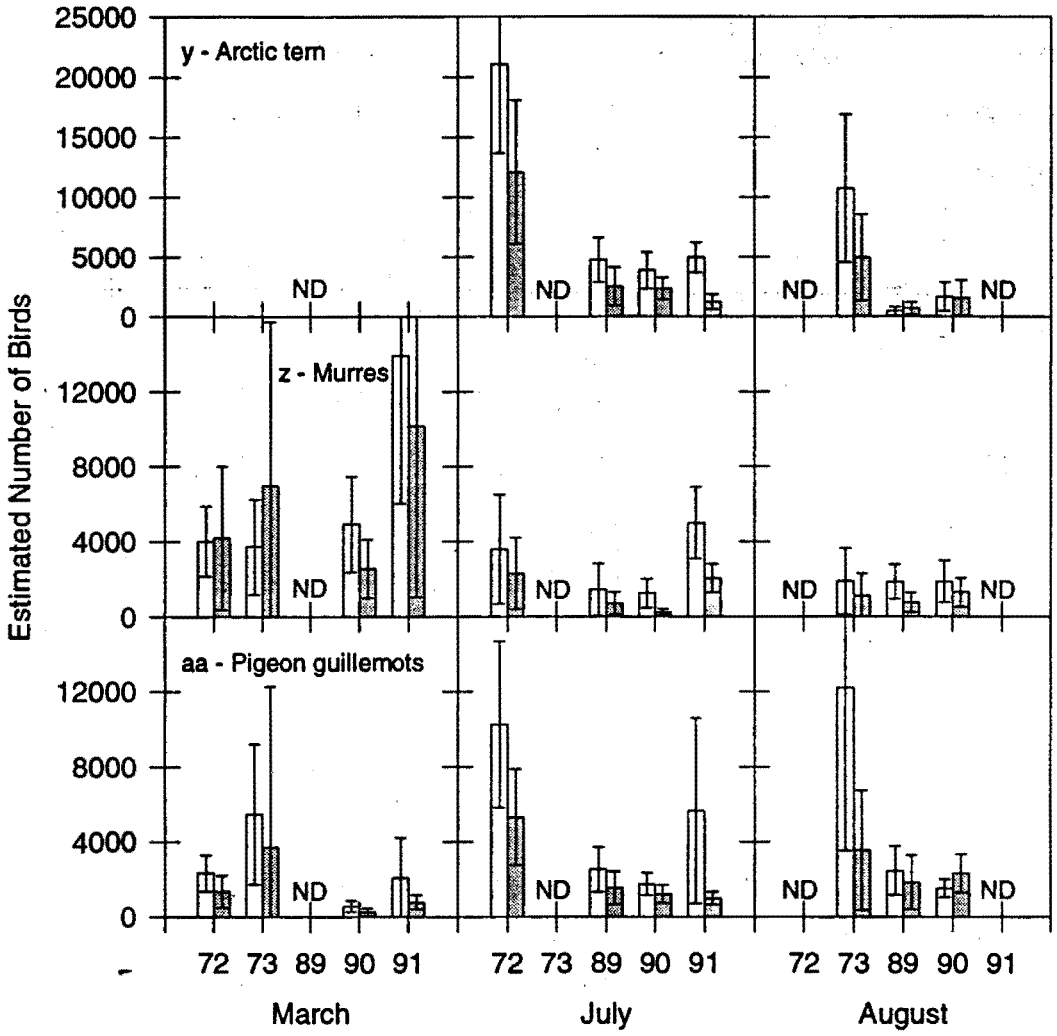


Figure 3 (continued).

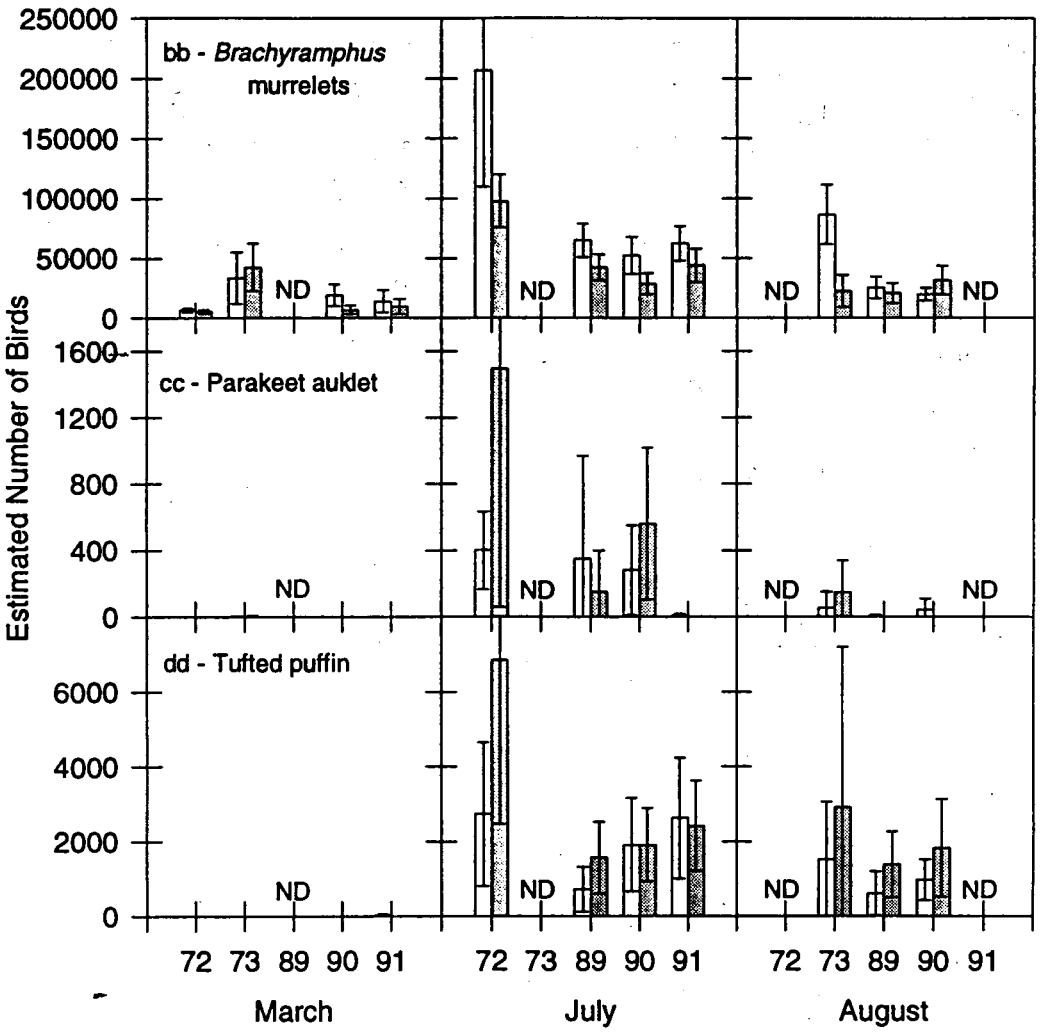


Figure 3 (continued).

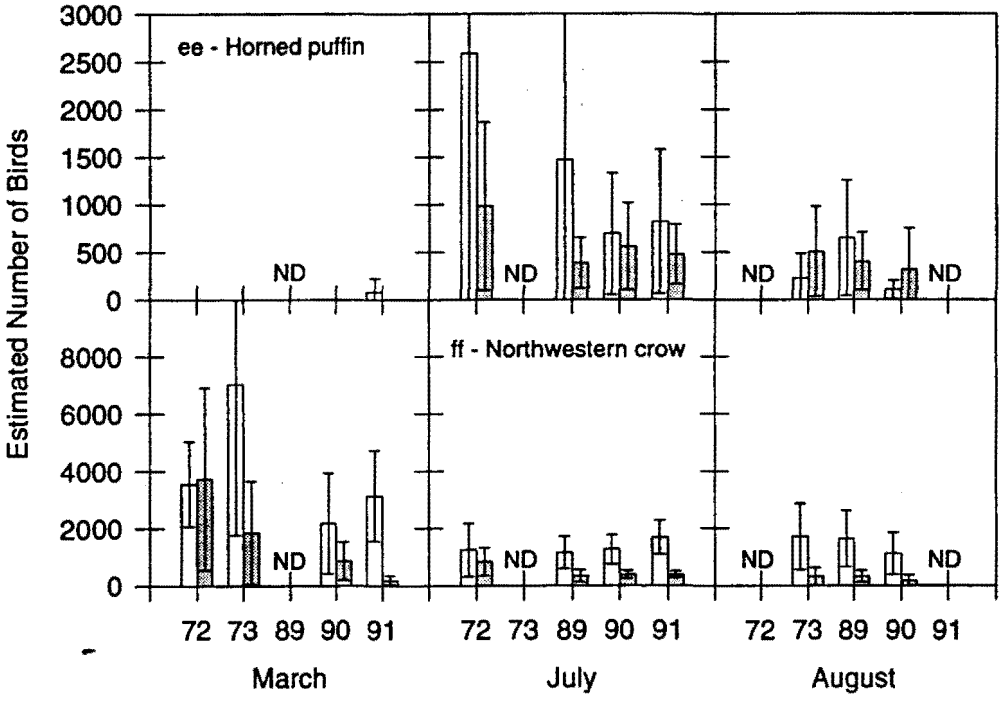


Figure 3 (continued).

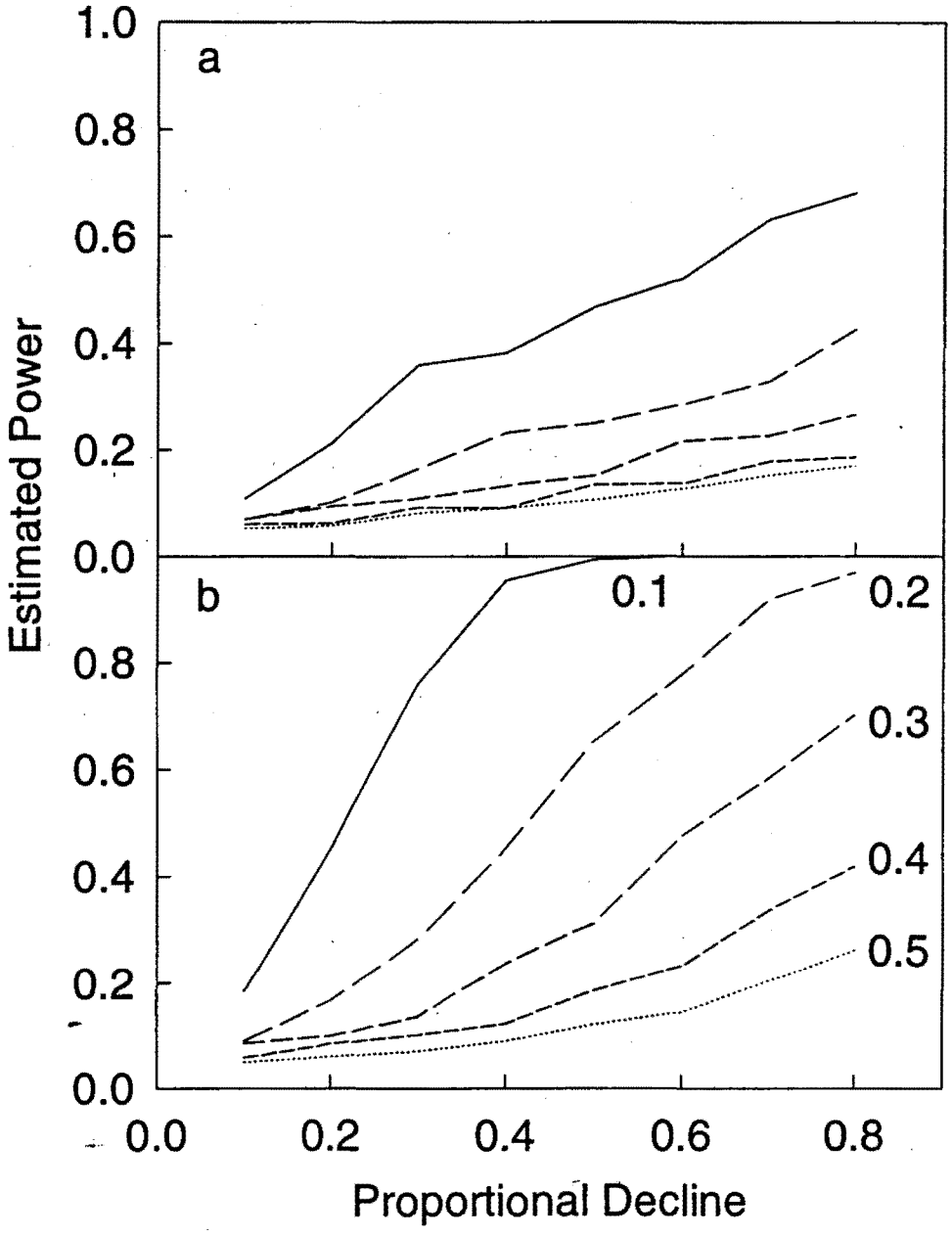


Figure 4. Estimated power of using an outlier t-test to detect a decline, expressed as a proportion of the population, due to an environmental perturbation such as an oil spill for hypothetical populations estimated with precision, i.e., *cv(N)*, between 0.1-0.5. Upper graph (a) represents results from Monte-Carlo simulations in which there were 2 years of pre- and 1 year of post-perturbation data. Lower graph (b) represents results from simulations in which there were 5 years of pre- and 1 year of post-perturbation data.

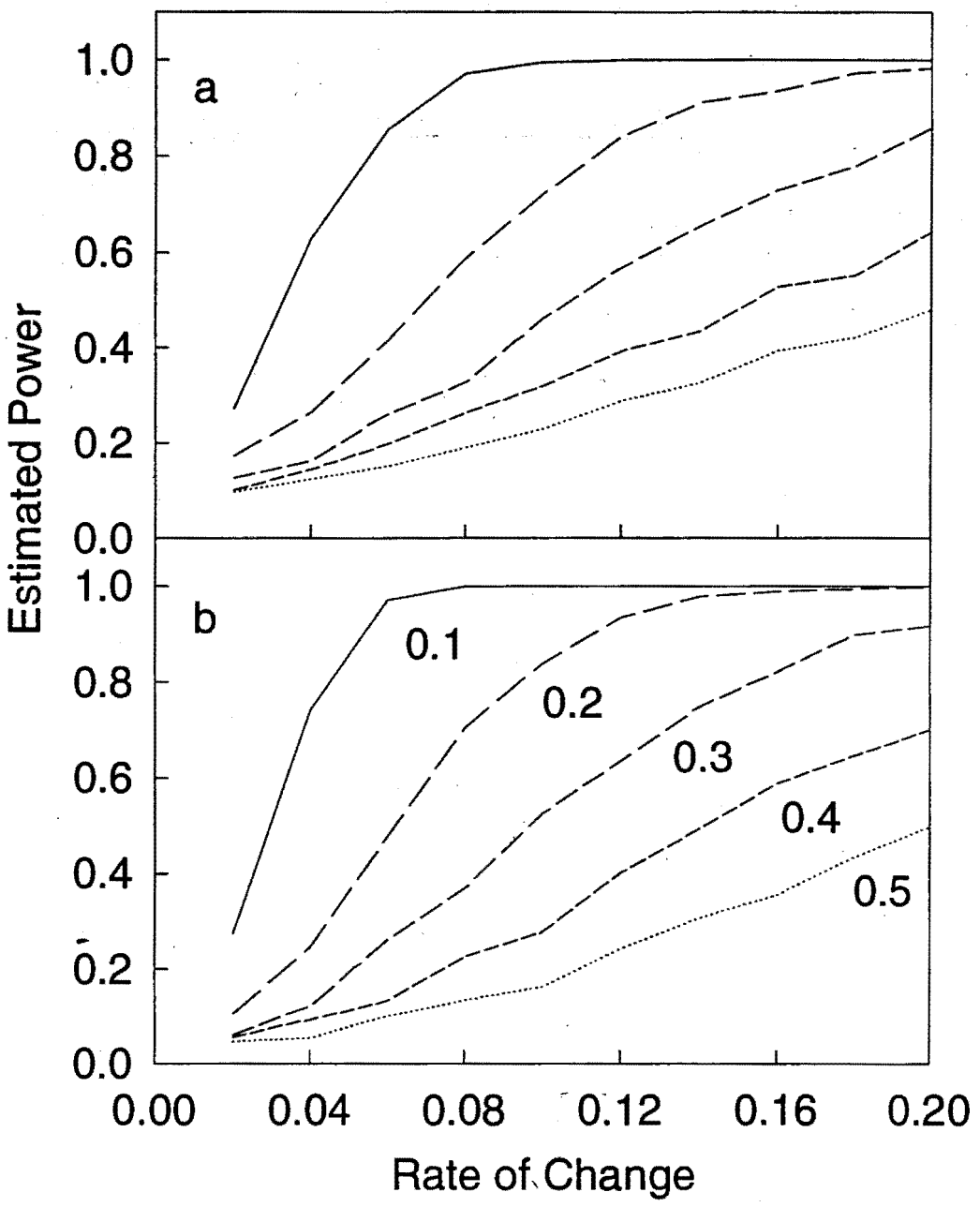


Figure 5. Estimated power of using regression analysis to detect population trends, expressed as a proportion of the population, for hypothetical populations estimated with precision, i.e., *cv(N)*, between 0.1-0.5. Upper graph (a) represents results from Monte-Carlo simulations in which there were 5 years of data collected every other year over a 9-year period. Lower graph (b) represents results from simulations in which there were 9 years of data collected every year.

Apendix I. Estimated number of Birds (N) and 95% error estimates (E.E.) for species and species groups observed in Prince William Sound, Alaska, during March, July, and August, before (1972-1973) and after (1989-1991) the *Exxon Valdez* oil spill. Dashes (-) denote mopnths when surveys were not done. Species listed in phylogenetic order following AOU (1989).

	March		July		August	
Species/Year	N	95% E.E.	N	95% E.E.	N	95% E.E.
Loons						
Red-throated loon (*Gavia stellata*)						
1972	179	161	1,255	1,125	-	-
1973	29	33	-	-	655	395
1989	-	-	128	132	9	15
1990	8	14	3	4	28	29
1991	90	166	110	198	-	-
Pacific loon (*Gavia pacifica*)						
1972	2,470	1,702	1,027	682	-	-
1973	1,112	1,479	-	-	1,398	1,154
1989	-	-	0	0	75	108
1990	66	121	80	101	61	71
1991	0	0	86	75	-	-
Common loon (*Gavia immer*)						
1972	97	102	133	169	-	-
1973	7	12	-	-	6	12
1989	-	-	420	271	709	780
1990	230	249	82	47	363	397
1991	386	397	596	448	-	-
Yellow-billed loon (*Gavia adamsii*)						
1972	426	444	12	15	-	-
1973	143	246	-	-	0	0
1989	-	-	4	8	4	7
1990	23	32	0	0	3	5
1991	47	69	6	6	-	-

Appendix I. (continued).

Species/Year	March N	March 95% E.E.	July N	July 95% E.E.	August N	August 95% E.E.
Unidentified loon						
1972	163	139	140	222	-	-
1973	1,762	1,619	-	-	140	132
1989	-	-	216	242	208	221
1990	549	323	204	214	95	111
1991	1,111	1,133	851	859	-	-
Total loons						
1972	3,335	1,788	2,567	1,469	-	-
1973	3,051	2,322	-	-	2,199	1,187
1989	-	-	768	386	1,005	817
1990	874	453	370	245	550	420
1991	1,634	1,192	1,649	1,129	-	-
Grebes						
Horned grebe (*Podiceps auritus*)						
1972	4,847	2,247	60	113	-	-
1973	5,370	1,634	-	-	389	329
1989	-	-	0	0	528	952
1990	3,780	1,545	0	0	131	124
1991	2,255	1,609	31	48	-	-
Red-necked grebe (*Podiceps grisegena*)						
1972	4,459	1,695	146	223	-	-
1973	7,369	11,316	-	-	341	293
1989	-	-	0	0	797	521
1990	2,108	1,397	20	27	530	491
1991	1,565	509	50	41	-	-
Unidentified grebe (*Podiceps* spp.)						
1972	0	0	0	0	-	-
1973	5	9	-	-	0	0
1989	-	-	0	0	39	53
1990	611	302	10	12	15	17
1991	1,775	1,375	7	11	-	-

Appendix I. (continued).

Species/Year	March N	March 95% E.E.	July N	July 95% E.E.	August N	August 95% E.E.
Total grebes (*Podiceps* spp.)						
1972	9,306	3,048	206	245	-	-
1973	12,744	9,046	-	-	730	489
1989	-	-	0	0	1,364	1,090
1990	6,499	2,053	29	38	676	512
1991	5,595	2,240	88	68	-	-
Procellariformes						
Northern fulmar (*Fulmarus glacialis*)						
1972	0	0	999	760	-	-
1973	0	0	-	-	105	129
1989	-	-	0	0	0	0
1990	0	0	39	48	141	138
1991	0	0	0	0	-	-
Sooty shearwater (*Puffinus griseus*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	78	69	3,991	5,452
1990	0	0	0	0	92	100
1991	0	0	0	0	-	-
Unidentified shearwater (*Puffinus* spp.)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	187	310	0	0
1990	0	0	34	55	0	0
1991	0	0	38,428	62,788	-	-
Unidentified petrel						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	828	1,321	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	-	-

Appendix I. (continued).

Species/Year	March N	March 95% E.E.	July N	July 95% E.E.	August N	August 95% E.E.
Fork-tailed storm-petrel (*Oceanodroma furcata*)						
1972	0	0	17,539	10,570	-	-
1973	0	0	-	-	7,133	21,337
1989	-	-	35,424	38,172	14,338	9,191
1990	595	705	18,426	5,319	10,417	7,615
1991	0	0	19,519	11,141	-	-
Unidentified storm-petrel (*Oceanodroma* spp.)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	155	257	4	7
1990	0	0	0	0	0	0
1991	0	0	0	0	-	-
Cormorants						
Double-crested cormorant (*Phalacrocorax auritus*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	89	108	127	96
1990	269	233	54	51	427	239
1991	124	109	49	48	-	-
Pelagic cormorant (*Phalacrocorax pelagicus*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	394	289	470	254
1990	8,448	2,552	138	84	473	247
1991	5,431	2,266	512	341	-	-
Red-faced cormorant (*Phalacrocorax urile*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	22	25	0	0
1990	0	0	0	0	0	0
1991	8	14	0	0	-	-

Appendix I. (continued).

Species/Year	March N	March 95% E.E.	July N	July 95% E.E.	August N	August 95% E.E.
Unidentified cormorant (*Phalacrocorax* spp.)						
1972	10,792	2,744	20,045	19,401	-	-
1973	27,679	8,203	-	-	6,822	7,367
1989	-	-	307	363	244	272
1990	352	358	34	28	26	17
1991	3,477	1,303	419	402	-	-
Total cormorants (*Phalacrocorax* spp.)						
1972	10,792	2,744	20,045	19,401	-	-
1973	27,679	8,203	-	-	6,822	7,367
1989	-	-	812	590	842	510
1990	9,068	2,583	225	106	926	347
1991	9,040	2,654	980	567	-	-
Herons						
Great blue heron (*Ardea herodias*)						
1972	113	85	47	50	-	-
1973	50	41	-	-	21	28
1989	-	-	18	16	60	33
1990	49	37	54	33	61	43
1991	30	33	36	33	-	-
Waterfowl						
Tundra swan (*Cygnus columbianus*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	0	0	0	0
1991	8	14	0	0	-	-
Trumpeter swan (*Cygnus buccinator*)						
1972	0	0	146	260	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	3	5	0	0
1991	0	0	0	0	-	-

Appendix I. (continued).

Species/Year	March N	March 95% E.E.	July N	July 95% E.E.	August N	August 95% E.E.
Emperor goose (*Chen canagica*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	0	0
1990	6	11	0	0	0	0
1991	0	0	0	0	-	-
Brant (*Branta bernicula*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	210	259
1989	-	-	0	0	0	0
1990	0	0	0	0	9	16
1991	0	0	3	4	-	-
Canada goose (*Branta canadensis*)						
1972	48	90	0	0	-	-
1973	138	252	-	-	195	213
1989	-	-	164	279	709	515
1990	38	71	1,907	3,326	1,562	1,661
1991	0	0	3,101	5,284	-	-
American green-winged teal (*Anas crecca*)						
1972	148	259	106	201	-	-
1973	59	80	-	-	206	286
1989	-	-	0	0	386	474
1990	0	0	64	86	485	643
1991	0	0	78	130	-	-
Unidentified Teal						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	-	-

Appendix I. (continued).

Species/Year	March N	March 95% E.E.	July N	July 95% E.E.	August N	August 95% E.E.
Mallard (*Anas platyrhynchos*)						
1972	7,185	8,722	291	266	-	-
1973	1,617	1,150	-	-	2,523	1,972
1989	-	-	278	383	725	481
1990	1,954	1,382	207	246	283	347
1991	8,249	11,958	457	293	-	-
Northern pintail (*Anas acuta*)						
1972	348	605	177	336	-	-
1973	276	492	-	-	3,103	3,910
1989	-	-	0	0	94	116
1990	0	0	44	72	13	17
1991	0	0	0	0	-	-
Northern shoveler (*Anas clypeata*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	42	87
1989	-	-	0	0	13	22
1990	0	0	0	0	39	63
1991	0	0	23	37	-	-
Gadwall (*Anas strepera*)						
1972	4,407	8,025	6	11	-	-
1973	487	625	-	-	0	0
1989	-	-	17	30	176	255
1990	174	327	27	32	42	45
1991	151	257	22	40	-	-
American Wigeon (*Anas americana*)						
1972	474	863	0	0	-	-
1973	0	0	-	-	987	1,532
1989	-	-	0	0	64	85
1990	0	0	68	98	9	11
1991	8	14	310	341	-	-

Appendix I. (continued).

Species/Year	March N	March 95% E.E.	July N	July 95% E.E.	August N	August 95% E.E.
Unidentified dabbling duck (Anatini)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	150	175
1990	1,043	1,510	47	51	714	634
1991	621	720	9	16	-	-
Greater scaup (*Aythya marila*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	439	518	17	24
1990	1,187	1,478	0	0	0	0
1991	0	0	147	214	-	-
Lesser scaup (*Aythya affinis*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	-	-
Unidentified scaup						
1972	1,626	943	29	46	-	-
1973	2,583	2,566	-	-	3,309	5,305
1989	-	-	0	0	0	0
1990	600	753	0	0	18	31
1991	431	775	195	311	-	-
Total scaup						
1972	1,626	943	29	46	-	-
1973	2,583	2,566	-	-	3,309	5,305
1989	-	-	439	518	17	24
1990	1,787	1,616	0	0	18	31
1991	431	775	342	375	-	-

Appendix I. (continued).

Species/Year	March N	March 95% E.E.	July N	July 95% E.E.	August N	August 95% E.E.
Steller's eider (*Polysticta stelleri*)						
1972	0	0	0	0	-	-
1973	13	25	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	-	-
Unidentified eider						
1972	40	44	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	-	-
Harlequin duck (*Histrionicus histrionicus*)						
1972	12,480	3,325	3,607	2,038	-	-
1973	15,831	5,528	-	-	18,218	27,281
1989	-	-	3,923	1,318	7,160	2,307
1990	10,629	2,544	9,341	3,507	7,815	2,168
1991	11,158	2,872	8,264	3,116	-	-
Oldsquaw (*Clangula hyemalis*)						
1972	19,187	16,562	90	147	-	-
1973	11,377	8,314	-	-	87	151
1989	-	-	0	0	0	0
1990	8,635	10,373	92	109	0	0
1991	3,169	1,419	47	69	-	-
Black scoter (*Melanitta nigra*)						
1972	4,119	2,575	35	36	-	-
1973	8,671	8,197	-	-	143	194
1989	-	-	1,235	1,765	282	371
1990	2,765	1,510	42	51	117	130
1991	1,387	825	431	457	-	-

Appendix I. (continued).

Species/Year	March N	March 95% E.E.	July N	July 95% E.E.	August N	August 95% E.E.
Surf scoter (*Melanitta perspicillata*)						
1972	16,400	6,162	8,177	6,280	-	-
1973	27,089	17,248	-	-	15,252	10,316
1989	-	-	528	381	1,595	1,398
1990	4,554	1,355	1,955	2,373	6,065	5,532
1991	9,313	4,709	1,069	710	-	-
White-winged scoter (*Melanitta fusca*)						
1972	23,910	12,909	4,763	3,023	-	-
1973	16,782	6,523	-	-	2,920	1,508
1989	-	-	3,024	3,003	431	232
1990	3,316	1,349	1,089	1,350	793	537
1991	5,296	2,747	3,564	3,131	-	-
Unidentified scoter (*Melanitta* spp.)						
1972	8,505	7,327	0	0	-	-
1973	7,647	7,493	-	-	95	180
1989	-	-	937	1,165	640	574
1990	2,136	2,402	1,464	1,658	2,490	3,399
1991	890	998	887	662	-	-
Total scoters (*Melanitta* spp.)						
1972	52,935	19,345	12,975	7,069	-	-
1973	60,187	22,389	-	-	18,410	10,786
1989	-	-	5,724	3,619	2,948	1,743
1990	12,770	3,557	4,551	4,258	9,466	8,353
1991	16,886	7,067	5,950	3,821	-	-
Common goldeneye (*Bucephala clangula*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	204	194	39	43
1990	896	721	28	28	105	112
1991	148	121	135	139	-	-

Appendix I. (continued).

Species/Year	March N	March 95% E.E.	July N	July 95% E.E.	August N	August 95% E.E.
Barrow's goldeneye (*Bucephala islandica*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	99	105	262	319
1990	14,970	3,601	6	9	37	45
1991	20,311	6,070	50	69	-	-
Unidentified goldeneye (*Bucephala* spp.)						
1972	14,802	4,741	427	381	-	-
1973	25,230	12,509	-	-	2,955	3,014
1989	-	-	87	92	369	320
1990	3,678	1,678	203	146	888	725
1991	3,181	2,306	671	895	-	-
Total goldeneyes (*Bucephala* spp.)						
1972	14,802	4,741	427	381	-	-
1973	25,230	12,509	-	-	2,955	3,014
1989	-	-	390	254	670	464
1990	19,544	4,397	237	148	1,030	785
1991	23,639	6,361	856	909	-	-
Bufflehead (*Bucephala albeola*)						
1972	8,198	4,981	0	0	-	-
1973	5,612	2,422	-	-	0	0
1989	-	-	0	0	0	0
1990	4,122	1,666	0	0	3	5
1991	2,129	660	20	27	-	-
Common merganser (*Mergus merganser*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	2,670	1,347	4,066	1,247
1990	1,076	386	3,425	2,046	3,125	1,572
1991	4,466	2,322	2,389	894	-	-

Appendix I. (continued).

Species/Year	March N	March 95% E.E.	July N	July 95% E.E.	August N	August 95% E.E.
Red-breasted merganser (*Mergus serrator*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	0	0
1990	1,477	476	106	82	606	354
1991	231	160	0	0	-	-
Unidentified merganser (*Mergus* spp.)						
1972	5,797	3,111	6,670	4,798	-	-
1973	4,473	1,634	-	-	4,594	2,205
1989	-	-	0	0	193	193
1990	867	552	409	223	360	227
1991	1,226	1,641	299	209	-	-
Total mergansers (*Mergus* spp.)						
1972	5,797	3,111	6,670	4,798	-	-
1973	4,473	1,634	-	-	4,594	2,205
1989	-	-	2,670	1,347	4,259	1,259
1990	3,420	875	3,941	2,062	4,091	1,627
1991	5,924	3,336	2,688	932	-	-
Unidentified diving/sea duck						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	376	310	180	234
1990	2,202	2,754	98	99	71	61
1991	3,227	1,505	1,008	492	-	-
Unidentified duck						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	65	83	112	193
1990	404	401	0	0	67	117
1991	76	82	20	27	-	-

Appendix I. (continued).

Species/Year	March N	March 95% E.E.	July N	July 95% E.E.	August N	August 95% E.E.
Hawks and Eagles						
Bald eagle (*Haliaeetus leucocephalus*)						
1972	1,372	382	1,172	419	-	-
1973	1,916	525	-	-	2,041	918
1989	-	-	1,120	235	1,399	257
1990	1,620	366	1,473	273	2,492	685
1991	1,811	489	2,325	356	-	-
Northern harrier (*Circus cyaneus*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	6	11
1989	-	-	0	0	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	-	-
Sharp-shinned hawk (*Accipiter striatus*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	4	8	19	15
1991	0	0	0	0	-	-
Northern goshawk (*Accipiter gentilis*)						
1972	0	0	0	0	-	-
1973	14	18	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	0	0	17	14
1991	0	0	0	0	-	-
Red-tailed hawk (*Buteo jamaicensis*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	4	8	0	0
1990	0	0	7	7	0	0
1991	0	0	0	0	-	-

Appendix I. (continued).

Species/Year	March N	March 95% E.E.	July N	July 95% E.E.	August N	August 95% E.E.
Rough-legged hawk (*Buteo lagopus*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	137	169
1989	-	-	0	0	0	0
1990	0	0	0	0	0	0
1991	0	0	3	5	-	-
Golden eagle (*Aquila chrysaetos*)						
1972	5	10	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	12	16
1990	0	0	0	0	0	0
1991	0	0	0	0	-	-
Unidentified eagle						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	0	0
1990	8	14	0	0	0	0
1991	0	0	0	0	-	-
Falcons						
Peregrine falcon (*Falco peregrinus*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	0	0
1990	8	14	0	0	3	5
1991	0	0	0	0	-	-
Gyrfalcon (*Falco rusticolus*)						
1972	0	0	13	25	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	-	-

Appendix I. (continued).

Species/Year	March N	March 95% E.E.	July N	July 95% E.E.	August N	August 95% E.E.
Unidentified raptor						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	4	8	3	5
1990	6	11	0	0	0	0
1991	0	0	4	8	-	-
Galliformes						
Unidentified ptarmigan (*Lagopus* spp.)						
1972	11	21	0	0	-	-
1973	18	39	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	-	-
Shorebirds						
Black oystercatcher (*Haematopus bachmani*)						
1972	181	337	544	410	-	-
1973	207	355	-	-	1,248	919
1989	-	-	432	126	1,001	482
1990	15	19	766	202	696	221
1991	8	14	773	316	-	-
Greater yellowlegs (*Tringa melanoleuca*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	0	0	3	5
1991	0	0	0	0	-	-
Lesser yellowlegs (*Tringa flavipes*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	3	5
1990	0	0	0	0	0	0
1991	0	0	0	0	-	-

Appendix I. (continued).

Species/Year	March N	March 95% E.E.	July N	July 95% E.E.	August N	August 95% E.E.
Unidentified yellowlegs						
1972	0	0	6	11	-	-
1973	0	0	-	-	6	12
1989	-	-	0	0	0	0
1990	0	0	84	91	31	30
1991	0	0	0	0	-	-
Solitary sandpiper (*Tringa solitaria*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	7	9
1990	0	0	0	0	0	0
1991	0	0	0	0	-	-
Wandering tattler (*Heteroscelus incanus*)						
1972	0	0	408	353	-	-
1973	0	0	-	-	512	453
1989	-	-	3	5	46	61
1990	0	0	84	73	99	111
1991	0	0	8	9	-	-
Spotted sandpiper (*Actitis macularia*)						
1972	0	0	55	56	-	-
1973	0	0	-	-	6	11
1989	-	-	13	13	21	25
1990	0	0	48	26	131	50
1991	0	0	21	16	-	-
Whimbrel (*Numenius phaeopus*)						
1972	0	0	27	54	-	-
1973	0	0	-	-	129	171
1989	-	-	108	133	18	21
1990	0	0	39	40	0	0
1991	0	0	30	35	-	-

Appendix I. (continued).

Species/Year	March N	March 95% E.E.	July N	July 95% E.E.	August N	August 95% E.E.
Black turnstone (*Arenaria melanocephala*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	5,169	8,994	116	195
1990	37	59	802	763	20	21
1991	303	554	22	26	-	-
Ruddy turnstone (*Arenaria interpres*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	-	-
Unidentified turnstone						
1972	57	76	0	0	-	-
1973	66	126	-	-	1,696	1,837
1989	-	-	0	0	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	-	-
Surfbird (*Aphriza virgata*)						
1972	8	15	1,582	2,352	-	-
1973	0	0	-	-	1,843	2,888
1989	-	-	679	798	128	171
1990	906	1,266	686	688	276	248
1991	0	0	3,880	3,385	-	-
Sanderling (*Calidris alba*)						
1972	0	0	0	0	-	-
1973	157	322	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	-	-

Appendix I. (continued).

Species/Year	March N	March 95% E.E.	July N	July 95% E.E.	August N	August 95% E.E.
Semipalmated sandpiper (*Calidris pusilla*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	9	15	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	-	-
Western sandpiper (*Calidris mauri*)						
1972	0	0	95	163	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	-	-
Rock sandpiper (*Calidris ptilocnemis*)						
1972	775	822	0	0	-	-
1973	7,188	7,976	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	0	0	0	0
1991	197	221	0	0	-	-
Dunlin (*Calidris alpina*)						
1972	0	0	0	0	-	-
1973	42	65	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	-	-
Long-billed Dowitcher (*Limnodromus scolopaceus*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	6	10	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	-	-

Appendix I. (continued).

Species/Year	March N	March 95% E.E.	July N	July 95% E.E.	August N	August 95% E.E.
Unidentified dowitcher						
1972	0	0	12	22	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	0	0	4	8
1991	0	0	0	0	-	-
Red-necked phalarope (*Phalaropus lobatus*)						
1972	0	0	2,178	3,561	-	-
1973	0	0	-	-	15,254	7,168
1989	-	-	9,701	9,169	19,997	10,409
1990	0	0	2,414	1,323	41,422	11,023
1991	0	0	19,218	27,529	-	-
Unidentified phalarope						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	163	262	72	84
1991	0	0	0	0	-	-
Unidentified calidris sp.						
1972	329	316	0	0	-	-
1973	0	0	-	-	1,932	2,080
1989	-	-	612	862	516	785
1990	0	0	3	5	240	280
1991	0	0	41	37	-	-
Unidentified shorebird						
1972	306	595	1,296	2,141	-	-
1973	0	0	-	-	950	1,628
1989	-	-	545	453	364	261
1990	2,547	3,152	754	529	546	269
1991	31	57	143	90	-	-

Appendix I. (continued).

Species/Year	March N	March 95% E.E.	July N	July 95% E.E.	August N	August 95% E.E.
Total shorebirds						
1972	1,656	1,185	4,025	3,202	-	-
1973	7,660	7,986	-	-	8,323	6,767
1989	-	-	7,576	9,942	2,221	1,058
1990	3,504	3,394	3,268	1,330	2,047	585
1991	538	660	4,919	3,435	-	-
Jaegers						
Pomarine jaeger (*Stercorarius pomarinus*)						
1972	0	0	1,011	662	-	-
1973	0	0	-	-	0	0
1989	-	-	1,508	774	3,647	1,692
1990	0	0	699	396	2,420	1,205
1991	0	0	0	0	-	-
Parasitic jaeger (*Stercorarius parasiticus*)						
1972	0	0	203	316	-	-
1973	0	0	-	-	0	0
1989	-	-	505	309	253	179
1990	0	0	56	94	213	175
1991	0	0	371	247	-	-
Long-tailed jaeger (*Stercorarius longicaudus*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	4	8	3	4
1991	0	0	63	95	-	-
Unidentified jaeger						
1972	0	0	29	57	-	-
1973	0	0	-	-	761	1,020
1989	-	-	1,543	954	143	137
1990	0	0	538	343	415	229
1991	0	0	115	108	-	-

Appendix I. (continued).

Species/Year	March N	March 95% E.E.	July N	July 95% E.E.	August N	August 95% E.E.
Total jaegers						
1972	0	0	1,243	841	-	-
1973	0	0	-	-	761	1,020
1989	-	-	3,556	1,305	4,043	1,744
1990	0	0	1,296	628	3,051	1,295
1991	0	0	549	276	-	-
Gulls						
Bonaparte's gull (*Larus philadelphia*)						
1972	112	248	9,848	9,803	-	-
1973	336	997	-	-	5,535	5,778
1989	-	-	2,469	1,843	1,061	765
1990	0	0	1,423	1,153	3,473	3,220
1991	94	178	823	689	-	-
Mew gull (*Larus canus*)						
1972	8,949	10,045	8,588	3,004	-	-
1973	3,401	1,860	-	-	25,494	15,576
1989	-	-	5,645	1,909	9,679	2,553
1990	2,457	1,286	8,254	2,793	14,055	4,102
1991	9,785	3,339	3,278	1,096	-	-
Herring gull						
1972	198	176	0	0	-	-
1973	396	1,439	-	-	62	82
1989	-	-	7	9	967	503
1990	154	172	125	129	55	39
1991	96	133	214	180	-	-
Thayer's gull (*Larus thayeri*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	-	-

Appendix I. (continued).

Species/Year	March N	March 95% E.E.	July N	July 95% E.E.	August N	August 95% E.E.
Glaucous-winged gull (*Larus glaucescens*)						
1972	27,930	12,405	51,850	33,230	-	-
1973	32,215	17,002	-	-	49,827	19,950
1989	-	-	21,255	4,877	48,597	15,203
1990	8,269	1,866	31,979	7,789	50,465	11,329
1991	10,226	3,693	25,107	5,504	-	-
Glaucous gull (*Larus hyperboreus*)						
1972	5	10	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	-	-
Black-legged kittiwake (*Rissa tridactyla*)						
1972	9,444	11,013	106,764	39,116	-	-
1973	6,102	3,214	-	-	140,338	107,810
1989	-	-	58,642	9,569	61,965	10,759
1990	157	118	42,191	8,757	58,644	13,221
1991	843	455	61,596	9,552	-	-
Sabine's gull (*Xema sabini*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	0	0	114	133
1991	0	0	0	0	-	-
Unidentified gull						
1972	3,607	3,226	146	244	-	-
1973	0	0	-	-	5,044	9,110
1989	-	-	13,063	8,204	17,573	7,299
1990	4,230	4,750	4,975	2,141	9,795	4,113
1991	1,440	973	4,124	1,817	-	-

Appendix I. (continued).

Species/Year	March N	March 95% E.E.	July N	July 95% E.E.	August N	August 95% E.E.
Total gulls						
1972	50,247	23,401	177,196	59,393	-	-
1973	42,451	18,416	-	-	226,300	129,915
1989	-	-	101,082	15,939	139,842	24,333
1990	15,267	5,541	88,947	15,680	136,602	22,546
1991	22,483	5,398	95,143	12,917	-	-
Terns						
Caspian tern (*Sterna caspia*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	0	0	7	7
1991	0	0	40	68	-	-
Arctic tern (*Sterna paradisaea*)						
1972	0	0	33,177	9,504	-	-
1973	0	0	-	-	15,679	7,157
1989	-	-	7,279	2,455	1,186	618
1990	0	0	6,240	1,782	3,243	1,883
1991	0	0	6,224	1,384	-	-
Aleutian tern (*Sterna aleutica*)						
1972	0	0	6	11	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	0	0	9	11
1991	0	0	323	483	-	-
Unidentified tern						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	52	76	0	0
1990	0	0	49	81	0	0
1991	0	0	318	323	-	-

Appendix I. (continued).

Species/Year	March N	March 95% E.E.	July N	July 95% E.E.	August N	August 95% E.E.
Alcidae						
Common murre (*Uria aalge*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	268	209	2,098	1,030
1990	4,895	2,107	875	530	2,309	977
1991	11,735	6,637	4,533	1,494	-	-
Thick-billed murre (*Uria lomvia*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	60	110	0	0
1991	0	0	0	0	-	-
Unidentified murre (*Uria* spp.)						
1972	8,195	4,037	5,915	3,405	-	-
1973	10,681	9,144	-	-	3,018	1,853
1989	-	-	1,914	1,436	531	327
1990	2,597	1,960	576	561	870	685
1991	12,368	6,898	2,505	1,287	-	-
Total murres (*Uria* spp.)						
1972	8,195	4,037	5,915	3,405	-	-
1973	10,681	9,144	-	-	3,018	1,853
1989	-	-	2,183	1,503	2,629	1,049
1990	7,492	2,978	1,512	796	3,179	1,343
1991	24,103	12,076	7,038	2,061	-	-
Pigeon guillemot (*Cepphus columba*)						
1972	3,695	1,294	15,567	5,134	-	-
1973	9,188	6,231	-	-	15,716	9,009
1989	-	-	4,070	1,488	4,289	1,928
1990	812	348	2,961	762	3,816	1,123
1991	2,842	2,178	6,625	4,941	-	-

Appendix I. (continued).

Species/Year	March N	March 95% E.E.	July N	July 95% E.E.	August N	August 95% E.E.
Marbled murrelet (*Brachyramphus marmoratus*)						
1972	11,567	2,413	236,633	51,727	-	-
1973	72,675	25,410	-	-	108,980	28,128
1989	-	-	59,284	11,825	27,646	7,669
1990	13,764	5,939	39,486	9,986	31,844	7,064
1991	7,717	4,595	42,477	9,151	-	-
Kittlitz's murrelet (*Brachyramphus brevirostris*)						
1972	346	657	63,229	80,122	-	-
1973	3,219	3,827	-	-	0	0
1989	-	-	6,436	3,151	514	398
1990	958	1,599	5,231	8,457	818	1,086
1991	466	398	1,184	1,121	-	-
Unidentified *Brachyramphus* murrelet						
1972	0	0	4,570	7,875	-	-
1973	0	0	-	-	0	0
1989	-	-	41,634	8,221	18,053	6,734
1990	11,379	7,026	36,624	7,910	18,741	8,357
1991	15,328	7,288	62,816	14,012	-	-
Total *Brachyramphus* murrelets						
1972	11,913	2,454	304,432	98,430	-	-
1973	75,893	31,963	-	-	108,980	28,128
1989	-	-	107,354	17,483	46,216	12,381
1990	26,102	9,663	81,341	17,758	51,403	13,113
1991	23,510	11,171	106,478	20,095	-	-
Ancient murrelet (*Synthliboramphus antiquus*)						
1972	0	0	446	347	-	-
1973	0	0	-	-	290	1,097
1989	-	-	26	26	137	94
1990	0	0	265	260	135	211
1991	81	145	231	223	-	-

Appendix I. (continued).

Species/Year	March N	March 95% E.E.	July N	July 95% E.E.	August N	August 95% E.E.
Unidentified murrelet						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	4	8
1990	0	0	0	0	0	0
1991	0	0	0	0	-	-
Cassin's auklet (*Ptychoramphus aleuticus*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	0	0	3	5
1991	39	48	0	0	-	-
Parakeet auklet (*Cyclorrhynchus psittacula*)						
1972	0	0	1,893	1,455	-	-
1973	5	8	-	-	201	215
1989	-	-	501	665	4	8
1990	0	0	842	529	41	69
1991	0	0	7	11	-	-
Crested auklet (*Aethia cristatella*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	-	-
Rhinoceros Auklet (*Cerorhinca monocerata*)						
1972	0	0	269	283	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	-	-

Appendix I. (continued).

Species/Year	March N	March 95% E.E.	July N	July 95% E.E.	August N	August 95% E.E.
Tufted Puffin (*Fratercula cirrhata*)						
1972	0	0	9,596	4,798	-	-
1973	0	0	-	-	4,439	4,543
1989	-	-	2,282	1,128	1,996	1,054
1990	0	0	3,819	1,588	2,795	1,421
1991	23	43	5,043	2,011	-	-
Horned Puffin (*Fratercula corniculata*)						
1972	0	0	3,580	3,055	-	-
1973	0	0	-	-	735	532
1989	-	-	1,856	1,867	1,052	677
1990	0	0	1,252	784	420	445
1991	81	137	1,297	818	-	-
Unidentified Puffin (*Fratercula* spp.)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	106	134	38	63
1990	0	0	0	0	0	0
1991	0	0	38	63	-	-
Unidentified alcid						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	0	0
1990	251	412	619	324	40	62
1991	621	438	1,584	1,050	-	-
Owls						
Snowy owl (*Nyctea scandiaca*)						
1972	4	7	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	-	-

Appendix I. (continued).

Species/Year	March N	March 95% E.E.	July N	July 95% E.E.	August N	August 95% E.E.
Northern hawk owl (*Surnia ulula*)						
1972	0	0	0	0	-	-
1973	7	12	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	-	-
Hummingbirds						
Rufous hummingbird (*Selasphorus rufus*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	53	95	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	-	-
Unidentified hummingbird						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	11	11	3	5
1991	0	0	11	10	-	-
Belted kingfisher (*Ceryle alcyon*)						
1972	0	0	0	0	-	-
1973	9	17	-	-	23	37
1989	-	-	21	16	34	20
1990	12	15	10	10	26	20
1991	0	0	12	12	-	-
Passerines						
Tree swallow (*Tachycineta bicolor*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	-	-

Appendix I. (continued).

Species/Year	March N	March 95% E.E.	July N	July 95% E.E.	August N	August 95% E.E.
Bank swallow (*Riparia riparia*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	13	17	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	-	-
Unidentified swallow						
1972	0	0	0	0	-	-
1973	0	0	-	-	19	36
1989	-	-	0	0	17	21
1990	0	0	0	0	0	0
1991	0	0	11	13	-	-
Steller's jay (*Cyanocitta stelleri*)						
1972	0	0	0	0	-	-
1973	9	17	-	-	0	0
1989	-	-	3	5	11	13
1990	0	0	4	8	41	31
1991	0	0	0	0	-	-
Unidentified jay						
1972	0	0	0	0	-	-
1973	0	0	-	-	8	16
1989	-	-	0	0	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	-	-
Black-billed magpie (*Pica pica*)						
1972	141	151	12	22	-	-
1973	123	92	-	-	8	17
1989	-	-	0	0	34	32
1990	88	80	50	33	20	14
1991	52	51	43	29	-	-

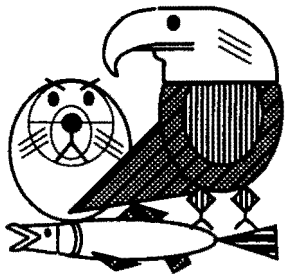
Appendix I. (continued).

Species/Year	March N	March 95% E.E.	July N	July 95% E.E.	August N	August 95% E.E.
Northwestern crow (*Corvus caurinus*)						
1972	7,283	3,470	2,074	1,029	-	-
1973	8,887	5,553	-	-	2,033	1,186
1989	-	-	1,479	609	1,945	998
1990	3,041	1,881	1,638	523	1,279	760
1991	3,325	1,607	2,061	607	-	-
Common raven (*Corvus corax*)						
1972	98	100	79	87	-	-
1973	52	40	-	-	32	51
1989	-	-	121	190	186	74
1990	178	179	157	148	161	152
1991	302	278	62	80	-	-
Unidentified thrush						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	3	5
1990	0	0	0	0	0	0
1991	0	0	0	0	-	-
Bohemian waxwing (*Bombycilla garrulus*)						
1972	0	0	24	43	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	4	8	0	0
1991	0	0	0	0	-	-
Unidentified warbler						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	22	38	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	-	-

Appendix I. (continued).

Species/Year	March N	March 95% E.E.	July N	July 95% E.E.	August N	August 95% E.E.
Snow bunting (*Plectrophenax nivalis*)						
1972	29	50	0	0	-	-
1973	7	13	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	0	0	0	0
1991	15	28	0	0	-	-
Pine grosbeak (*Pinicola enucleator*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	0	0	0	0
1990	0	0	7	11	0	0
1991	0	0	0	0	-	-
Pine siskin (*Carduelis pinus*)						
1972	0	0	0	0	-	-
1973	0	0	-	-	120	229
1989	-	-	0	0	0	0
1990	0	0	0	0	72	84
1991	0	0	0	0	-	-
Unidentified passerine						
1972	8	14	0	0	-	-
1973	130	192	-	-	189	303
1989	-	-	27	29	9	15
1990	152	278	12	17	7	9
1991	8	14	42	25	-	-
Unidentified bird						
1972	1,025	767	0	0	-	-
1973	0	0	-	-	0	0
1989	-	-	2,056	977	1,811	2,454
1990	1,293	1,206	871	476	2,052	1,931
1991	2,288	2,360	281	224	-	-

Exxon Valdez Oil Spill Trustee Council
Restoration Office
645 G Street, Suite 401, Anchorage, Alaska 99501-3451
Phone: (907) 278-8012 Fax: (907) 276-7178



FAX COVER SHEET

To: See Distribution Number:

From: Molly McCammon Date: 6-9-94

Comments: Total Pages: 2

Please forward to the person in your office listed below.

FAX COMPLETE

- Jim Ayers
- David Irons
- Agency Liaisons:

Dave Gibbons — Veronica Gilbert
Jerome Montague — Sandy Rabinowitch
Byron Morris — Mark Brodersen

Document Sent By: Rebecca

****
*** MULTI TRANSACTION REPORT ***
****

TX/RX NO. 0217

INCOMPLETE TX/RX

TRANSACTION OK	[09] 5867589	J.AYERS
	[11] 4655375	M.BRODERSEN
	[12] 4654759	J.MONTAGUE
	[13] 7896608	MORRIS-WRIGHT
	[14] 2572510	S.RABINOWITCH
	[15] 5624871	C.FRIES
ERROR	[10] 5867555	D.GIBBONS

****
*** ACTIVITY REPORT ***
****

TRANSMISSION OK

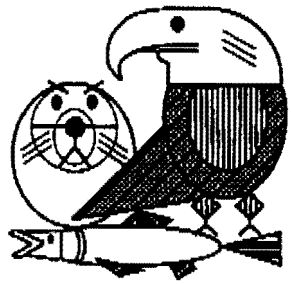
TX/RX NO.	0217
CONNECTION TEL	5867555
CONNECTION ID	D.GIBBONS
START TIME	06/09 10:21
USAGE TIME	01'11
PAGES	2
RESULT	OK

****
*** ERROR TX REPORT ***
****

TX FUNCTION WAS NOT COMPLETED

TX/RX NO.	0217
CONNECTION TEL	5867555
CONNECTION ID	D.GIBBONS
START TIME	06/09 09:51
USAGE TIME	01'24
PAGES	2
RESULT	NG 1

Exxon Valdez Oil Spill Trustee Council
Restoration Office
645 G Street, Suite 401, Anchorage, Alaska 99501-3451
Phone: (907) 278-8012 Fax: (907) 276-7178



FAX COVER SHEET

To: See Distribution Number:

From: Molly McCammon Date: 6-9-94

Comments: Total Pages: 2

Please forward to the person in your office listed below.

- Jim Ayers
- David Irons
- Agency Liaisons:

Dave Gibbons Veronica Gilbert

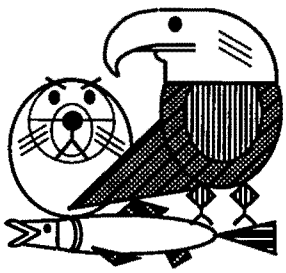
Terrance Montagnet Sandra Rabinowitch,

****
*** ACTIVITY REPORT ***
****

TRANSMISSION OK

TX/RX NO.	0216
CONNECTION TEL	7863641
CONNECTION ID	
START TIME	06/09 09:47
USAGE TIME	01'26
PAGES	2
RESULT	OK

Exxon Valdez Oil Spill Trustee Council
Restoration Office
645 G Street, Suite 402, Anchorage, Alaska 99501
Phone: (907) 278-8012 Fax: (907) 276-7178



MEMORANDUM

TO: Ward Lane

FROM: Molly McCammon, Director of Operations

DATE: June 7, 1994

SUBJ: Development of FY 95 Work Plan

The purpose of this memorandum is to enlist your assistance with the preparation of the FY 95 Work Plan, in particular:

— development of a "master spreadsheet" that can be used to track the progress of any particular project proposal from the time it is submitted as a Brief Project Description (BPD) until final action by the Trustee Council at the late October meeting; and

— responsibility for the preparation of the electronic version of the Draft FY 95 Work Plan that will eventually be published as the public comment draft in mid-August.

FY 95 Projects — Master Spreadsheet

As BPDs are received, organized, reviewed and evaluated by various entities (e.g., the SRB, the PAG, and others) a master spreadsheet will be needed that can be used to track the progress of individual projects. This spreadsheet will be similar to the one that you developed last year for the FY 94 projects and used to display information regarding the projects at various times (for example to the SRB or to the PAG). As an initial starting point, this spreadsheet should include:

— Project Number
— Project Title
— Project Budget ($ - FY 95)
— Lead Agency
— Project Leader

This basic information should be available from the BPDs by Monday, June 20th (allowing a couple of days for the initial organization and copying of

BPDs that are due June 15th). The PAG will be meeting on Tuesday June 28th and a working version of the spreadsheet will be needed for that meeting.

In addition to simply recording basic information about individual projects, it will be important to design this spreadsheet so that it can be manipulated to analyze projects proposed for the Draft FY 95 Work Plan. This includes, for example, being able to sort the spreadsheet to identify projects (and associated budgets) that are "research" projects vs. "monitoring" projects vs. "general restoration" projects. Another example would be to analyze proposed projects by lead agency or, possibly, the resource affected (e.g., pink salmon). The spreadsheet will also be used to document, in summary form, the recommendations of the SRB, the PAG and the Executive Director and perhaps other entities. The spreadsheet will also be used to maintain a record of the action taken regarding specific projects (e.g., assigned to ADF&G for further work with the sponsor).

Please work with Eric Myers, Bob Loeffler, Veronica Gilbert and Sandra Schubert to design a spreadsheet that is responsive to the need to track and analyze proposed FY 95 projects over the course of the next several months in anticipation of the Trustee Council's action at the end of October. As you can appreciate, the next few months will be quite hectic and it will be important to make the data in this spreadsheet readily accessible as work progresses on other aspects of the Draft FY 95 Work Plan.

Draft FY 95 Work Plan — Public Comment Draft

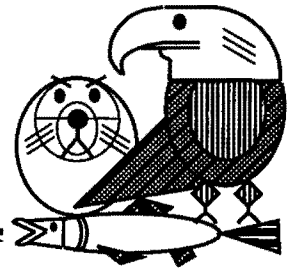
A printed version of the Draft FY 95 Work Plan, comprised largely of BPDs, will be published for public review and comment. As the electronic versions of the BPDs are submitted along with the hard copies of the BPDs, I would like to have you assume the lead for combining these BPDs into one large "master" document that will — after substantial work, no doubt — be ready for publication and mailing in late August.

This is a task that will require substantial editing. Again, please work with Eric Myers, Bob Loeffler, Veronica Gilbert and Sandra Schubert to design the contents and format for this document. Quite likely, we will also involve other staff in the development of the Draft FY 95 Work Plan.

I would appreciate the chance to discuss this with you further.

cc: Eric Myers
Bob Loeffler
Veronica Gilbert
Sandra Schubert

Exxon Valdez Oil Spill Trustee Council
Restoration Office
645 G Street, Suite 402, Anchorage, Alaska 99501
Phone: (907) 278-8012 Fax: (907) 276-7178



MEMORANDUM

TO: Jerome Montague/ADF&G

FROM: Molly McCammon, Director of Operations

DATE: June 6, 1994

SUBJ: Project #94255/Kenai River Sockeye Salmon Restoration

The purpose of this memorandum is to formally authorize work under Project #94255/Kenai River Sockeye Salmon Restoration.

As you will note, the peer review process generated a number of specific recommendations regarding how this project could be implemented most effectively (see attached). I would appreciate it if you could respond to the recommendations outlined in the Chief Scientist's recommendations. A telephone conference call including the Chief Scientist and appropriate project staff might provide the simplest means of follow-up on these recommendations.

Please let me know in writing when these issues have been resolved.

cc: Bob Spies
Joe Sullivan
Peter Montasano
Ken Tarbox
Jim Seeb
Jim Ayers

APPLIED
marine
SCIENCES

May 24, 1994

TO: James Ayers
Executive Director

FROM: Robert B. Spies
Chief Scientist

THRU: Eric Myers

CC: Peter Montesano
James Seeb

RE: Project No. 94255

Project 94255 ("Kenai River Sockeye Salmon Restoration") was delivered to my office with a request to expedite the peer-review process. The DPD for Project 94255 arrived at Applied Marine Sciences on March 15, and the initial reviews for this project was received on April 21. Dr. Jim Seeb, one of the principal investigators, requested more review of the genetic aspects of this proposal and we obliged with a second round of review, which is now complete.

The purpose of Project 94255 is to track the Kenai River system sockeye salmon through the mixed stock fishery of Cook Inlet so that the in-season management of the escapement can help to restore the condition of the rearing lakes in the Kenai River system. As you may know these lakes were overloaded with fry by large escapements several years in a row, culminating in 1989. The number of outmigrating fry from these systems has been dropping precipitously since 1991 and this year may be a very poor year for this fishery due to the high probability of a weak run and the need to closely regulate the fishery. This project will continue to apply genetic techniques to the identification of the Kenai River stocks amongst all the other stocks in Cook Inlet during the annual run. This will allow managers to protect the damaged stocks while at the same time target an expected surplus of Kasilof River and Susitna River stocks in the fishery. There is also a hydroacoustic component to the project to provide more accurate estimates of abundance of fishes in Cook Inlet.

The reviewers were impressed with the quality of the team assembled to carry out this research and provided every indication that this project will be a success. A few of the comments of the reviewers are worthy of mention here.

1. The number of samples is not specified, but there will be a large number of individuals in every sample (400). The reviewer felt that a large number of samples is as important or more important than having a large number of individual fish in each sample.

2. There should be an archival system started in order to be able to do repeat genetic analyses in the future.

3. The contractual amount for the nuclear DNA study is probably insufficient. It is suggested that some of the money needed to prôperly fund this aspect of the work come from the equipment

2155 Las Positas Court, Suite S Livermore, CA 94550 510.373.7442 FAX 510.373.7834

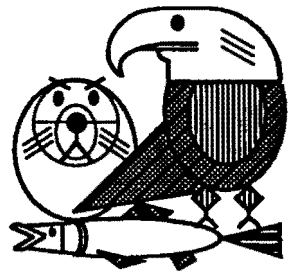
budget in out years as the $24,500 in the first year should be sufficient to take care of equipment needs.

4. There should be a program review prior to funding the 1995 project to specifically examine the genetics and hydroacoustic aspects.

I recommend that this project be approved with the condition that a workshop be held before October 1994 to review progress of this project. This workshop might be held in conjunction with one examining progress on pink salmon genetics. I trust Dr. Seeb will also implement the changes suggested by the reviewers that are possible at this date and with the resources available.

As you are aware, the analysis that the peer reviewers and I have provided this Detailed Project Description is focused upon its technical merit. I recommend that this project be given a budgetary review in addition to the technical review provided by my office. This is particularly appropriate for Project 94255 as it is a multi-year study.

Exxon Valdez Oil Spill Trustee Council
Restoration Office
645 G Street, Suite 401, Anchorage, AK 99501-3451
Phone: (907) 278-8012 Fax: (907) 276-7178



MEMORANDUM

TO: Restoration Work Force

FROM: Molly McCammon, Director of Operations

DATE: June 6, 1994

SUBJ: Draft Trustee Council Meeting Actions

Attached please find a DRAFT of the Trustee Council Meeting Actions from the meeting of May 31, 1994.

Please let me know of any changes, additions or corrections you would like to make to this DRAFT by close of business **Wednesday, June 8, 1994.**

Your assistance is appreciated.

cc: June Arkoulis-Sinclair
Rebecca Williams
Mary Rivera

Exxon Valdez Oil Spill Trustee Council

Restoration Office
645 G Street, Suite 401, Anchorage, AK 99501-3451
Phone: (907) 278-8012 Fax: (907) 276-7178

TRUSTEE COUNCIL MEETING ACTIONS

May 31, 1994 @ 1:00 p.m. Juneau, Alaska
Reconvened from May 3, 1994 meeting

DRAFT

By James R. Ayers
Executive Director

Trustee Council Members Present:

* Steve Pennoyer, NMFS
John Sandor, ADEC
• Craig Tillery, DOL
Carl Rosier, ADF&G
• Jim Wolfe, USFS
• Deborah Williams, USDOI

* Chair
• Note:
— Craig Tillery served as an alternate for Attorney General Bruce Botelho for the entire meeting.
— Jim Wolfe served as a representative for the USFS for the entire meeting.
— Deborah Williams served as an alternate for George T. Frampton, Jr. for the entire meeting.

Teleconference sites included the Anchorage Restoration Office and the Fairbanks LIO.

1. Approval of the Agenda

APPROVED MOTION: Approved the Agenda. (Attachment A)

2. Resolution Honoring Michael Barton

APPROVED MOTION: Approved a resolution honoring the work of Michael Barton as a Trustee Council member (Attachment B).

3. Analysis of Options Available to Maximize Earnings on Settlement Funds

APPROVED MOTION: Directed the Executive Director to prepare an analysis of options available to the Trustee Council to maximize the interest earned on EVOS civil settlement funds.

4. Tatitlek and Chugach Habitat Evaluation and Ranking

APPROVED MOTION: Authorized the Executive Director, subject to a formal determination of a willing seller, to

proceed with the habitat evaluation and ranking of large parcels that have not been evaluated and ranked in the past.

5. Transfer of Funds from Herring Project to Harlequin Duck Project

APPROVED MOTION: Approved the transfer of $20.0 thousand from Project #94165/Herring Genetic Stock Identification to Project #94427/Harlequin Duck Boat Survey to provide funds to conduct additional harlequin brood surveys.

6. Trustee Council Policy on Less Than Fee Simple Habitat Acquisitions

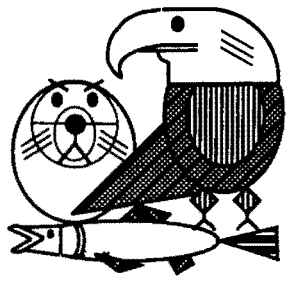
APPROVED MOTION: Directed the Executive Director to, first, develop a draft process and policy statement on less than fee simple habitat acquisition which will examine public access and canopy protection, among other issues and, second, bring the policy statement and process to the Trustee Council by resolution at the next Trustee Council meeting.

The meeting was recessed. The next meeting of the Trustee Council was tentatively scheduled for some time in late June.

Attachment A Agenda
Attachment B Resolution Honoring Michael Barton

Exxon Valdez Oil Spill Trustee Council

Restoration Office
645 G Street, Suite 401, Anchorage, Alaska 99501-3451
Phone: (907) 278-8012 Fax: (907) 276-7178



AGENDA
EXXON VALDEZ OIL SPILL SETTLEMENT
TRUSTEE COUNCIL
CONTINUATION OF APRIL 28, 1994 MEETING
TELECONFERENCE
MAY 31, 1994 @ 1:00 P.M.

5/27/94
11:12 am
DRAFT

Trustee Council Members:

JAMES A. WOLFE/Trustee Representative
Director, Engineering & Aviation Management
U.S. Department of Agriculture-Forest Service

BRUCE M. BOTELHO/CRAIG TILLERY
Attorney General/Trustee
State of Alaska/Representative

GEORGE T. FRAMPTON, JR./DEBORAH WILLIAMS
Assistant Secretary/Trustee Representative
U.S. Department of the Interior

STEVEN PENNOYER
Director, Alaska Region
National Marine Fisheries Service

CARL L. ROSIER
Commissioner
Alaska Department of Fish & Game

JOHN A. SANDOR
Commissioner
Alaska Department of Environmental Conservation

Steven Pennoyer, Chair
Juneau location - U.S. Forest Service Conference Room 541A
Anchorage location - 645 G Street Fourth Floor

1. Approval of Agenda
   - Order of the Day
   - Approval of Meeting Notes from April 11 & 28, May 2 & 3

2. Executive Director's Report (Jim Ayers)
   - Financial Report (June Sinclair)
   - Project Status (Eric Myers)
   - Restoration Plan EIS (Rod Kuhn)
   - Institute of Marine Science (Kim Sundberg)
   - Public Information and Communication (Molly McCammon)
   - FY95 Work Plan Process (Molly McCammon)
   - Habitat Protection and Acquisition Status (Dave Gibbons)

3. New Business

* Authorization for Ranking and Negotiations:
    1) Tatitlek
    2) Chugach
    3) Other

* Transfer of $20,000 from Project 94165 (Prince William Sound Herring Genetic Stock Identification) to Project 94427 (Harlequin Duck Boat Surveys & Methodology Testing)[1].

4. 2:30 p.m. Executive Session on Habitat Protection and Acquisition Strategies
Trustee Council and Appropriate Staff Only.

Tentative Meeting Schedule:
1) Between August 24 & 31 (May require 2 days)
2) Last week of September
3) October 31

Adjourn

* Action Items

[1] The $20K in Project 94165 is available because poor herring returns this spring did not allow for a full-scale testing of the hypothesis of several spawning stocks in Prince William Sound. A full-scale project will be considered again for FY95.

Exxon Valdez Oil Spill Trustee Council
Restoration Office
645 "G" Street, Anchorage, AK 99501
Phone: (907) 278-8012 Fax: (907) 276-7178

Resolution of Appreciation for Michael A. Barton
Recognizing His Outstanding Leadership and Dedication
as
Trustee Council Member for the
U.S. Department of Agriculture on the
Exxon Valdez Oil Spill Trustee Council

The *Exxon Valdez* Oil Spill Trustee Council expresses its profound appreciation to **Michael A. Barton** for his extraordinary leadership and stewardship as the Trustee Council Member for the U.S. Department of Agriculture on the *Exxon Valdez* Oil Spill Trustee Council. From the time of the spill, during response and damage assessment, as well as subsequent planning and implementation of restoration activities, **Michael Barton** always brought exceptional judgment and insight to the process of formulating policy for the restoration of the injured natural resources and the services they provide. **Michael Barton's** dedication to service and his composure under pressure contributed significantly to the Trustee Council's design of a balanced approach to restoration of the spill affected area. The Trustee Council unanimously commends **Michael Barton** for his professionalism and friendship and wish **Michael Barton** well in future endeavors.

James Wolfe
Regional Forester
USDA Forest Service

Bruce Botelho
Attorney General
State of Alaska

George T. Frampton, Jr.
Assistant Secretary
U.S. Department of Interior

John A.Sandor
Commissioner
Department of Environmental Conservation

Steve Pennoyer
Director
National Marine Fisheries Service

Carl L. Rosier
Commissioner
Department of Fish and Game

Exxon Valdez Oil Spill Trustee Council

Restoration Office
645 "G" Street, Anchorage, AK 99501
Phone: (907) 278-8012 Fax: (907) 276-7178

June 3, 1994

Mr. Howard Valley
Chairman
Afognak Joint Ventures
P.O. Box 1277
Kodiak, AK 99615

Dear Mr. Valley:

Once again, thank you for the interest in and comments you have provided to me and other members of the EVOS Trustee Council staff regarding the appraisal process to be utilized for habitat acquisition projects. I want to assure you that the comments made were carefully reviewed, and many have been reflected in the process that has now been approved.

This process recognizes the right of sellers or their representatives to review and comment on the appraisal prepared under contract to the government before that appraisal is authorized for use in the Council process. In addition, sellers may, at their option and expense, retain their own appraiser. The governments, through the lead negotiating agency, will work with the private appraisers in such manner as the sellers deem appropriate. This is to insure that the private appraisers have the same information concerning the property as do the governments' appraisers, and that they conduct an appraisal that satisfies the Uniform Appraisal Standards for Federal Land Acquisitions (UASFLA) and Uniform Standards of Professional Appraisal Practice (USPAP). Such private appraisals will be reviewed by both governments.

If one of the appraisers has considered appropriate information not considered by the other appraiser, this process will allow the review appraiser to make that information available to the second appraiser for consideration. If the review concludes that there is pertinent information that has been overlooked by USFS appraiser then it would be referred to the contract appraiser for consideration. If the private appraisal conforms to UASFLA and USPAP and best supports the estimate of value for the property or interests to be acquired, the private appraisal will be used for the Trustee Council acquisition process.

A copy of the approved process and a description flow chart are enclosed. Should you have any questions about this process, please don't hesitate to provide them to me by letter. On behalf of the Trustee Council, I look forward to working with you in the future on successful habitat acquisition and protection projects.

Sincerely,

James R. Ayers
Executive Director

JRA/mir

Enclosures

cc: Bill Timme
Middleton, Timme & Luke

Exxon Valdez Oil Spill Trustee Council

Restoration Office
645 "G" Street, Anchorage, AK 99501
Phone: (907) 278-8012 Fax: (907) 276-7178

June 3, 1994

Mr. Ralph Eluska
President
Akhiok-Kaguyak Corporation
5028 Mills Drive
Anchorage, AK 99508

Dear Mr. Eluska: Ralph

Once again, thank you for the interest in and comments you have provided to me and other members of the EVOS Trustee Council staff regarding the appraisal process to be utilized for habitat acquisition projects. I want to assure you that the comments made were carefully reviewed, and many have been reflected in the process that has now been approved.

This process recognizes the right of sellers or their representatives to review and comment on the appraisal prepared under contract to the government before that appraisal is authorized for use in the Council process. In addition, sellers may, at their option and expense, retain their own appraiser. The governments, through the lead negotiating agency, will work with the private appraisers in such manner as the sellers deem appropriate. This is to insure that the private appraisers have the same information concerning the property as do the governments' appraisers, and that they conduct an appraisal that satisfies the Uniform Appraisal Standards for Federal Land Acquisitions (UASFLA) and Uniform Standards of Professional Appraisal Practice (USPAP). Such private appraisals will be reviewed by both governments.

If one of the appraisers has considered appropriate information not considered by the other appraiser, this process will allow the review appraiser to make that information available to the second appraiser for consideration. If the review concludes that there is pertinent information that has been overlooked by USFS appraiser then it would be referred to the contract appraiser for consideration. If the private appraisal conforms to UASFLA and USPAP and best supports the estimate of value for the property or interests to be acquired, the private appraisal will be used for the Trustee Council acquisition process.

A copy of the approved process and a description flow chart are enclosed. Should you have any questions about this process, please don't hesitate to provide them to me by letter. On behalf of the Trustee Council, I look forward to working with you in the future on successful habitat acquisition and protection projects.

Sincerely,

James R. Ayers
Executive Director

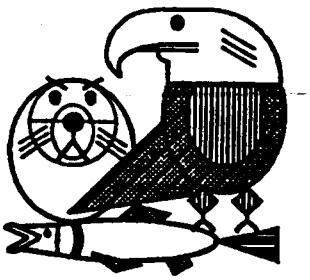
JRA/mir

Enclosures

cc: Jim Wilkens
Bliss & Wilkens

Exxon Valdez Oil Spill Trustee Council

Restoration Office
645 "G" Street, Anchorage, AK 99501
Phone: (907) 278-8012 Fax: (907) 276-7178



June 3, 1994

Mr. Charles W. Totemoff
President
Chenega Corporation
P.O. Box 60
Chenega, AK 99574-9999

Dear Mr. Totemoff:

Once again, thank you for the interest in and comments you have provided to me and other members of the EVOS Trustee Council staff regarding the appraisal process to be utilized for habitat acquisition projects. I want to assure you that the comments made were carefully reviewed, and many have been reflected in the process that has now been approved.

This process recognizes the right of sellers or their representatives to review and comment on the appraisal prepared under contract to the government before that appraisal is authorized for use in the Council process. In addition, sellers may, at their option and expense, retain their own appraiser. The governments, through the lead negotiating agency, will work with the private appraisers in such manner as the sellers deem appropriate. This is to insure that the private appraisers have the same information concerning the property as do the governments' appraisers, and that they conduct an appraisal that satisfies the Uniform Appraisal Standards for Federal Land Acquisitions (UASFLA) and Uniform Standards of Professional Appraisal Practice (USPAP). Such private appraisals will be reviewed by both governments.

If one of the appraisers has considered appropriate information not considered by the other appraiser, this process will allow the review appraiser to make that information available to the second appraiser for consideration. If the review concludes that there is pertinent information that has been overlooked by USFS appraiser then it would be referred to the contract appraiser for consideration. If the private appraisal conforms to UASFLA and USPAP and best supports the estimate of value for the property or interests to be acquired, the private appraisal will be used for the Trustee Council acquisition process.

A copy of the approved process and a description flow chart are enclosed. Should you have any questions about this process, please don't hesitate to provide them to me by letter. On behalf of the Trustee Council, I look forward to working with you in the future on successful habitat acquisition and protection projects.

Sincerely,

James R. Ayers
Executive Director

JRA/mir

Enclosures

cc: Sam Fortier
Fortier & Mikko, P.C.

Exxon Valdez Oil Spill Trustee Council

Restoration Office
645 "G" Street, Anchorage, AK 99501
Phone: (907) 278-8012 Fax: (907) 276-7178

June 3, 1994

Mr. Michael E. Brown
President
Chugach Alaska Corporation
560 East 34th Street #200
Anchorage, AK 99503

Dear Mr. Brown:

Once again, thank you for the interest in and comments you have provided to me and other members of the EVOS Trustee Council staff regarding the appraisal process to be utilized for habitat acquisition projects. I want to assure you that the comments made were carefully reviewed, and many have been reflected in the process that has now been approved.

This process recognizes the right of sellers or their representatives to review and comment on the appraisal prepared under contract to the government before that appraisal is authorized for use in the Council process. In addition, sellers may, at their option and expense, retain their own appraiser. The governments, through the lead negotiating agency, will work with the private appraisers in such manner as the sellers deem appropriate. This is to insure that the private appraisers have the same information concerning the property as do the governments' appraisers, and that they conduct an appraisal that satisfies the Uniform Appraisal Standards for Federal Land Acquisitions (UASFLA) and Uniform Standards of Professional Appraisal Practice (USPAP). Such private appraisals will be reviewed by both governments.

If one of the appraisers has considered appropriate information not considered by the other appraiser, this process will allow the review appraiser to make that information available to the second appraiser for consideration. If the review concludes that there is pertinent information that has been overlooked by USFS appraiser then it would be referred to the contract appraiser for consideration. If the private appraisal conforms to UASFLA and USPAP and best supports the estimate of value for the property or interests to be acquired, the private appraisal will be used for the Trustee Council acquisition process.

A copy of the approved process and a description flow chart are enclosed. Should you have any questions about this process, please don't hesitate to provide them to me by letter. On behalf of the Trustee Council, I look forward to working with you in the future on successful habitat acquisition and protection projects.

Sincerely,

James R. Ayers
Executive Director

JRA/mir

Enclosures

cc: William Bittner
Birch, Horton, Bittner & Cherot

Exxon Valdez Oil Spill Trustee Council

Restoration Office
645 "G" Street, Anchorage, AK 99501
Phone: (907) 278-8012 Fax: (907) 276-7178

June 3, 1994

Mr. Donald Emmal
President
English Bay Corporation
1637 Stanton Avenue
Anchorage, AK 99508

Dear Mr. Emmal:

Once again, thank you for the interest in and comments you have provided to me and other members of the EVOS Trustee Council staff regarding the appraisal process to be utilized for habitat acquisition projects. I want to assure you that the comments made were carefully reviewed, and many have been reflected in the process that has now been approved.

This process recognizes the right of sellers or their representatives to review and comment on the appraisal prepared under contract to the government before that appraisal is authorized for use in the Council process. In addition, sellers may, at their option and expense, retain their own appraiser. The governments, through the lead negotiating agency, will work with the private appraisers in such manner as the sellers deem appropriate. This is to insure that the private appraisers have the same information concerning the property as do the governments' appraisers, and that they conduct an appraisal that satisfies the Uniform Appraisal Standards for Federal Land Acquisitions (UASFLA) and Uniform Standards of Professional Appraisal Practice (USPAP). Such private appraisals will be reviewed by both governments.

If one of the appraisers has considered appropriate information not considered by the other appraiser, this process will allow the review appraiser to make that information available to the second appraiser for consideration. If the review concludes that there is pertinent information that has been overlooked by USFS appraiser then it would be referred to the contract appraiser for consideration. If the private appraisal conforms to UASFLA and USPAP and best supports the estimate of value for the property or interests to be acquired, the private appraisal will be used for the Trustee Council acquisition process.

A copy of the approved process and a description flow chart are enclosed. Should you have any questions about this process, please don't hesitate to provide them to me by letter. On behalf of the Trustee Council, I look forward to working with you in the future on successful habitat acquisition and protection projects.

Sincerely,

James R. Ayers
Executive Director

JRA/mir

Enclosures

cc: Bill Timme
Middleton, Timme & Luke

Exxon Valdez Oil Spill Trustee Council

Restoration Office
645 "G" Street, Anchorage, AK 99501
Phone: (907) 278-8012 Fax: (907) 276-7178

June 3, 1994

Ms. Donna Nadell
President
The Eyak Corporation
P.O. Box 340
Cordova, AK 99574

Dear Ms. Nadell: Donna

Once again, thank you for the interest in and comments you have provided to me and other members of the EVOS Trustee Council staff regarding the appraisal process to be utilized for habitat acquisition projects. I want to assure you that the comments made were carefully reviewed, and many have been reflected in the process that has now been approved.

This process recognizes the right of sellers or their representatives to review and comment on the appraisal prepared under contract to the government before that appraisal is authorized for use in the Council process. In addition, sellers may, at their option and expense, retain their own appraiser. The governments, through the lead negotiating agency, will work with the private appraisers in such manner as the sellers deem appropriate. This is to insure that the private appraisers have the same information concerning the property as do the governments' appraisers, and that they conduct an appraisal that satisfies the Uniform Appraisal Standards for Federal Land Acquisitions (UASFLA) and Uniform Standards of Professional Appraisal Practice (USPAP). Such private appraisals will be reviewed by both governments.

If one of the appraisers has considered appropriate information not considered by the other appraiser, this process will allow the review appraiser to make that information available to the second appraiser for consideration. If the review concludes that there is pertinent information that has been overlooked by USFS appraiser then it would be referred to the contract appraiser for consideration. If the private appraisal conforms to UASFLA and USPAP and best supports the estimate of value for the property or interests to be acquired, the private appraisal will be used for the Trustee Council acquisition process.

A copy of the approved process and a description flow chart are enclosed. Should you have any questions about this process, please don't hesitate to provide them to me by letter. On behalf of the Trustee Council, I look forward to working with you in the future on successful habitat acquisition and protection projects.

Sincerely,

James R. Ayers
Executive Director

JRA/mir

Enclosures

cc: James Linxwiler
Guess & Rudd

Exxon Valdez Oil Spill Trustee Council

Restoration Office
645 "G" Street, Anchorage, AK 99501
Phone: (907) 278-8012 Fax: (907) 276-7178

June 3, 1994

The Honorable Jerome Selby
Mayor
Kodiak Island Borough
710 Mill Bay Road
Kodiak, AK 99615-6331

Dear Mayor Selby: Jerome

Once again, thank you for the interest in and comments you have provided to me and other members of the EVOS Trustee Council staff regarding the appraisal process to be utilized for habitat acquisition projects. I want to assure you that the comments made were carefully reviewed, and many have been reflected in the process that has now been approved.

This process recognizes the right of sellers or their representatives to review and comment on the appraisal prepared under contract to the government before that appraisal is authorized for use in the Council process. In addition, sellers may, at their option and expense, retain their own appraiser. The governments, through the lead negotiating agency, will work with the private appraisers in such manner as the sellers deem appropriate. This is to insure that the private appraisers have the same information concerning the property as do the governments' appraisers, and that they conduct an appraisal that satisfies the Uniform Appraisal Standards for Federal Land Acquisitions (UASFLA) and Uniform Standards of Professional Appraisal Practice (USPAP). Such private appraisals will be reviewed by both governments.

If one of the appraisers has considered appropriate information not considered by the other appraiser, this process will allow the review appraiser to make that information available to the second appraiser for consideration. If the review concludes that there is pertinent information that has been overlooked by USFS appraiser then it would be referred to the contract appraiser for consideration. If the private appraisal conforms to UASFLA and USPAP and best supports the estimate of value for the property or interests to be acquired, the private appraisal will be used for the Trustee Council acquisition process.

A copy of the approved process and a description flow chart are enclosed. Should you have any questions about this process, please don't hesitate to provide them to me by letter. On behalf of the Trustee Council, I look forward to working with you in the future on successful habitat acquisition and protection projects.

Sincerely,

James R. Ayers
Executive Director

JRA/mir

Enclosures

cc: Joel Bolger
Jamin, Ebell, Bolger & Gentry

Exxon Valdez Oil Spill Trustee Council

Restoration Office
645 "G" Street, Anchorage, AK 99501
Phone: (907) 278-8012 Fax: (907) 276-7178

June 3, 1994

Mr. Uwe Gross
President
Koniag Incoporated
4300 B Street, #407
Anchorage, AK 99503

Dear Mr. Gross:

Once again, thank you for the interest in and comments you have provided to me and other members of the EVOS Trustee Council staff regarding the appraisal process to be utilized for habitat acquisition projects. I want to assure you that the comments made were carefully reviewed, and many have been reflected in the process that has now been approved.

This process recognizes the right of sellers or their representatives to review and comment on the appraisal prepared under contract to the government before that appraisal is authorized for use in the Council process. In addition, sellers may, at their option and expense, retain their own appraiser. The governments, through the lead negotiating agency, will work with the private appraisers in such manner as the sellers deem appropriate. This is to insure that the private appraisers have the same information concerning the property as do the governments' appraisers, and that they conduct an appraisal that satisfies the Uniform Appraisal Standards for Federal Land Acquisitions (UASFLA) and Uniform Standards of Professional Appraisal Practice (USPAP). Such private appraisals will be reviewed by both governments.

If one of the appraisers has considered appropriate information not considered by the other appraiser, this process will allow the review appraiser to make that information available to the second appraiser for consideration. If the review concludes that there is pertinent information that has been overlooked by USFS appraiser then it would be referred to the contract appraiser for consideration. If the private appraisal conforms to UASFLA and USPAP and best supports the estimate of value for the property or interests to be acquired, the private appraisal will be used for the Trustee Council acquisition process.

A copy of the approved process and a description flow chart are enclosed. Should you have any questions about this process, please don't hesitate to provide them to me by letter. On behalf of the Trustee Council, I look forward to working with you in the future on successful habitat acquisition and protection projects.

Sincerely,

James R. Ayers
Executive Director

JRA/mir

Enclosures

cc: Bill Timme
Middleton, Timme & Luke

Exxon Valdez Oil Spill Trustee Council

Restoration Office
645 "G" Street, Anchorage, AK 99501
Phone: (907) 278-8012 Fax: (907) 276-7178

June 3, 1994

Mr. Emil Christiansen
President
Old Harbor Corporation
P.O. Box 71
Old Harbor, AK 99643

Dear Mr. Christiansen:

Once again, thank you for the interest in and comments you have provided to me and other members of the EVOS Trustee Council staff regarding the appraisal process to be utilized for habitat acquisition projects. I want to assure you that the comments made were carefully reviewed, and many have been reflected in the process that has now been approved.

This process recognizes the right of sellers or their representatives to review and comment on the appraisal prepared under contract to the government before that appraisal is authorized for use in the Council process. In addition, sellers may, at their option and expense, retain their own appraiser. The governments, through the lead negotiating agency, will work with the private appraisers in such manner as the sellers deem appropriate. This is to insure that the private appraisers have the same information concerning the property as do the governments' appraisers, and that they conduct an appraisal that satisfies the Uniform Appraisal Standards for Federal Land Acquisitions (UASFLA) and Uniform Standards of Professional Appraisal Practice (USPAP). Such private appraisals will be reviewed by both governments.

If one of the appraisers has considered appropriate information not considered by the other appraiser, this process will allow the review appraiser to make that information available to the second appraiser for consideration. If the review concludes that there is pertinent information that has been overlooked by USFS appraiser then it would be referred to the contract appraiser for consideration. If the private appraisal conforms to UASFLA and USPAP and best supports the estimate of value for the property or interests to be acquired, the private appraisal will be used for the Trustee Council acquisition process.

A copy of the approved process and a description flow chart are enclosed. Should you have any questions about this process, please don't hesitate to provide them to me by letter. On behalf of the Trustee Council, I look forward to working with you in the future on successful habitat acquisition and protection projects.

Sincerely,

James R. Ayers
Executive Director

JRA/mir

Enclosures

cc: Walt Ebell
Jamin, Ebell, Bolger & Gentry

Exxon Valdez Oil Spill Trustee Council

Restoration Office
645 "G" Street, Anchorage, AK 99501
Phone: (907) 278-8012 Fax: (907) 276-7178

June 3, 1994

Mr. Pat Norman
President
Port Graham Corporation
P.O. Box PGM
Port Graham, AK 99603-8998

Dear Mr. Norman:

Once again, thank you for the interest in and comments you have provided to me and other members of the EVOS Trustee Council staff regarding the appraisal process to be utilized for habitat acquisition projects. I want to assure you that the comments made were carefully reviewed, and many have been reflected in the process that has now been approved.

This process recognizes the right of sellers or their representatives to review and comment on the appraisal prepared under contract to the government before that appraisal is authorized for use in the Council process. In addition, sellers may, at their option and expense, retain their own appraiser. The governments, through the lead negotiating agency, will work with the private appraisers in such manner as the sellers deem appropriate. This is to insure that the private appraisers have the same information concerning the property as do the governments' appraisers, and that they conduct an appraisal that satisfies the Uniform Appraisal Standards for Federal Land Acquisitions (UASFLA) and Uniform Standards of Professional Appraisal Practice (USPAP). Such private appraisals will be reviewed by both governments.

If one of the appraisers has considered appropriate information not considered by the other appraiser, this process will allow the review appraiser to make that information available to the second appraiser for consideration. If the review concludes that there is pertinent information that has been overlooked by USFS appraiser then it would be referred to the contract appraiser for consideration. If the private appraisal conforms to UASFLA and USPAP and best supports the estimate of value for the property or interests to be acquired, the private appraisal will be used for the Trustee Council acquisition process.

A copy of the approved process and a description flow chart are enclosed. Should you have any questions about this process, please don't hesitate to provide them to me by letter. On behalf of the Trustee Council, I look forward to working with you in the future on successful habitat acquisition and protection projects.

Sincerely,

James R. Ayers
Executive Director

JRA/mir

Enclosures

cc: Sam Fortier
Fortier & Mikko, P.C.

Exxon Valdez Oil Spill Trustee Council

Restoration Office
645 "G" Street, Anchorage, AK 99501
Phone: (907) 278-8012 Fax: (907) 276-7178

June 3, 1994

Mr. Carroll Kompkoff
President
Tatitlek Corporation
P.O. Box 650
Cordova, AK 99574

Dear Mr. Kompkoff:

Once again, thank you for the interest in and comments you have provided to me and other members of the EVOS Trustee Council staff regarding the appraisal process to be utilized for habitat acquisition projects. I want to assure you that the comments made were carefully reviewed, and many have been reflected in the process that has now been approved.

This process recognizes the right of sellers or their representatives to review and comment on the appraisal prepared under contract to the government before that appraisal is authorized for use in the Council process. In addition, sellers may, at their option and expense, retain their own appraiser. The governments, through the lead negotiating agency, will work with the private appraisers in such manner as the sellers deem appropriate. This is to insure that the private appraisers have the same information concerning the property as do the governments' appraisers, and that they conduct an appraisal that satisfies the Uniform Appraisal Standards for Federal Land Acquisitions (UASFLA) and Uniform Standards of Professional Appraisal Practice (USPAP). Such private appraisals will be reviewed by both governments.

If one of the appraisers has considered appropriate information not considered by the other appraiser, this process will allow the review appraiser to make that information available to the second appraiser for consideration. If the review concludes that there is pertinent information that has been overlooked by USFS appraiser then it would be referred to the contract appraiser for consideration. If the private appraisal conforms to UASFLA and USPAP and best supports the estimate of value for the property or interests to be acquired, the private appraisal will be used for the Trustee Council acquisition process.

A copy of the approved process and a description flow chart are enclosed. Should you have any questions about this process, please don't hesitate to provide them to me by letter. On behalf of the Trustee Council, I look forward to working with you in the future on successful habitat acquisition and protection projects.

Sincerely,

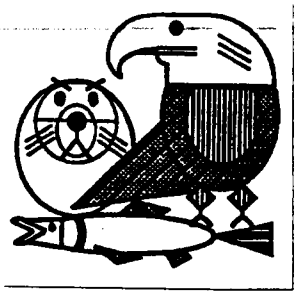
James R. Ayers
Executive Director

JRA/mir

Enclosures

cc: William Bittner
Birch, Horton, Bittner & Cherot

Exxon Valdez Oil Spill Trustee Council
Restoration Office
645 "G" Street, Anchorage, AK 99501
Phone: (907) 278-8012 Fax: (907) 276-7178



June 3, 1994

12 STEP PROCESS FOR APPRAISAL/APPRAISAL REVIEW/APPROVAL

1. Lead Negotiating Agency advises Landowner that with Landowner Consent, the Trustee Council is prepared to authorize an appraisal. The Landowner is advised that it should provide all information it believe's is important in determining the value of its interests. The Lead Negotiating Agency informs the Landowner that it may, at its option and expense, procure its own market value appraisal but that it must comply with USPAP and UASFLA in order to be considered by the governments. It is preferable that any such appraisal be completed and submitted in the same time frame as that of the Trustee Council contract appraisal to provide for concurrent review.

2. Lead Negotiating Agency, through the Executive Director, requests that the Forest Service task the Contract Appraiser to conduct an appraisal of Landowner's interests.

3. The Forest Service issues a task order to the Contract Appraiser identifying the scope of work to be conducted. A copy of the standardized appraisal specifications is attached.

4. The Contract Appraiser and representatives of the Lead Negotiating Agency hold a Pre-Work Conference with representatives of the Landowner. If applicable, the Landowner's Appraiser should attend the conference. Purposes of the conference are to: (1) discuss the conduct of the appraisal; (2) establish target dates for completion of the Contract Appraisal and any Landowner Appraisal; and (3) establish an appropriate procedure for the Landowner to provide to the Contract Appraiser all information it believes is important or relevant to determing the value of its property.

5. A site visit of the subject property by the Contract Appraiser is conducted. Representatives from the Lead Negotiating Agency, the Landowner and Landowner Appraiser are encouraged to attend and provide further pertinent information.

6. The Contract and Landowner Appraisers (if a landowner appraisal is expected to be prepared) submit Draft Appraisal Reports, which the

Forest Service distributes to the Lead Negotiating Agency Review Appraiser and the State and Federal Review Appraisers for review and comment (Landowner Appraisal Report is reviewed by Landowner prior to submission). The Lead Negotiating Agency Review Appraiser and State and Federal Review Appraisers review the draft Appraisals .

7. State and Federal Review Appraisers submit comments to Lead Review Appraiser and Forest Service Contract Officer. The Forest Service then provides comments to the respective Contract and Landowner Appraisers (Landowner is copied with comments regarding the Landowner Appraisal).

8. The Contract and Landowner Appraisers consider review comments received and modify their respective Draft Appraisal Reports where considered appropriate. The Contract and Landowner Appraisers submit final Appraisal Reports to the Forest Service, which then distributes them to the Lead Negotiating Agency Review Appraiser and the State and Federal Review Appraisers. The review appraisers cannot modify the Contract or Landowner Appraisers value determinations, but can request further documentation and clarification as they determine. It is possible that this review process may be repeated.

9. State and Federal Review Appraisers submit comments to the Lead Negotiating Agency Review Appraiser who issues a Review Statement, designating an approved Appraisal or rejecting both Appraisals.

10. The Lead Negotiating Agency submits the Approved Appraisal Report and Review Statement (or the Review Statement for the rejected Appraisal's) to the Landowner for review and the opportunity to comment.

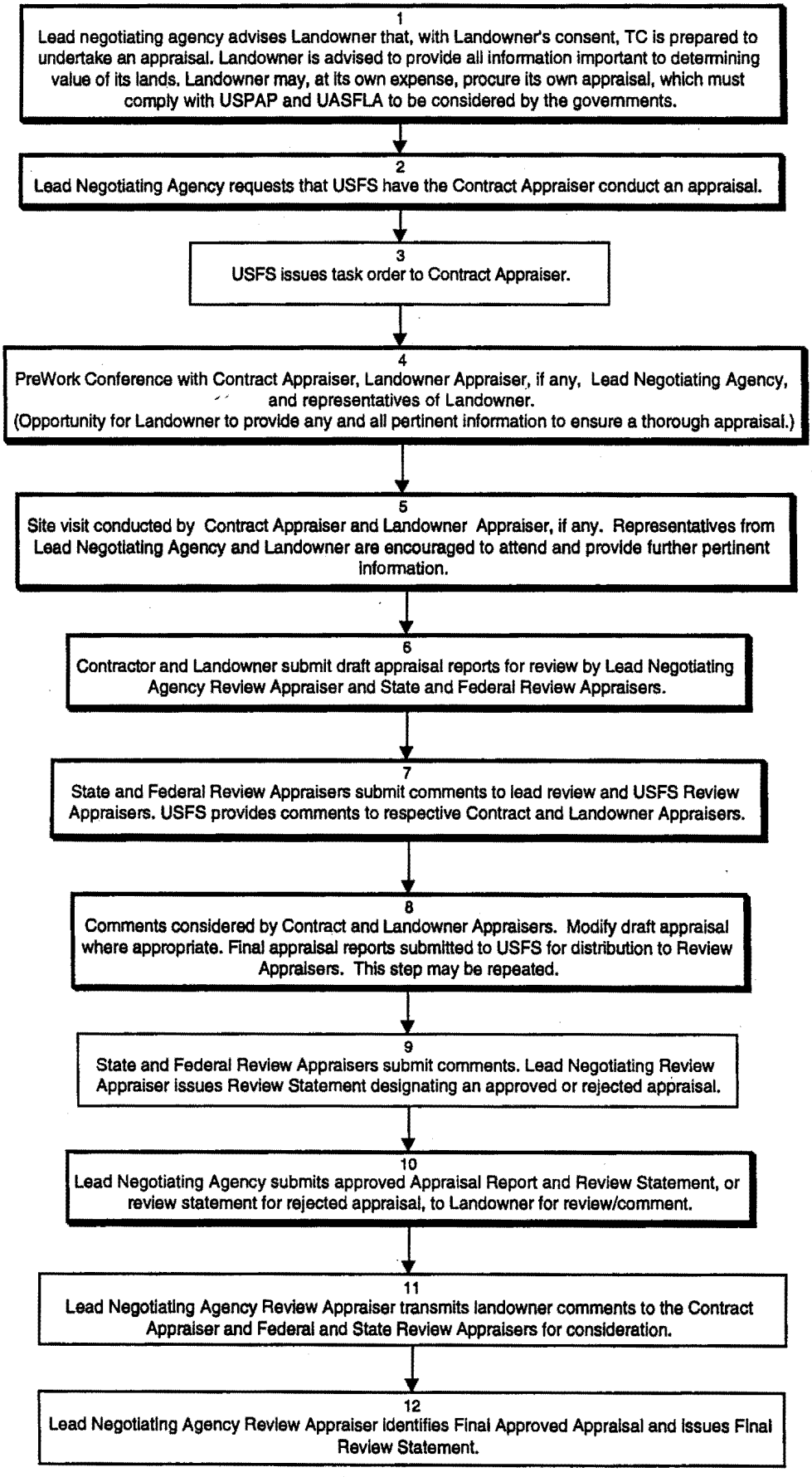
11. Lead Negotiating Agency Review Appraiser receives and transmits Landowner's comments concerning the Approved Appraisal Report and Review Statement to the Appraiser and State and Federal Review Appraisers for consideration.

12 Once all appropriate modifications are made, the Lead Negotiating Agency Review Appraiser specifies the Final Approved Appraisal and issues a Final Review Statement.

Appraisal Process

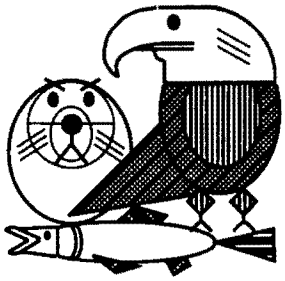
5/18/94

(Shadowed boxes indicate landowner involvement)



Exxon Valdez Oil Spill Trustee Council

Restoration Office
645 G Street, Suite 401, Anchorage, Alaska 99501-3451
Phone: (907) 278-8012 Fax: (907) 276-7178



June 3, 1994

Dr. Ted Cooney
Institute of Marine Science
University of Alaska Fairbanks
Fairbanks, Alaska 99775-1080

Dear Dr. Cooney:

I have recently been advised that you are in the process of preparing your FY95 proposal for restoration funds, to continue research efforts in Prince William Sound (PWS). I want to commend you for your commitment in FY94 and provide some framework for the FY95 work plan process. We are building the work plan for FY95 as you know through the "*Invitation to Submit Project Descriptions for Fiscal Year 1995.*" I want to call your attention to this document.

Specifically, there are a couple of points I want to bring to your attention. First, due to time constraints, the Trustee Council will not take action on the final FY95 work plan until late October. Therefore, Fish and Game will be contacting you regarding first quarter funding needs. The first quarter funding is limited to funds for completing 94 field work and reports, as well as funds to continue those specific projects through the fall that absolutely cannot wait until the complete work plan process is finalized in late October. Ted, we expect this to be minimal.

Secondly, it is important that you note that there is clear guidance in many areas. In particular I look forward to your cooperation in meeting our financial effort to continue a <u>total</u> level of funding for research and monitoring similar to last year. This is imperative if we are to carry out a comprehensive balanced approach throughout the spill area. A rapid expansion of program and a dramatic increase in costs would be irresponsible. I am suggesting that I am willing to support an FY95 level of funding for the PWS Science Center that is <u>similar to the level in FY94</u> less the hatchery project amount. That support of course will depend on the accomplishments of FY94 work, the FY95 proposal itself, and how the project ranks in meeting the overall Trustee Council mission compared to other projects that are being proposed this year. By way of this letter I am asking the Department of Fish and Game to work with you on a review of FY94 expenditures and assist us in the development of FY95 proposals within these guidelines.

Therefore, unless there is some unforeseen circumstance or discovery I do not intend to support dramatic increases (i.e., above $4.25 million).

I hope this is consistent with your understanding and expectations. I look forward to our continuing restoration efforts together.

Sincerely,

James R. Ayers
Executive Director

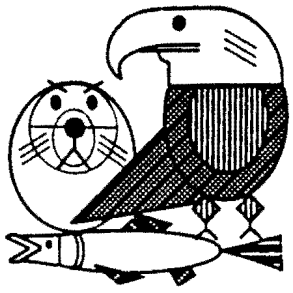
Attachment: "*Invitation to Submit Project Descriptions for Fiscal Year 1995*"

cc: Trustee Council Members
Molly McCammon, Director of Operations, Anchorage
Jerome Montague/Joe Sullivan, ADF&G
Dr. Don Schell, Director, Institute Marine Science, UAF
Dr. Gary Thomas, Director, PWSSC

jra/raw

Exxon Valdez Oil Spill Trustee Council

Restoration Office
645 G Street, Suite 401, Anchorage, Alaska 99501-3451
Phone: (907) 278-8012 Fax: (907) 276-7178



FAX COVER SHEET

To: Bob Spies Number:

From: Molly & Jim Date: 6/7/94

Comments: Total Pages: 3

Here is the Ted Cooney letter.

Document Sent By:

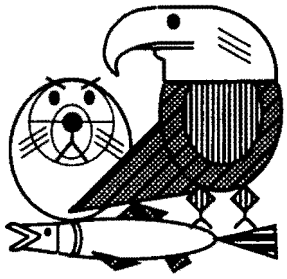
****
*** ACTIVITY REPORT ***
****

TRANSMISSION OK

TX/RX NO.	0174
CONNECTION TEL	5103737834
CONNECTION ID	B.SPIES
START TIME	06/07 11:03
USAGE TIME	01'55
PAGES	3
RESULT	OK

Exxon Valdez Oil Spill Trustee Council

Restoration Office
645 G Street, Suite 401, Anchorage, Alaska 99501-3451
Phone: (907) 278-8012 Fax: (907) 276-7178



FAX COVER SHEET

FAX COMPLETE

To: Dr. Ted Cooney Number: 474-7204

From: James Ayers Date:

Comments: Total Pages: 3

Please deliver to Dr. Cooney. Hard copy to follow via mail.

Post-It™ brand fax transmittal memo 7671 | # of pages ▸ 2

To Trustee Council	From James Ayers
Co.	Co. Executive Director
Dept.	Phone # 278-8012
Fax #	Fax # 276-7178

Document Sent By: Rebecca Williams

****
*** ACTIVITY REPORT ***
****

TRANSMISSION OK

TX/RX NO.	0155
CONNECTION TEL	4747204
CONNECTION ID	SFOS/IMS
START TIME	06/06 15:57
USAGE TIME	01'22
PAGES	3
RESULT	OK

****
*** ACTIVITY REPORT ***
****

TRANSMISSION OK

TX/RX NO.	0156
CONNECTION TEL	4745863
CONNECTION ID	IMS DIRECTOR
START TIME	06/06 16:08
USAGE TIME	01'11
PAGES	2
RESULT	OK

Post-It™ brand fax transmittal memo 7671 | # of pages ▸ 2

To Don Schell	From James Ayers
Co.	Co.
Dept.	Phone # 278-8012
Fax #	Fax # 276-7178

****
*** ACTIVITY REPORT ***
****

TRANSMISSION OK

TX/RX NO.	0157
CONNECTION TEL	4654759
CONNECTION ID	J.MONTAGUE
START TIME	06/06 16:10
USAGE TIME	01'26
PAGES	2
RESULT	OK

Post-It™ brand fax transmittal memo 7671 | # of pages ▸ 2

To Jerome Montague/ Joe Sullivan	From James Ayers
Co.	Co.
Dept.	Phone # 278-8012
Fax #	Fax # 276-7178

****
*** ACTIVITY REPORT ***
****

TRANSMISSION OK

TX/RX NO.	0158
CONNECTION TEL	5223148
CONNECTION ID	J.SULLIVAN
START TIME	06/06 16:12
USAGE TIME	01'25
PAGES	2
RESULT	OK

****
*** ACTIVITY REPORT ***
****

TRANSMISSION OK

TX/RX NO.	0159
CONNECTION TEL	4245820
CONNECTION ID	
START TIME	06/06 16:14
USAGE TIME	01'27
PAGES	2
RESULT	OK

Post-It™ brand fax transmittal memo 7671 | # of pages ▸ 2

To Gary Thomas	From James Ayers
Co.	Co.
Dept.	Phone # 278-8012
Fax #	Fax # 276-7178

****
*** ACTIVITY REPORT ***
****

TRANSMISSION OK

TX/RX NO.	0168
CONNECTION TEL	2714102
CONNECTION ID	D.WILLIAMS
START TIME	06/07 08:38
USAGE TIME	01'02
PAGES	2
RESULT	OK

****
*** ACTIVITY REPORT ***
****

TRANSMISSION OK

TX/RX NO.	0167	
CONNECTION TEL		5867555
CONNECTION ID		
START TIME	06/07 08:36	
USAGE TIME	01'03	
PAGES	2	
RESULT	OK	

****
*** MULTI TRANSACTION REPORT ***
****

TX/RX NO. 0160

INCOMPLETE TX/RX

TRANSACTION OK	[09] 5867589	J.AYERS
	[25] 5867840	M.BARTON
	[26] 4652075	B.BOTELHO
	[27] 2022084684	G.FRAMPTON
	[28] 5867249	S.PENNOYER
	[29] 4652332	C.ROSIER
	[31] 4655070	J.SANDOR
	[36] 2787022	ALEX-CRAIG

ERROR

Exxon Valdez Oil Spill Trustee Council
Restoration Office
645 "G" Street, Anchorage, AK 99501
Phone: (907) 278-8012 Fax: (907) 276-7178

MEMORANDUM

TO: Walt Sheridan, USFS
Alex Swirderski, DOL

FROM: James R. Ayers
Executive Director

DATE: June 3, 1994

RE: Less Than Fee Simple Acquisitions/Public Access

The Trustee Council has directed me to organize a process to establish a policy regarding "less than fee simple" acquisitions with specific attention to the issue of public access and the extent of protection required in commercial timber/conservation easement. I am hereby authorizing you to coordinate that effort. Please be sure to build a schedule that includes:

a. public advisory group review and comment;

b. the participation/comments of the Habitat Work Group;

c. a preliminary review by the Restoration Work Force;

d. participation/comments by affected landowners; and

e. full presentation to the Trustee Council during its next meeting.

As you know our primary responsibility is the restoration of injured resources and services. Acquisitions are to be accomplished with that sole purpose in mind. There may be secondary benefits; however, the primary goal is habitat protection. To that end "less than fee simple" proposals are not the preference of the Trustee Council but may be considered within the framework of satisfying the protection that is necessary for restoration.

It is understood that some of the sellers are reluctant to sacrifice or impair their lands and subsistence rights granted to them under the Alaska Native Claims Settlement Act

(ANCSA) and the Alaska National Interest Lands Conservation Act (ANILCA). Their efforts to maintain their rights while accommodating the need for long term habitat protection should be recognized and respected.

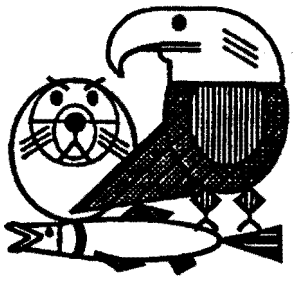
Please advise me no later than Tuesday, June 6, of your plan and schedule.

Thank you!

JRA/mir

cc: Trustee Council Members

Exxon Valdez Oil Spill Trustee Council
Restoration Office
645 "G" Street, Anchorage, AK 99501
Phone: (907) 278-8012 Fax: (907) 276-7178



June 2, 1994

Mr. Craig O. Matkin, Director
North Gulf Oceanic Society
P.O. Box 15244
Homer, AK 99603

Dear Mr. Matkin:

Thank you for your letter. I'm sorry that you were not able to attend the monitoring portion of the workshop last month. In general, I think there was broad appreciation for the workshop and a feeling that the sessions were very constructive. The workshop was the beginning of what I intend will be an on-going "adaptive management" process that will include an annual forum to share information as part of the effort to continually update, revise and refine the research and monitoring program, always trying to take advantage of the most current information available.

I understand that you have already received a copy of the *Invitation to Submit Project Descriptions for Fiscal Year 1995.* As you will note, this document draws heavily from the findings of the April workshop sessions. The project descriptions generated as a result of this invitation will be used to develop a Draft FY 95 Work Plan that will be published in mid-August which will then be subject to formal public review and comment. It is anticipated that the Trustee Council will meet at the end of October to take formal action on the FY 95 work plan.

The Trustee Council has included a policy in the *Draft Restoration Plan* (November 1993) stating that competitive proposals for restoration projects will be encouraged (Policy #6). We are working to implement this policy in several ways. As part of the FY 95 work plan *development* process, we are experimenting with two competitive procurement methods: a federal Broad Agency Announcement (or BBA), and a state, two-stage RFQ/RFP process (see *Invitation to Submit Project Descriptions for Fiscal Year 1995*, Chapter 1). Additionally, we will be trying to implement more project work through competitive RFPs. Again, referring to the *Invitation to Submit Project Descriptions for Fiscal Year 1995*, if a project is proposed for implementation by a specific state or

federal agency, a statement will be required as to why that agency is appropriate to implement the project. The public would have an opportunity to comment on that statement during the September public comment period.

Again, thank you for your participation in the workshop process. I hope that you will contribute your suggestions regarding appropriate restoration projects for the FY 95 work plan.

Sincerely,

James R. Ayers
Executive Director

JRA/mir

cc: Molly McCammon, Director of Operations
Jim Diehl

Exxon Valdez Oil Spill Trustee Council
Restoration Office
645 "G" Street, Anchorage, AK 99501
Phone: (907) 278-8012 Fax: (907) 276-7178

MEMORANDUM

TO: See Distribution

FROM: June Arkoulis-Sinclair
Administrative Officer

DATE: June 2, 1994

RE: Court Request Number Seven

Attached is a signed copy of court request number seven for your files. I spoke with Alex Swiderski and he expects that number six will be filed on June 3, 1994.

Attachment

Distribution
Mark Broderson
Carol Fries
Veronica Gilbert
Dave Gibbons
Jerome Montague
Sandy Rabinowitch

cr7dist.wpd

Exxon Valdez Oil Spill Trustee Council
Restoration Office
645 "G" Street, Anchorage, AK 99501
Phone: (907) 278-8012 Fax: (907) 276-7178

June 2, 1994

Mr. Craig O. Matkin, Director
North Gulf Oceanic Society
P.O. Box 15244
Homer, AK 99603

Dear Mr. Matkin:

Thank you for your letter. I'm sorry that you were not able to attend the monitoring portion of the workshop last month. In general, I think there was broad appreciation for the workshop and a feeling that the sessions were very constructive. The workshop was the beginning of what I intend will be an on-going "adaptive management" process that will include an annual forum to share information as part of the effort to continually update, revise and refine the research and monitoring program, always trying to take advantage of the most current information available.

I understand that you have already received a copy of the *Invitation to Submit Project Descriptions for Fiscal Year 1995.* As you will note, this document draws heavily from the findings of the April workshop sessions. The project descriptions generated as a result of this invitation will be used to develop a Draft FY 95 Work Plan that will be published in mid-August which will then be subject to formal public review and comment. It is anticipated that the Trustee Council will meet at the end of October to take formal action on the FY 95 work plan.

The Trustee Council has included a policy in the *Draft Restoration Plan* (November 1993) stating that competitive proposals for restoration projects will be encouraged (Policy #6). We are working to implement this policy in several ways. As part of the FY 95 work plan *development* process, we are experimenting with two competitive procurement methods: a federal Broad Agency Announcement (or BBA), and a state, two-stage RFQ/RFP process (see *Invitation to Submit Project Descriptions for Fiscal Year 1995*, Chapter 1). Additionally, we will be trying to implement more project work through competitive RFPs. Again, referring to the *Invitation to Submit Project Descriptions for Fiscal Year 1995*, if a project is proposed for implementation by a specific state or

federal agency, a statement will be required as to why that agency is appropriate to implement the project. The public would have an opportunity to comment on that statement during the September public comment period.

Again, thank you for your participation in the workshop process. I hope that you will contribute your suggestions regarding appropriate restoration projects for the FY 95 work plan.

Sincerely,

James R. Ayers
Executive Director

JRA/mir

cc: Molly McCammon, Director of Operations
Jim Diehl

Exxon Valdez Oil Spill Trustee Council
Restoration Office
645 "G" Street, Anchorage, AK 99501
Phone: (907) 278-8012 Fax: (907) 276-7178

MEMORANDUM

TO: See Distribution

FROM: June Arkoulis-Sinclair
Administrative Officer

DATE: June 2, 1994

RE: FFY 95 Budget Instructions

Enclosed are the FFY 95 budget instructions, hardcopy budget forms and diskette with the forms. There are no significant changes from the FFY 94 format. Please note that the project number, title and agency blocks have not been filled in. The FFY95 projects have not been fully identified yet. I will be out of town from June 3 through June 10. During that time Molly will be working with you reviewing the various categories of projects. I will contact you upon my return to the office on June 13.

Enclosures

Distribution
Mark Brodersen
Carol Fries
Dave Gibbons
Veronica Gilbert
Molly McCammon
Jerome Montague
Byron Morris
Sandy Rabinowitch
Joe Sullivan

Instructions for Preparing Detailed Project Budgets Using Excel 4.0

Complete the attached budget forms for the project if funds are being requested from theTrustee Council. Forms should not be altered in any way. Include amounts for each budget category for the next two fiscal years of the project (FFY95 and FFY 96). If it is a multi-agency project, estimate total budget amounts for every subsequent year and list in the comment block. Every project conducted by a single agency requires completion of forms 2A an 2B. If project funding will be allocated among different organizations, then Forms 3A and 3B must be used for each organization's portion of the project funding, the totals for the project are then summed on Form 2A. The personnel block is not filled in on the 2A when it is used as a summary sheet. No 2B form is used for a multi-agency project. An electronic file will be provided for each project. The project number, title, and agency block will already be filled in. The file nomenclature provided for each project must be used. On a separate sheet, note the amount of other funding being supplied or sought, and the source of the other funding.

Budget information should be presented in a format which allows an evaluator to understand the relationship between the project/sub-project and the budget item. No commitment can be made for future budget years so closeout costs cannot be guaranteed. Approval in one budget year is not a commitment to meet any closeout costs.

Rules for Numbers

When providing expenditure and position data, please adhere to the following rules:

1. Expenditure information should be stated in thousands of dollars. Therefore, $1,869,489 should be written as $1,869.5.

2. All expenditure numbers should have a decimal point with one digit to the right of the decimal point. Position information given in FTEs and months should have a decimal point with one digit to the right of the decimal point.

3. When the number "5" is the digit to be rounded, the number should be rounded to the higher rather than the lower amount.

4. Use parenthesis to indicate a negative number: For example, 10.0 minus 15.0 equals (5.0).

Rules for Names

The following standard agency names/abbreviations are to be used:

AK Dept. of Environmental Conservation

AK Dept. of Fish & Game
AK Dept. of Natural Resources
Dept. of Agriculture, Forest Service
Dept. of Interior
Dept. of Interior, Fish & Wildlife Service
Dept. of Interior, National Biological Survey
Dept. of Interior, National Park Service
National Oceanic & Atmospheric Admin

The categories used on the 2A and 3A forms are described below:

1. **Project Description:** Project Description should include enough information to allow differentiation between the project and any similarly named projects.

2. **Personnel:** The relationship of proposed personnel expenditures to the project should be explained using simple terminology. Personnel data should correspond to the full time equivalent numbers for each year. Overtime costs need to be identified.

3. **Travel:** Savings on budgeted travel costs should not result in increased travel but should instead be lapsed. Travel between Anchorage and Juneau should be budgeted at a standardized cost of $450 for air travel plus per diem of $150 for state agencies and $225 for federal agencies. Notwithstanding standardized costs for some travel, detail of every individual trip need not be listed but estimating travel by budgeting a percentage of wages is inadequate. In all cases there should be easily understood evidence of the relationship of the travel to specific parts of the project.

   Please include the cost of two trips to Anchorage and seven days time for the principal investigators. That time will be used for winter workshops to discuss the results of the 1994 field season and make any adjustments for 1995.

4. **Contractual:** Estimated or expected contractor bids should be budgeted rather than off-the-shelf per unit rates. Evidence that estimates were gathered by contacting a few potential contractors could be helpful. There should be easily understood evidence of the relationship between contracted action and specific parts of the project.

   Your budget should include the cost of any needed data analysis or report preparation, even if that cost would be incurred after September 30, 1995. Report writing costs should include the costs of four (4) camera ready copies and thirty-two (32) bound copies of the final report to be provided to the Oil Spill Public Information Center for distribution.

5. **Commodities:** In all cases there should be easily understood evidence of the commodities to the specific parts of the project, i.e. office and lab supplies, postal

expenses, books and publications.

6. **Equipment:** The useful life of capital equipment needs to be projected into the project life by budget year. Documentation of consideration of leasing vs. purchasing of capital equipment, and consideration of using existing agency equipment and being reimbursed for the use vs. purchasing of capital equipment, would be helpful to evaluators. In all cases, numbers of pieces of equipment e.g. outboards X horsepower, computers, computer peripherals, generators X KW, should be given. In all cases there should be easily understood evidence of the relationship of the equipment to specific parts of the project. Equipment previously purchased by the Trustee Council should be utilized to the maximum extent practicable.

7. **Capital Outlay:** There should be easily understood evidence of the relationship of capital outlay to specific parts of the project, e.g., acquisition of land or buildings (real property).

8. **General Administration:** General administrative costs may be incorporated into each budget and can include 15% of each project's direct personnel cost and up to 7% of the first $250,000 of each project's contract costs, plus 2% of project contract costs in excess of $250,000. General administrative costs are intended to cover indirect costs such as office space, office utilities, fixed telephone charges, and all normal agency services for administering procurement, personnel, payroll, accounting, auditing, clerical and so on.

9. **Full Time Equivalents:** One person full time for 12 months equals 1 FTE, one person full time for 6 months equals 0.5 FTE, etc.

10. **1994 Project No.:** If the project was funded in 1994, enter the corresponding 1994 project number in place of the dots. Enter the FFY 1994 authorized funding amounts in this column. Both subtotal and project total will sum automatically.

11. **'94 Report/'95 Interim:** All of these amounts except General Administration will be entered automatically from the detail on the **B** forms and Budget Year Proposed Personnel. General Administration must be calculated and entered.

    '94 report costs are those costs in FFY95 to complete the report for information gathered in 1994 and prior years.

    '95 interim costs are to cover expenditures for the period October 1, 1994 to December 31, 1994 for new or continuing projects.

    If this column contains both '94 report and '95 interim costs, display those costs separately in the comment block.

12. **Remaining Cost:** The funding in this column is to cover expenditures and continuing projects from January 1, 1995 through September 30, 1995. All amounts except general administration are entered automatically.

13. **Total:** All amounts are entered automatically.

14. **FFY 96:** Enter budget amounts for projects to be carried out in FFY 96. Subtotal and Project Total will be calculated automatically.

15. **Comment:** Explain anything that is out of the ordinary. Include estimates of funding for FFY 97 and beyond.

16. **Budget Year Proposed Personnel:** Position titles may not be understood by every evaluator so a description might be helpful in some instances. Start listing position descriptions in column B. Capitalize the first letter of each word. Identify report and interim personnel by putting report or intrm in Column A as appropriate.

17. **NEPA Cost:** Enter the NEPA cost in column l. Do not include NEPA cost in the total. An explanation of NEPA cost in the comment block may be appropriate.

18. **Fiscal Year:** The fiscal year is October 1 through September 30 of the year ending in the designated number (for example, FFY95 starts October 1, 1994 and ends September 30, 1995).

Forms 2A & 2B: These forms are the responsibility of the lead agency and must be used to describe the costs associated with a proposed project to be carried out by one agency. A 2A is used to summarize a multi-agency project. When used as a summary sheet, number entry will be done automatically. A 2B is not used when a 2A is used as a summary sheet.

Form 2A, Project Detail: If the project was funded in FFY94, then show the authorized amounts for 1994 in the first column. Itemize expenses by budget category for the upcoming two years (FFY95 and FFY96). If the project will continue past FFY96, include estimated totals for each subsequent year in the comment block. Identify positions to be funded in FFY95.

Form 2B, Project Detail (Narrative): Provide a brief, but specific narrative explanation of the items included in each budget category for FFY95. Detail should be sufficient to evaluate the expenses. Identify any contracts to be issued and their estimated amounts. Specify what the contract should accomplish in one or two sentences. For instance, do not state $20.0 for sample analysis, rather state $20.0 for 400 blood hydrocarbon samples at $50 each. Provide justification and identify all equipment purchases greater than $500.0. Form 2B is created only if no Form 3's are used.

Start all lines in column B. All continuation lines should start in column C. Identify in column A all report and interim expenses. Remove "rprt" or "intrm" where it is not appropriate. Costs

are summed automatically and entered automatically on the 2A. Blank lines may be added or subtracted with caution. The total number of lines available on the form should not be exceeded if possible. If, for clarity, you need to add lines to the form, identify on the disk or a separate list that you have done so. Modifications will be made by the people compiling the budget to account for the extra lines.

Form 3A and 3B: These forms are required if more than one agency is involved, or if there are distinct sub-projects and are the responsibility of the sub-project agency.

Form 3A, Sub-Project Detail: Brief project description as in 2A, but complete a form for each individual organization receiving funding for this project or for distinct sub-projects.

Form 3B, Sub-Project Detail (Narrative): Similar narrative as in 2B, but complete a form for each individual organization receiving funding for this project or for distinct sub-projects.

EXXON VALDEZ ISTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description:

Budget Category:	1994 Project No. . . . . Authorized FFY 94	'94 Report/ '95 Interim* FFY 95	Remaining Cost** FFY 95	Total FFY 95	FFY 96	Comment
Personnel		$0.0	$0.0	$0.0		
Travel		$0.0	$0.0	$0.0		
Contractual		$0.0	$0.0	$0.0		
Commodities		$0.0	$0.0	$0.0		
Equipment		$0.0	$0.0	$0.0		
Capital Outlay		$0.0	$0.0	$0.0		
Subtotal	$0.0	$0.0	$0.0	$0.0	$0.0	
General Administration		$0.0	$0.0	$0.0	$0.0	
Project Total	$0.0	$0.0	$0.0	$0.0	$0.0	
Full-time Equivalents (FTE)		0.0	0.0	0.0		
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Rept				
Intrm				
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost:	$0.0

*Oct 1, 1994 - Dec 31, 1994
**Jan 1, 1995 - Sep 30, 1995

Project Number:
Project Title:
Agency:

FORM 2A
PROJECT
DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

	Reprt/Intrm	Remaining
Travel:		
Rept		
Intrm		
Travel Total	$0.0	$0.0
Contractual:		
Rept		
Intrm		
Contractual Total	$0.0	$0.0

07/14/93

1995

Printed: 6/2/94 10:21 AM

Project Number:
Project Title:
Agency:

FORM 2A
PROJECT
DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Commodities:	Reprt/Intrm	Remaining
Rept		
Intrm		
Commodities Total	$0.0	$0.0
Equipment:		
Rept		
Intrm		
Equipment Total	$0.0	$0.0

07/14/93

1995

Printed: 6/2/94 10:21 AM

Project Number:
Project Title:
Agency:

FORM 2B
PROJECT
DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1994 - September 30, 1995

Project Description:

Budget Category:	1994 Project No. . . . . Authorized FFY 94	'94 Report/ '95 Interim* FFY 95	Remaining Cost** FFY 95	Total FFY 95	FFY 96	Comment
Personnel	$0.0	$0.0	$0.0	$0.0	$0.0	
Travel	$0.0	$0.0	$0.0	$0.0	$0.0	
Contractual	$0.0	$0.0	$0.0	$0.0	$0.0	
Commodities	$0.0	$0.0	$0.0	$0.0	$0.0	
Equipment	$0.0	$0.0	$0.0	$0.0	$0.0	
Capital Outlay	$0.0	$0.0	$0.0	$0.0	$0.0	
Subtotal	$0.0	$0.0	$0.0	$0.0	$0.0	
General Administration	$0.0	$0.0	$0.0	$0.0	$0.0	
Project Total	$0.0	$0.0	$0.0	$0.0	$0.0	
Full-time Equivalents (FTE)	0.0	0.0	0.0	0.0	0.0	
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
See Individual 3A Forms for Personnel Details				
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost: $0.0

*Oct 1, 1994 - Dec 31, 1994

**Jan 1, 1995 - Sep 30, 1995

Project Number:
Project Title:
Agency:

FORM 2A PROJECT DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1994 - September 30, 1995

Project Description:

Budget Category:	1994 Project No. . . . . Authorized FFY 94	'94 Report/ '95 Interim* FFY 95	Remaining Cost** FFY 95	Total FFY 95	FFY 96	Comment
Personnel		$0.0	$0.0	$0.0		
Travel		$0.0	$0.0	$0.0		
Contractual		$0.0	$0.0	$0.0		
Commodities		$0.0	$0.0	$0.0		
Equipment		$0.0	$0.0	$0.0		
Capital Outlay		$0.0	$0.0	$0.0		
Subtotal	$0.0	$0.0	$0.0	$0.0	$0.0	
General Administration		$0.0	$0.0	$0.0	$0.0	
Project Total	$0.0	$0.0	$0.0	$0.0	$0.0	
Full-time Equivalents (FTE)		0.0	0.0	0.0		
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Rept				
Intrm				
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost: $0.0

*Oct 1, 1994 - Dec 31, 1994

**Jan 1, 1995 - Sep 30, 1995

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3A SUB-PROJECT DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 1994 - September 30, 1995

	Reprt/Intrm	Remaining
Travel:		
Rept		
Intrm		
Travel Total	$0.0	$0.0
Contractual:		
Rept		
Intrm		
Contractual Total	$0.0	$0.0

06/01/94

1995

Printed: 6/2/94 10:22 AM

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3B
SUB-
PROJECT
DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1994 - September 30, 1995

Commodities:	Reprt/Intrm	Remaining
Rept		
Intrm		
Commodities Total	$0.0	$0.0
Equipment:		
Rept		
Intrm		
Equipment Total	$0.0	$0.0

06/01/94

1995

Printed: 6/2/94 10:22 AM

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3B
SUB-
PROJECT
DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1994 - September 30, 1995

Project Description:

Budget Category:	1994 Project No. . . . . Authorized FFY 94	'94 Report/ '95 Interim* FFY 95	Remaining Cost** FFY 95	Total FFY 95	FFY 96	Comment
Personnel		$0.0	$0.0	$0.0		
Travel		$0.0	$0.0	$0.0		
Contractual		$0.0	$0.0	$0.0		
Commodities		$0.0	$0.0	$0.0		
Equipment		$0.0	$0.0	$0.0		
Capital Outlay		$0.0	$0.0	$0.0		
Subtotal	$0.0	$0.0	$0.0	$0.0	$0.0	
General Administration		$0.0	$0.0	$0.0	$0.0	
Project Total	$0.0	$0.0	$0.0	$0.0	$0.0	
Full-time Equivalents (FTE)		0.0	0.0	0.0		
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Rept				
Intrm				
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost:	$0.0

*Oct 1, 1994 - Dec 31, 1994

**Jan 1, 1995 - Sep 30, 1995

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3A SUB-PROJECT DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 1994 - September 30, 1995

	Reprt/Intrm	Remaining
Travel:		
Rept		
Intrm		
Travel Total	$0.0	$0.0
Contractual:		
Rept		
Intrm		
Contractual Total	$0.0	$0.0

06/01/94

1995

Printed: 6/2/94 10:22 AM

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3B
SUB-
PROJECT
DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1994 - September 30, 1995

Commodities:	Reprt/Intrm	Remaining
Rept		
Intrm		
Commodities Total	$0.0	$0.0
Equipment:		
Rept		
Intrm		
Equipment Total	$0.0	$0.0

06/01/94

1995

Printed: 6/2/94 10:22 AM

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3B
SUB-
PROJECT
DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1994 - September 30, 1995

Project Description:

Budget Category:	1994 Project No. . . . . Authorized FFY 94	'94 Report/ '95 Interim* FFY 95	Remaining Cost** FFY 95	Total FFY 95	FFY 96	Comment
Personnel		$0.0	$0.0	$0.0		
Travel		$0.0	$0.0	$0.0		
Contractual		$0.0	$0.0	$0.0		
Commodities		$0.0	$0.0	$0.0		
Equipment		$0.0	$0.0	$0.0		
Capital Outlay		$0.0	$0.0	$0.0		
Subtotal	$0.0	$0.0	$0.0	$0.0	$0.0	
General Administration		$0.0	$0.0	$0.0	$0.0	
Project Total	$0.0	$0.0	$0.0	$0.0	$0.0	
Full-time Equivalents (FTE)		0.0	0.0	0.0		
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Rept				
Intrm				
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost:	$0.0

*Oct 1, 1994 - Dec 31, 1994

**Jan 1, 1995 - Sep 30, 1995

06/01/94

1995

Printed: 6/2/94 10:22 AM

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3A SUB-PROJECT DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 1994 - September 30, 1995

	Reprt/Intrm	Remaining
Travel:		
Rept		
Intrm		
Travel Total	$0.0	$0.0
Contractual:		
Rept		
Intrm		
Contractual Total	$0.0	$0.0

06/01/94

1995

Printed: 6/2/94 10:22 AM

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3B
SUB-
PROJECT
DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1994 - September 30, 1995

Commodities:	Reprt/Intrm	Remaining
Rept		
Intrm		
Commodities Total	$0.0	$0.0

Equipment:		
Rept		
Intrm		
Equipment Total	$0.0	$0.0

06/01/94

1995

Printed: 6/2/94 10:22 AM

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3B
SUB-
PROJECT
DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1994 - September 30, 1995

Project Description:

Budget Category:	1994 Project No. . . . . Authorized FFY 94	'94 Report/ '95 Interim* FFY 95	Remaining Cost** FFY 95	Total FFY 95	FFY 96	Comment
Personnel		$0.0	$0.0	$0.0		
Travel		$0.0	$0.0	$0.0		
Contractual		$0.0	$0.0	$0.0		
Commodities		$0.0	$0.0	$0.0		
Equipment		$0.0	$0.0	$0.0		
Capital Outlay		$0.0	$0.0	$0.0		
Subtotal	$0.0	$0.0	$0.0	$0.0	$0.0	
General Administration		$0.0	$0.0	$0.0	$0.0	
Project Total	$0.0	$0.0	$0.0	$0.0	$0.0	
Full-time Equivalents (FTE)		0.0	0.0	0.0		
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Rept				
Intrm				
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost: $0.0

*Oct 1, 1994 - Dec 31, 1994

**Jan 1, 1995 - Sep 30, 1995

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3A SUB-PROJECT DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 1994 - September 30, 1995

	Reprt/Intrm	Remaining
Travel:		
Rept		
Intrm		
Travel Total	$0.0	$0.0
Contractual:		
Rept		
Intrm		
Contractual Total	$0.0	$0.0

06/01/94

1995

Printed: 6/2/94 10:22 AM

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3B
SUB-
PROJECT
DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1994 - September 30, 1995

Commodities:	Reprt/Intrm	Remaining
Rept		
Intrm		
Commodities Total	$0.0	$0.0
Equipment:		
Rept		
Intrm		
Equipment Total	$0.0	$0.0

06/01/94

1995

Printed: 6/2/94 10:22 AM

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3B
SUB-
PROJECT
DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1994 - September 30, 1995

Project Description:

Budget Category:	1994 Project No. . . . . Authorized FFY 94	'94 Report/ '95 Interim* FFY 95	Remaining Cost** FFY 95	Total FFY 95	FFY 96	Comment
Personnel		$0.0	$0.0	$0.0		
Travel		$0.0	$0.0	$0.0		
Contractual		$0.0	$0.0	$0.0		
Commodities		$0.0	$0.0	$0.0		
Equipment		$0.0	$0.0	$0.0		
Capital Outlay		$0.0	$0.0	$0.0		
Subtotal	$0.0	$0.0	$0.0	$0.0	$0.0	
General Administration		$0.0	$0.0	$0.0	$0.0	
Project Total	$0.0	$0.0	$0.0	$0.0	$0.0	
Full-time Equivalents (FTE)		0.0	0.0	0.0		
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Rept				
Intrm				
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost: $0.0

*Oct 1, 1994 - Dec 31, 1994

**Jan 1, 1995 - Sep 30, 1995

06/01/94

1995

Printed: 6/2/94 10:22 AM

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3A SUB-PROJECT DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1994 - September 30, 1995

	Reprt/Intrm	Remaining
Travel:		
Rept		
Intrm		
Travel Total	$0.0	$0.0
Contractual:		
Rept		
Intrm		
Contractual Total	$0.0	$0.0

06/01/94

1995

Printed: 6/2/94 10:22 AM

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3B
SUB-
PROJECT
DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 1994 - September 30, 1995

Commodities:	Reprt/Intrm	Remaining
Rept		
Intrm		
Commodities Total	$0.0	$0.0
Equipment:		
Rept		
Intrm		
Equipment Total	$0.0	$0.0

06/01/94

1995

Printed: 6/2/94 10:22 AM

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3B
SUB-
PROJECT
DETAIL

1995 EXXON VALDEZ TRUST COUNCIL PROJECT BUDGET
October 1, 1994 - September 30, 1995

Project Description:

Budget Category:	1994 Project No. . . . . Authorized FFY 94	'94 Report/ '95 Interim* FFY 95	Remaining Cost** FFY 95	Total FFY 95	FFY 96	Comment
Personnel	$0.0	$0.0	$0.0	$0.0	$0.0	
Travel	$0.0	$0.0	$0.0	$0.0	$0.0	
Contractual	$0.0	$0.0	$0.0	$0.0	$0.0	
Commodities	$0.0	$0.0	$0.0	$0.0	$0.0	
Equipment	$0.0	$0.0	$0.0	$0.0	$0.0	
Capital Outlay	$0.0	$0.0	$0.0	$0.0	$0.0	
Subtotal	$0.0	$0.0	$0.0	$0.0	$0.0	
General Administration	$0.0	$0.0	$0.0	$0.0	$0.0	
Project Total	$0.0	$0.0	$0.0	$0.0	$0.0	
Full-time Equivalents (FTE)	0.0	0.0	0.0	0.0	0.0	
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
See Individual 3A Forms for Personnel Details				
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost: $0.0

*Oct 1, 1994 - Dec 31, 1994

**Jan 1, 1995 - Sep 30, 1995

Project Number:
Project Title:
Agency:

FORM 2A
PROJECT
DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1994 - September 30, 1995

Project Description:

Budget Category:	1994 Project No. . . . . Authorized FFY 94	'94 Report/ '95 Interim* FFY 95	Remaining Cost** FFY 95	Total FFY 95	FFY 96	Comment
Personnel		$0.0	$0.0	$0.0		
Travel		$0.0	$0.0	$0.0		
Contractual		$0.0	$0.0	$0.0		
Commodities		$0.0	$0.0	$0.0		
Equipment		$0.0	$0.0	$0.0		
Capital Outlay		$0.0	$0.0	$0.0		
Subtotal	$0.0	$0.0	$0.0	$0.0	$0.0	
General Administration		$0.0	$0.0	$0.0	$0.0	
Project Total	$0.0	$0.0	$0.0	$0.0	$0.0	
Full-time Equivalents (FTE)		0.0	0.0	0.0		
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Rept				
Intrm				
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost: $0.0

*Oct 1, 1994 - Dec 31, 1994

**Jan 1, 1995 - Sep 30, 1995

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3A SUB-PROJECT DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1994 - September 30, 1995

	Reprt/Intrm	Remaining
Travel:		
Rept		
Intrm		
Travel Total	$0.0	$0.0
Contractual:		
Rept		
Intrm		
Contractual Total	$0.0	$0.0

06/01/94

1995

Printed: 6/2/94 10:22 AM

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3B
SUB-
PROJECT
DETAIL

1995 EXXON VALDEZ TRUS' COUNCIL PROJECT BUDGET
October 1, 1994 - September 30, 1995

Commodities:	**Reprt/Intrm**	**Remaining**
Rept		
Intrm		
Commodities Total	$0.0	$0.0
Equipment:		
Rept		
Intrm		
Equipment Total	$0.0	$0.0

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3B
SUB-
PROJECT
DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1994 - September 30, 1995

Project Description:

Budget Category:	1994 Project No. . . . . Authorized FFY 94	'94 Report/ '95 Interim* FFY 95	Remaining Cost** FFY 95	Total FFY 95	FFY 96	Comment
Personnel		$0.0	$0.0	$0.0		
Travel		$0.0	$0.0	$0.0		
Contractual		$0.0	$0.0	$0.0		
Commodities		$0.0	$0.0	$0.0		
Equipment		$0.0	$0.0	$0.0		
Capital Outlay		$0.0	$0.0	$0.0		
Subtotal	$0.0	$0.0	$0.0	$0.0	$0.0	
General Administration		$0.0	$0.0	$0.0	$0.0	
Project Total	$0.0	$0.0	$0.0	$0.0	$0.0	
Full-time Equivalents (FTE)		0.0	0.0	0.0		
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Rept				
Intrm				
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost: $0.0

*Oct 1, 1994 - Dec 31, 1994

**Jan 1, 1995 - Sep 30, 1995

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3A SUB-PROJECT DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 1994 - September 30, 1995

Travel:	**Reprt/Intrm**	**Remaining**
Rept		
Intrm		
Travel Total	$0.0	$0.0
Contractual:		
Rept		
Intrm		
Contractual Total	$0.0	$0.0

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3B
SUB-
PROJECT
DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1994 - September 30, 1995

Commodities:	Reprt/Intrm	Remaining
Rept		
Intrm		
Commodities Total	$0.0	$0.0
Equipment:		
Rept		
Intrm		
Equipment Total	$0.0	$0.0

06/01/94

1995

Printed: 6/2/94 10:22 AM

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3B
SUB-
PROJECT
DETAIL

1995 EXXON VALDEZ TRUS' COUNCIL PROJECT BUDGET

October 1, 1994 - September 30, 1995

Project Description:

Budget Category:	1994 Project No. . . . . Authorized FFY 94	'94 Report/ '95 Interim* FFY 95	Remaining Cost** FFY 95	Total FFY 95	FFY 96	Comment
Personnel		$0.0	$0.0	$0.0		
Travel		$0.0	$0.0	$0.0		
Contractual		$0.0	$0.0	$0.0		
Commodities		$0.0	$0.0	$0.0		
Equipment		$0.0	$0.0	$0.0		
Capital Outlay		$0.0	$0.0	$0.0		
Subtotal	$0.0	$0.0	$0.0	$0.0	$0.0	
General Administration		$0.0	$0.0	$0.0	$0.0	
Project Total	$0.0	$0.0	$0.0	$0.0	$0.0	
Full-time Equivalents (FTE)		0.0	0.0	0.0		
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Rept				
Intrm				
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost:	$0.0

*Oct 1, 1994 - Dec 31, 1994

**Jan 1, 1995 - Sep 30, 1995

06/01/94

1995

Printed: 6/2/94 10:22 AM

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3A SUB-PROJECT DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 1994 - September 30, 1995

	Reprt/Intrm	Remaining
Travel:		
Rept		
Intrm		
Travel Total	$0.0	$0.0
Contractual:		
Rept		
Intrm		
Contractual Total	$0.0	$0.0

06/01/94

1995

Printed: 6/2/94 10:22 AM

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3B
SUB-
PROJECT
DETAIL

1995 EXXON VALDEZ TRUST COUNCIL PROJECT BUDGET
October 1, 1994 - September 30, 1995

	Reprt/Intrm	Remaining
Commodities:		
Rept		
Intrm		
Commodities Total	$0.0	$0.0
Equipment:		
Rept		
Intrm		
Equipment Total	$0.0	$0.0

06/01/94

1995

Printed: 6/2/94 10:22 AM

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3B
SUB-
PROJECT
DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 1994 - September 30, 1995

Project Description:

Budget Category:	1994 Project No. . . . . Authorized FFY 94	'94 Report/ '95 Interim* FFY 95	Remaining Cost** FFY 95	Total FFY 95	FFY 96	Comment
Personnel		$0.0	$0.0	$0.0		
Travel		$0.0	$0.0	$0.0		
Contractual		$0.0	$0.0	$0.0		
Commodities		$0.0	$0.0	$0.0		
Equipment		$0.0	$0.0	$0.0		
Capital Outlay		$0.0	$0.0	$0.0		
Subtotal	$0.0	$0.0	$0.0	$0.0	$0.0	
General Administration		$0.0	$0.0	$0.0	$0.0	
Project Total	$0.0	$0.0	$0.0	$0.0	$0.0	
Full-time Equivalents (FTE)		0.0	0.0	0.0		
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Rept				
Intrm				
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost: $0.0

*Oct 1, 1994 - Dec 31, 1994

**Jan 1, 1995 - Sep 30, 1995

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3A SUB-PROJECT DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 1994 - September 30, 1995

Travel:	**Reprt/Intrm**	**Remaining**
Rept		
Intrm		
Travel Total	$0.0	$0.0
Contractual:		
Rept		
Intrm		
Contractual Total	$0.0	$0.0

06/01/94

1995

Printed: 6/2/94 10:22 AM

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3B
SUB-
PROJECT
DETAIL

1995 EXXON VALDEZ TRUST COUNCIL PROJECT BUDGET
October 1, 1994 - September 30, 1995

	Reprt/Intrm	Remaining
Commodities:		
Rept		
Intrm		
Commodities Total	$0.0	$0.0
Equipment:		
Rept		
Intrm		
Equipment Total	$0.0	$0.0

06/01/94

1995

Printed: 6/2/94 10:22 AM

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3B
SUB-
PROJECT
DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1994 - September 30, 1995

Project Description:

Budget Category:	1994 Project No. . . . . Authorized FFY 94	'94 Report/ '95 Interim* FFY 95	Remaining Cost** FFY 95	Total FFY 95	FFY 96	Comment
Personnel	$0.0	$0.0	$0.0	$0.0	$0.0	
Travel	$0.0	$0.0	$0.0	$0.0	$0.0	
Contractual	$0.0	$0.0	$0.0	$0.0	$0.0	
Commodities	$0.0	$0.0	$0.0	$0.0	$0.0	
Equipment	$0.0	$0.0	$0.0	$0.0	$0.0	
Capital Outlay	$0.0	$0.0	$0.0	$0.0	$0.0	
Subtotal	$0.0	$0.0	$0.0	$0.0	$0.0	
General Administration	$0.0	$0.0	$0.0	$0.0	$0.0	
Project Total	$0.0	$0.0	$0.0	$0.0	$0.0	
Full-time Equivalents (FTE)	0.0	0.0	0.0	0.0	0.0	
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
See Individual 3A Forms for Personnel Details				
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost: $0.0

*Oct 1, 1994 - Dec 31, 1994

**Jan 1, 1995 - Sep 30, 1995

Project Number:
Project Title:
Agency:

FORM 2A PROJECT DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1994 - September 30, 1995

Project Description:

Budget Category:	1994 Project No. . . . . Authorized FFY 94	'94 Report/ '95 Interim* FFY 95	Remaining Cost** FFY 95	Total FFY 95	FFY 96	Comment
Personnel		$0.0	$0.0	$0.0		
Travel		$0.0	$0.0	$0.0		
Contractual		$0.0	$0.0	$0.0		
Commodities		$0.0	$0.0	$0.0		
Equipment		$0.0	$0.0	$0.0		
Capital Outlay		$0.0	$0.0	$0.0		
Subtotal	$0.0	$0.0	$0.0	$0.0	$0.0	
General Administration		$0.0	$0.0	$0.0	$0.0	
Project Total	$0.0	$0.0	$0.0	$0.0	$0.0	
Full-time Equivalents (FTE)		0.0	0.0	0.0		
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Rept				
Intrm				
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost:	$0.0

*Oct 1, 1994 - Dec 31, 1994

**Jan 1, 1995 - Sep 30, 1995

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3A
SUB-
PROJECT
DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1994 - September 30, 1995

	Reprt/Intrm	Remaining
Travel:		
Rept		
Intrm		
Travel Total	$0.0	$0.0
Contractual:		
Rept		
Intrm		
Contractual Total	$0.0	$0.0

06/01/94

1995

Printed: 6/2/94 10:22 AM

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3B
SUB-
PROJECT
DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 1994 - September 30, 1995

Commodities:	**Reprt/Intrm**	**Remaining**
Rept		
Intrm		
Commodities Total	$0.0	$0.0
Equipment:		
Rept		
Intrm		
Equipment Total	$0.0	$0.0

06/01/94

1995

Printed: 6/2/94 10:22 AM

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3B
SUB-
PROJECT
DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1994 - September 30, 1995

Project Description:

Budget Category:	1994 Project No. . . . . Authorized FFY 94	'94 Report/ '95 Interim* FFY 95	Remaining Cost** FFY 95	Total FFY 95	FFY 96	Comment
Personnel		$0.0	$0.0	$0.0		
Travel		$0.0	$0.0	$0.0		
Contractual		$0.0	$0.0	$0.0		
Commodities		$0.0	$0.0	$0.0		
Equipment		$0.0	$0.0	$0.0		
Capital Outlay		$0.0	$0.0	$0.0		
Subtotal	$0.0	$0.0	$0.0	$0.0	$0.0	
General Administration		$0.0	$0.0	$0.0	$0.0	
Project Total	$0.0	$0.0	$0.0	$0.0	$0.0	
Full-time Equivalents (FTE)		0.0	0.0	0.0		
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Rept				
Intrm				
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost: $0.0

*Oct 1, 1994 - Dec 31, 1994

**Jan 1, 1995 - Sep 30, 1995

06/01/94

1995

Printed: 6/2/94 10:22 AM

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3A SUB-PROJECT DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 1994 - September 30, 1995

	Reprt/Intrm	Remaining
Travel:		
Rept		
Intrm		
Travel Total	$0.0	$0.0
Contractual:		
Rept		
Intrm		
Contractual Total	$0.0	$0.0

06/01/94

1995

Printed: 6/2/94 10:22 AM

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3B
SUB-
PROJECT
DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1994 - September 30, 1995

Commodities:	Reprt/Intrm	Remaining
Rept		
Intrm		
Commodities Total	$0.0	$0.0
Equipment:		
Rept		
Intrm		
Equipment Total	$0.0	$0.0

06/01/94

1995

Printed: 6/2/94 10:22 AM

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3B
SUB-
PROJECT
DETAIL

1995 EXXON VALDEZ TRUST COUNCIL PROJECT BUDGET
October 1, 1994 - September 30, 1995

Project Description:

Budget Category:	1994 Project No. . . . . Authorized FFY 94	'94 Report/ '95 Interim* FFY 95	Remaining Cost** FFY 95	Total FFY 95	FFY 96	Comment
Personnel		$0.0	$0.0	$0.0		
Travel		$0.0	$0.0	$0.0		
Contractual		$0.0	$0.0	$0.0		
Commodities		$0.0	$0.0	$0.0		
Equipment		$0.0	$0.0	$0.0		
Capital Outlay		$0.0	$0.0	$0.0		
Subtotal	$0.0	$0.0	$0.0	$0.0	$0.0	
General Administration		$0.0	$0.0	$0.0	$0.0	
Project Total	$0.0	$0.0	$0.0	$0.0	$0.0	
Full-time Equivalents (FTE)		0.0	0.0	0.0		
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Rept				
Intrm				
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost: $0.0

*Oct 1, 1994 - Dec 31, 1994

**Jan 1, 1995 - Sep 30, 1995

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3A SUB-PROJECT DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 1994 - September 30, 1995

	Reprt/Intrm	Remaining
Travel:		
Rept		
Intrm		
Travel Total	$0.0	$0.0
Contractual:		
Rept		
Intrm		
Contractual Total	$0.0	$0.0

06/01/94

1995

Printed: 6/2/94 10:22 AM

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3B
SUB-
PROJECT
DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1994 - September 30, 1995

Commodities:	Reprt/Intrm	Remaining
Rept		
Intrm		
Commodities Total	$0.0	$0.0
Equipment:		
Rept		
Intrm		
Equipment Total	$0.0	$0.0

06/01/94

1995

Printed: 6/2/94 10:22 AM

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3B
SUB-
PROJECT
DETAIL

1995 EXXON VALDEZ TRUS. _ COUNCIL PROJECT BUDGET

October 1, 1994 - September 30, 1995

Project Description:

Budget Category:	1994 Project No. . . . . Authorized FFY 94	'94 Report/ '95 Interim* FFY 95	Remaining Cost** FFY 95	Total FFY 95	FFY 96	Comment
Personnel	$0.0	$0.0	$0.0	$0.0	$0.0	
Travel	$0.0	$0.0	$0.0	$0.0	$0.0	
Contractual	$0.0	$0.0	$0.0	$0.0	$0.0	
Commodities	$0.0	$0.0	$0.0	$0.0	$0.0	
Equipment	$0.0	$0.0	$0.0	$0.0	$0.0	
Capital Outlay	$0.0	$0.0	$0.0	$0.0	$0.0	
Subtotal	$0.0	$0.0	$0.0	$0.0	$0.0	
General Administration	$0.0	$0.0	$0.0	$0.0	$0.0	
Project Total	$0.0	$0.0	$0.0	$0.0	$0.0	
Full-time Equivalents (FTE)	0.0	0.0	0.0	0.0	0.0	
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
See Individual 3A Forms for Personnel Details				
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost: $0.0

*Oct 1, 1994 - Dec 31, 1994

**Jan 1, 1995 - Sep 30, 1995

Project Number:
Project Title:
Agency:

FORM 2A PROJECT DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 1994 - September 30, 1995

Project Description:

Budget Category:	1994 Project No. . . . . Authorized FFY 94	'94 Report/ '95 Interim* FFY 95	Remaining Cost** FFY 95	Total FFY 95	FFY 96	Comment
Personnel		$0.0	$0.0	$0.0		
Travel		$0.0	$0.0	$0.0		
Contractual		$0.0	$0.0	$0.0		
Commodities		$0.0	$0.0	$0.0		
Equipment		$0.0	$0.0	$0.0		
Capital Outlay		$0.0	$0.0	$0.0		
Subtotal	$0.0	$0.0	$0.0	$0.0	$0.0	
General Administration		$0.0	$0.0	$0.0	$0.0	
Project Total	$0.0	$0.0	$0.0	$0.0	$0.0	
Full-time Equivalents (FTE)		0.0	0.0	0.0		
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Rept Intrm				
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost:	$0.0

*Oct 1, 1994 - Dec 31, 1994
**Jan 1, 1995 - Sep 30, 1995

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3A SUB-PROJECT DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1994 - September 30, 1995

	Reprt/Intrm	Remaining
Travel:		
Rept		
Intrm		
Travel Total	$0.0	$0.0
Contractual:		
Rept		
Intrm		
Contractual Total	$0.0	$0.0

06/01/94

1995

Printed: 6/2/94 10:22 AM

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3B
SUB-
PROJECT
DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 1994 - September 30, 1995

Commodities:	**Reprt/Intrm**	**Remaining**
Rept		
Intrm		
Commodities Total	$0.0	$0.0
Equipment:		
Rept		
Intrm		
Equipment Total	$0.0	$0.0

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3B
SUB-
PROJECT
DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1994 - September 30, 1995

Project Description:

Budget Category:	1994 Project No. . . . . Authorized FFY 94	'94 Report/ '95 Interim* FFY 95	Remaining Cost** FFY 95	Total FFY 95	FFY 96	Comment
Personnel		$0.0	$0.0	$0.0		
Travel		$0.0	$0.0	$0.0		
Contractual		$0.0	$0.0	$0.0		
Commodities		$0.0	$0.0	$0.0		
Equipment		$0.0	$0.0	$0.0		
Capital Outlay		$0.0	$0.0	$0.0		
Subtotal	$0.0	$0.0	$0.0	$0.0	$0.0	
General Administration		$0.0	$0.0	$0.0	$0.0	
Project Total	$0.0	$0.0	$0.0	$0.0	$0.0	
Full-time Equivalents (FTE)		0.0	0.0	0.0		
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Rept				
Intrm				
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost:	$0.0

*Oct 1, 1994 - Dec 31, 1994

**Jan 1, 1995 - Sep 30, 1995

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3A SUB-PROJECT DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 1994 - September 30, 1995

	Reprt/Intrm	Remaining
Travel:		
Rept		
Intrm		
Travel Total	$0.0	$0.0
Contractual:		
Rept		
Intrm		
Contractual Total	$0.0	$0.0

06/01/94

1995

Printed: 6/2/94 10:22 AM

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3B
SUB-
PROJECT
DETAIL

1995 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1994 - September 30, 1995

Commodities:	Reprt/Intrm	Remaining
Rept		
Intrm		
Commodities Total	$0.0	$0.0
Equipment:		
Rept		
Intrm		
Equipment Total	$0.0	$0.0

06/01/94

1995

Printed: 6/2/94 10:22 AM

Project Number:
Project Title:
Sub-Project:
Agency:

FORM 3B
SUB-
PROJECT
DETAIL

Exxon Valdez Oil Spill Trustee Council
Restoration Office
645 G Street, Suite 401, Anchorage, AK 99501-3451
Phone: (907) 278-8012 Fax: (907) 276-7178

MEMORANDUM

TO: Mark Brodersen/DEC
Byron Morris/NOAA

FROM: Molly McCammon, Director of Operations

DATE: June 2, 1994

SUBJ: Project #94090/Mussel Bed Restoration — Authorization

The purpose of this memorandum is to formally authorize Project #94090/Mussel Bed Restoration consistent with the review and recommendations of the Chief Scientist (see attached).

As you will note, the peer review process highlighted the need to ensure proper public understanding of the mussel bed cleaning effort in order to avoid misunderstanding about "cleaning PWS by polluting it." It is my understanding that a map of the mussel beds selected for cleaning this field season will be available in the near future. This would be essential basic information needed to communicate to the interested public about planned activities. It is also my understanding that Ron Bruyere will put together a rough estimate of the costs of alternative disposal methods for the contaminated sediments.

attachment

cc: Bob Spies (w/o attachment)
Ron Bruyere (w/o attachment)

APPLIED
marine
SCIENCES

May 24, 1994

TO: James Ayers
Executive Director

FROM: Robert B. Spies
Chief Scientist

THRU: Eric Myers

CC: Bruce Wright
National Marine Fisheries Service

RE: Project 94090 ("Mussel Bed Restoration and Monitoring")

Project 94090 ("Mussel Bed Restoration and Monitoring") was delivered to my office on April 11, 1994, with a request to expedite the peer-review process. Comments were received from two peer reviewers by April 29, 1994, and based upon those reviews I requested additional information from the principal investigators (PIs). I received their detailed written response to inquiry on May 5, and a revised DPD was delivered on May 20, 1994. I can now provide you with my recommendation regarding this project, although you should be advised that work has proceeded according to the schedule contained in the original DPD.

Purpose of Study

In many places throughout the oil spill region, mussels exist in very dense beds. These beds tend to be in sites that are exposed to relatively high tidal and wind-driven currents. During clean up operations, these mussel beds were not flushed with hot water because of the damage that would have been done to the mussels. Instead, it was assumed that natural processes in these exposed sites would flush the oil out of the beds. Preliminary surveys in PWS in 1991, followed by formal studies in 1992 and 1993, documented that relatively unweathered oil remained in many of these mussel beds. The oil is in the sediment underlying the mussels, and is also bioaccumulated by the mussels to relatively high concentrations.

Pilot restoration studies using minimally intrusive restoration techniques did not result in significant clean-up of the oiled beds. The purpose of the 1994 project is take more aggressive action to clean several heavily oiled beds by actually removing the contaminated sediment and replacing it with clean sediment from nearby sites. Continued chemical monitoring of the recovery of these sites and untreated (control) sites will also be conducted. This study also has as a minor objective the examination of the biological impact of the persistent oil on the mussels at the contaminated locations.

Relation to Restoration Management Objectives

Mussels are prey for several species injured by the oil spill, including harlequin ducks, sea otters, and black oystercatchers. It has been hypothesized that recovery of these species could be retarded by continued exposure to petroleum hydrocarbons through consumption of oiled mussels. Proving such a hypothesis is extremely difficult. However, many people (including Pete Peterson) believe that oiled mussels are the most likely cause for the documented reproductive problems of

harlequin ducks in western Prince William Sound. Although there is little data to support a linkage between harlequin reproductive damage and oiled mussels, the oil in these sites could be quite toxic, and it is my opinion that these deposits may be causing localized damage. Removing the contaminated sediment from these sites should eliminate these damages. In addition, subsistence use of these beds is impossible until the oil is removed.

Analysis

The monitoring and measurement techniques to be used in this study have been previously reviewed, and the principal investigators have demonstrated their expertise in conducting related studies in the past. The major concern of the peer reviewers related to exactly how the cleaning of the mussel beds was to occur. Although there was very little detail provided in the DPD regarding this subject, in response to my inquiry the PIs provided an exact description of the methods to be used.

The PIs propose to place the oiled sediment that is excavated from the contaminated beds along adjacent beaches just below mean higher high water. At high tide, these sediments and the oil they contain will be mixed into the waters of PWS, exploiting dilution, evaporation, and biodegradation as the method of clean up. It is acknowledged that this will produce significant sheening; the PIs point out that these beds sheen anyway. They state that water quality impacts will be temporary, and "... the alternative of — — transporting to an official disposal site is prohibitively expensive and time consuming." No estimate of disposal costs was presented, and the PIs case would be strengthened by presenting an estimate of the actual costs to transfer the contaminated sediment to a hazardous waste disposal facility.

The PIs also point out that "NOAA and ADEC are aware that this method of dispersal will have public perception ramifications" (revised DPD, p. 5). Both of the reviewers expressed concerns about whether such a disposal method is appropriate. It is my understanding that this technique was used routinely on contaminated beaches during clean up operations, often using heavy equipment to dig up large quantities of sediment and spread it in the intertidal area for dispersal.

Despite the past use of this practice, on an even larger scale, I agree with the PIs that the public perception of this action is important. I could see some people suggesting that the Trustee Council is "cleaning PWS by polluting it." The PIs are aware of the ecologically sensitive periods, proposing to conduct the work after larvae of salmon and herring have left the area, and before returning pink salmon arrive in July.

I am not an expert in hazardous waste regulations, and I note that an environmental assessment of this study has been prepared and a Finding Of No Significant Impact (FONSI) has been secured from NOAA. I am therefore assuming that it has been determined that the proposed method for disposing of the contaminated sediment, which I would assume is a hazardous waste, is legal.

One of the reviewers suggested that an important opportunity for investigating whether these clean up operations accelerate the recovery of injured populations should be considered. The reviewer points out that we may lose valuable information by not having studies of harlequin ducks and other mussel predators integrated with the mussel beds study this year. This is a valid recommendation, but unfortunately at this late stage there is little we can do change the 1994 projects. However, we should carefully consider this issue in related work proposed for 1995.

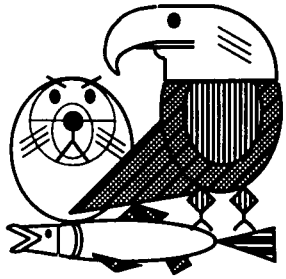
Recommendation

I recommend that the Project 94090 go forward as described in the revised DPD, with the following provision:

1. The PIs should work closely with Trustee Council staff to educate the public regarding the clean-up and disposal operation. The PIs should consider preparing an estimate of the cost of alternate disposal methods.

As you are aware, the analysis that the peer reviewers and I provide Detailed Project Descriptions is focused upon their technical merit. I recommend that each project be given a budgetary review in addition to the technical review provided by my office.

Exxon Valdez Oil Spill Trustee Council
Restoration Office
645 G Street, Suite 402, Anchorage, Alaska 99501
Phone: (907) 278-8012 Fax: (907) 276-7178



MEMORANDUM

TO: Byron Morris/NOAA

FROM: Molly McCammon, Director of Operations

DATE: June 1, 1994

SUBJ: Proj #94285/Subtidal Monitoring: Recovery of Sediments in the Northwestern Gulf of Alaska — Authorization

---

The purpose of this memorandum is to formally authorize Project #94285/Subtidal Monitoring: Recovery of Sediments in the Northwestern Gulf of Alaska consistent with the recommendation of the Chief Scientist (see attached).

cc: Bruce Wright
Jeep Rice
Chuck O'Clair

APPLIED
marine
SCIENCES

May 26, 1994

TO: James Ayers
Executive Director

FROM: Robert B. Spies
Chief Scientist

THRU: Eric Myers

CC: Chuck O'Clair
Jeep Rice
Bruce Wright

RE: Project No. 94285 ("Subtidal monitoring: Recovery of sediments in the northwest Gulf of Alaska")

Project 94285 ("Subtidal monitoring: Recovery of sediments in the northwest Gulf of Alaska") was delivered to my office on March 10 for the peer-review process. Because of my own experience with hydrocarbon analysis of environmental samples I decide to review this myself. If the proposers wish to have further review by an outside reviewer I would be pleased to arrange such a review but it would take additional time.

This purpose of this project is to evaluate the contamination of subtidal sediments on the Kenai coast and the Alaska Peninsula coast by *Exxon Valdez* oil. Previously contamination was evident to depths of only 20 m in these areas.There is also some effort that will be devoted to completing the past work of a similar nature in Prince William Sound (PWS) and to comparing concentrations of oil in subtidal sediments inside and outside the Sound. The last survey of subtidal sediments outside the Sound was carried in 1989 and 1990 and it seems appropriate to return to a few sites in 1994 to determine the course of natural recovery, as well as to compare these results with those obtained in PWS.

The personnel on this project are very experienced with performing hydrocarbon analyses on sediment samples and interpreting the data. I have every confidence that this project will be producing high-quality and scientifically valid products.

I recommend that this project go forward based on its technical merits.

I also recommend that this project be given a budgetary review in addition to the technical review provided by my office.

Exxon Valdez Oil Spill Trustee Council
Restoration Office
645 G Street, Suite 401, Anchorage, AK 99501-3451
Phone: (907) 278-8012 Fax: (907) 276-7178

MEMORANDUM

TO: James R. Ayers, Executive Director

FROM: Molly McCammon, Director of Operations

DATE: June 1, 1994

SUBJ: Sub-project 94320-S/Disease Impacts on PWS Herring Populations — DPD Peer Review

---

The purpose of this memorandum is to update you on sub-project 94320-S/Disease Impacts on Prince William Sound Herring Populations with particular regard for the peer review of the Detailed Project Description (DPD). As you know, on April 27, 1994 the Trustee Council was briefed on the adaptive management process that led to the revision of the scope of work for Project #94320/PWS System Investigation scope of work to address the time-sensitive need for a VHS herring data collection effort. At that meeting, the Trustee Council took formal action to ratify staff action in moving forward with the VHS herring data collection.

Due to the expedited and time-critical nature of the VHS herring data collection work, it has not been possible to subject the DPD for this sub-project to the conventional peer review process (although the report prepared as a result of the data collection effort will be peer reviewed). This sub-project was, however, developed with the assistance of numerous highly qualified technical reviewers and the subject of substantial de facto peer review. In addition to the Chief Scientist, individuals with professional and technical expertise directly involved in the development of this sub-project included Dr. Joe Sullivan/ADF&G (a fish pathologist by training); Evelyn Brown/ADF&G (herring biologist); John Wilcock/ADF&G (herring biologist); Dr. Gary Martin/University of California - Davis (histopathologist); and Dr. Theodore Meyers/ADF&G (fish pathologist). Accordingly, I concur with the Chief Scientist that the peer review of the herring VHS pathology sub-project has been substantial and recommend that it be deemed complete unless you direct otherwise.

cc: Joe Sullivan
Bob Spies

APPLIED
marine
SCIENCES

May 3, 1994

TO: James Ayers
Executive Director

FROM: Robert B. Spies
Chief Scientist

THRU: Molly McCammon
Director of Operations

RE: Peer Review of Project 94320-S

Project 94320-S ("Disease Impacts on Prince William Sound Herring Populations") was recently approved on an emergency basis by the Trustee Council in response to the poor herring returns in 1994. The purpose of this project is to determine the health of the returning herring, particularly with respect to the incidence of viral hemorrhagic septicemia. There is concern that this disease could be a cause of the decline of the herring fishery. This study will examine the incidence of the disease in different age classes and relate disease incidence to the condition of the fish.

Due to the emergency nature of this project, work has already begun and little could be gained by immediate peer review. Consequently, unless you direct otherwise, I will not be providing technical review of the DPD for Project 94320-S. I will peer review the report produced by Dr. Hinton. As histopathological samples are quite stable for many years, if peer reviewers suggest additional lesions to study for inclusion in the final report, those data may be collected at that later time.

2155 Las Positas Court Suite S Livermore, CA 94550 510.373.7142 FAX 510.373.7834

Exxon Valdez Oil Spill Trustee Council

Restoration Office
645 "G" Street, Anchorage, AK 99501
Phone: (907) 278-8012 Fax: (907) 276-7178

MEMORANDUM

TO: Sandy Rabinowitch, DOI

FROM: James R. Ayers
Executive Director

DATE: June 1, 1994

RE: Project #94102 and Taking of Marbled Murrelets

As you are aware, I asked the Chief Scientist to develop a recommendation regarding the proposed collection of marbled murrelets as part of the proposed study design for Project #94102/Marbled Murrelet Prey and Foraging Habitat in PWS. On the basis of our teleconference phone call on May 18 as well as subsequent discussions, the Chief Scientist has recommended that the proposed taking of murrelets be deferred until next year in order to better coordinate and integrate this element of the Project #94102 study with Project #94163, the forage fish research project being conducted by NOAA (see attached).

As you can appreciate, collections have been the source of substantial controversy and while I recognize that there would be value in data obtained as a result of taking murrelets this field season, I concur with the Chief Scientist's assessment that a more integrated and coordinated effort in concert with the forage fish investigations when there is an operable capability to detect forage fish in shallow waters would yield the most valuable results. Accordingly, based on the Chief Scientist's recommendation and observation, it seems most prudent to defer further discussions of this issue until we can address it comprehensively. At such time as there is an operable capability to detect forage fish in shallow waters, I would be willing to entertain further consideration of this issue. It should be noted that if this capability is demonstrated in late FY 94, one of the issues that will have to be addressed is the value of being able to collect data only from the final portion of the field season in 1994.

The commitment and hard work of Fish & Wildlife staff with regard to restoration effort is appreciated. We share the concern for marbled murrelets and believe this is the wisest course.

JRA/mir

Attachment

cc: Catherine Berg
Kathy Kuletz
Karen Oakley
Bob Spies

Exxon Valdez Oil Spill Trustee Council

Restoration Office
645 "G" Street, Anchorage, AK 99501
Phone: (907) 278-8012 Fax: (907) 276-7178

June 1, 1994

Dear Potential Contractor:

The *Exxon Valdez* Oil Spill Trustee Council funds activities each year to restore the resources and services injured by the 1989 *Exxon Valdez* oil spill. The Trustee Council is seeking suggestions for use of the Restoration Fund for federal fiscal year 1995 (October 1, 1994 through September 30, 1995).

Invitation to Submit Project Descriptions. If you would like to suggest projects for 1995, please call and request a copy of the *Invitation to Submit Restoration Projects for Fiscal Year 1995* from the phone number on the letterhead. The *Invitation* explains the format and criteria for submitting projects. You may also call toll free at 1-800-478-7745 (within Alaska) or 1-800-283-7745 (outside Alaska). Project descriptions that we receive before **June 15, 1994** will be evaluated for use in the 1995 restoration program. A Draft 1995 Work Plan will be published for public review during August 1994, and funding decisions are expected to be made in late October.

After the Trustee Council approves funding for 1995 projects in late October, some projects will be implemented by agencies, while others will be implemented using Requests for Proposals or other competitive solicitations. Ideas and project descriptions that you submit in response to the *Invitation to Submit Restoration Projects* may be used in developing Requests for Proposals after October.

Three Competitive Solicitations. In addition to the competitive procurements that will follow Trustee Council approval of 1995 restoration project funding in October, two limited competitive solicitations are being issued at this time to generate restoration project proposals for the Draft 1995 Work Plan. (These are being done on a limited, trial basis to determine the effectiveness of using competitive methods to *develop* project proposals as well as to *implement* them. Two solicitations for 1995 restoration projects, and a Request for Proposals for a 1994 project are described below.)

- **Notice of Broad Agency Announcement.** The National Oceanic and Atmospheric Administration is issuing a Broad Agency Announcement (BAA, FAC 90-4, Part 35) on behalf of the Trustee Council requesting research proposals on factors that may be influencing the recovery from the oil spill of one or more pelagic-feeding marine mammal or seabird species. These species have also been experiencing a long-term decline in the northern Gulf of Alaska and Prince William Sound. As part of investigations into possible food limitations,

the agency is requesting research proposals concerning the energetic values of different prey — effects of diet composition on factors such as reproductive success, juvenile (or chick) survival and adult conditions.

More information, including proposal requirements and evaluation criteria, is available in the Broad Agency Announcement. Interested parties should obtain copies of BAA #52ABNF-4-00104 directly from NOAA:

NOAA, WASC, Procurement Division, WC33
7600 Sand Point Way NE, Bin C15700
Seattle, WA 98115
(206) 526-6262

Questions should be directed to Heide Sickles (206) 526-6033. Proposals under this announcement are due **June 30, 1994**. Successful proposals will be included in the Draft 1995 Work Plan that will be published in mid-August 1994. A decision to approve or disapprove funding is not expected until the end of October 1994.

- **Notice of Expression of Interest.** Unpriced Expressions of Interest are being solicited by the Alaska Department of Fish and Game using a two step sealed proposal process (AS 36.30.265) to investigate the role of disease and other factors in causing interannual mortalities of adult and subadult Pacific herring in Prince William Sound, Alaska, and the cumulative effects of these mortalities on the herring spawning population.

  Interested parties may request a copy of the Expression of Interest Notice from:

  Alaska Department of Fish and Game
  Habitat and Restoration Division
  333 Raspberry Road
  Anchorage, Ak 99518-1599
  Attention: Sheila Westfall (907) 267-2112

  Proposals under this announcement are due **June 30, 1994.** Successful proposals will be included in the Draft 1995 Work Plan that will be published in mid-August 1994. A decision to approve or disapprove funding is not expected until the end of October 1994.

- **Request for Proposals (*1994* Work Plan Project).** Projects generated by the two competitive solicitations noticed above may become part of the *1995* restoration program. A Request for Proposals is currently available to implement a project approved as part of the *1994* program. A "Forage Fish Study in Prince William Sound, Alaska" RFP #52ABNF-4-00092, was advertised in the Commerce Business Daily on May 9, 1994. The RFP closes on **June 8, 1994**. Offerers interested in this project should request copies of the RFP directly from the NOAA procurement office:

  NOAA, WASC, Procurement Division, WC33
  7600 Sand Point Way NE, Bin C15700
  Seattle, WA 98115
  (206) 526-6262

  Funds have already been approved for this project.

If have any additional questions, please call myself or ask for Bob Loeffler, Eric Myers, or Veronica Gilbert of the restoration staff at (907) 278-8012, or toll free at 1-800-478-7745 (within Alaska) or 1-800-283-7745 (outside Alaska). Thank you for your interest.

Sincerely,

Molly McCammon

Molly McCammon
Director of Operations