Exxon Valdez Oil Spill
Restoration Project Final Report

Subsistence Restoration Project

Restoration Project 93017
Final Report

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January 1995

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Restoration Project 93017
Final Report

Study History: Restoration Project 93017 was initiated as part of the 1993 detailed study plan (Subsistence Restoration Project), as a result of data collection by the Alaska Department of Fish and Game, Division of Subsistence, documenting injury to the subsistence resource by the *Exxon Valdez* oil spill.

Abstract: The goal of this project was to restore the confidence of subsistence users in their abilities to determine the safety of their resources. Methods included community meetings, collection and testing of subsistence resource samples, accompanying community representatives on test laboratory tours and informational newsletters to communities. Community participation was maximized in every phase. Hydrocarbon testing occurred on ninety composite samples of edible tissue from shellfish, and blubber and liver samples from harbor seals collected in 1993. The tests on the edible tissue showed aromatic contaminants at low levels so as to be within the test's margin of error. The bile of rockfish, seals and one duck were screened for the presence of metabolites of fluorescent aromatic contaminants. The levels of fluorescent aromatic contaminants in the fish bile was so low, one would not to expect to find elevated concentrations in the edible flesh of the fish. The concentrations of fluorescent aromatic compounds in the harbor seal bile were also very low. The project was partly successful in disseminating the subsistence food safety advice of the Oil Spill Health Task Force and in improving the level of trust in the results of hydrocarbon tests on the resources.

Key Words: Subsistence resources, community participation, hydrocarbon testing, *Exxon Valdez*, Prince William Sound, Kenai Peninsula, Kodiak Archipelago, Alaska Peninsula.

Citation:

Miraglia, R.A. 1995. Subsistence Restoration Project, *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 93017), Alaska Department of Fish and Game, Division of Subsistence, Anchorage, Alaska.

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EXECUTIVE SUMMARY

Subsistence uses of fish and other wildlife constitute a vital natural resource service injured by the *Exxon Valdez* oil spill. This injury has been documented by the Alaska Department of Fish and Game, Division of Subsistence. While there has been some recovery of subsistence harvests and uses, concerns about subsistence food safety and the health of the resource populations persist. The goal of this project was to restore the confidence of subsistence users in their abilities to determine the safety of their resources. The methods used to work towards this goal included community meetings, the collection and testing of samples of subsistence resources, taking community representatives on a tour of the laboratory where the tests are conducted, and informational newsletters to report results back to the communities. An effort was made to maximize community participation in every phase of the project. Hydrocarbon tests were conducted on ninety composite samples of edible tissue from shellfish, and blubber and liver samples from five harbor seals, collected as part of this project in 1993. The tests on the edible tissue showed levels of aromatic contaminants so low as to be within the margin of error for the tests. The bile of thirty-two rockfish, five seals and one duck were screened for the presence of metabolites of fluorescent aromatic contaminants. The levels of fluorescent aromatic contaminants in the fish bile was so low, one would not expect to find elevated concentrations in the edible flesh of the fish. The concentrations of fluorescent aromatic compounds in the bile of the five harbor seals was also found to be very low. Since there was only one bile sample from a duck, little can be said about exposure. The project has been partly successful in disseminating the advice of the Oil Spill Health Task Force with regard to subsistence food safety in the wake of the oil spill, and in improving the level of trust in the results of hydrocarbon tests on the resources. Some progress was also made in beginning a dialog between subsistence users and researchers studying the resources injured by the oil spill.

It is recommended that:

1) hydrocarbon testing be continued into 1994. We were unable to test all the species and locations that were requested in 1993, and subsistence users have asked that testing be continued.

2) the newsletter continue. The newsletter has proven to be a more effective communication tool now that Exxon is no longer involved in editing it. Subsistence users have indicated they find the newsletter helpful and would like to see it continue. One community leader specifically asked that the results of restoration projects be presented in a format which is easy to understand. He used the Subsistence Restoration Project Newsletter as an example of the type of communication he wanted to see.

3) a second tour of the laboratory be undertaken for representatives of the communities that were unable to participate in the first one. A number of the community representatives involved in the tour of the laboratory indicated they were coming away with a better sense of how the tests are done, and now had more trust that there is a sincere attempt on the part of the laboratory to get accurate results.

4) the dialog between subsistence users and researchers be continued and expanded. Subsistence users have consistently asked that the researchers involved in various restoration projects communicate with them directly. They are interested in getting information on project results, and also would like to aid researchers with traditional and other local knowledge.

5) a program be put in place to allow subsistence users to send samples of abnormal resources to be inspected by biologists and pathologists. The oil spill and its aftermath have heightened the awareness of subsistence users of deformities and abnormalities observed in resource species. As some people have become convinced of the safety of eating wild resources, they have shifted their concern to the health of the resources and the viability of the resource populations. Subsistence users frequently ask where they can send samples of abnormal animals they find.

6) another attempt be made to get duck samples from the Chenega Bay area. The single duck sample collected in 1993 was inadequate to allow interpretation of test results.

7) the Trustee Council visit the villages impacted by the oil spill. Subsistence users throughout the oil spill area indicated they thought it was important that the people making the decisions about oil spill restoration visit the places and meet the people affected by their decisions.

INTRODUCTION

Subsistence uses of fish and other wildlife constitute a vital natural resource service that was injured by the *Exxon Valdez* oil spill. Data collected by the Alaska Department of Fish and Game's Division of Subsistence demonstrated this injury (Fall, 1991).

State and federal laws define subsistence as the "customary and traditional" uses of wild resources for food, clothing, fuel, transportation, construction, art, crafts, sharing and customary trade. Harvesting, sharing, and using fish and wildlife are integral to the customs and traditions of a variety of cultural groups. Subsistence uses are also important for Alaska's economy. Many Alaskan communities, including those in the EVOS area, depend upon mixed, subsistence-cash economies, where subsistence production is a major economic sector. The household economies of many families are dependent upon food and raw materials from subsistence activities. State and federal statutes recognize the importance of customary and traditional subsistence uses of wild resources. Subsistence uses are given preference over commercial fishing and recreational fishing and hunting in state and federal law. State and federal laws differ in who qualifies for subsistence uses. Currently, all state residents qualify for subsistence fishing and hunting under state law. Under federal law, rural residents qualify for subsistence fishing and hunting on federal lands in Alaska (Wolfe and Bosworth, 1994).

Within the oil spill area, subsistence harvests are relatively high in diversity. Major resources include seals, sea lions, moose, deer, goats, waterfowl, salmon and other finfish, invertebrates, and plants and berries. Virtually everyone participates in the harvesting and processing of wild resources, especially in the smaller communities. Subsistence harvests make up a large portion of the diet of many families.

Annual per capita subsistence harvests declined dramatically, ranging from a nine percent to a seventy-seven percent decline as compared to pre-spill averages, in ten of the communities in the path of the spill during the first year after the event. Declines also occurred in the breadth of resources used and participation in subsistence activities. In some communities, only limited recovery to pre-spill levels has occurred. Subsistence harvests in seven communities were estimated for 1990, the second post-spill year. Harvests had increased in five of these communities compared to the year after the spill, but the majority of these harvests remained below pre-spill levels. In the other two communities, Chenega Bay and Tatitlek in Prince William Sound, harvest levels showed no signs of recovery and remained about sixty percent or more below those before the spill.

In subsequent years, levels of subsistence harvests, ranges of uses, harvest effort, and the sharing of resources have gradually increased in all of the spill area communities. Generally, subsistence uses rebounded first in communities of the Alaska Peninsula, Kodiak Island and the lower Kenai Peninsula, but lagged behind a year or more in the Prince William Sound villages.

Reasons for increases in subsistence uses after the first spill year are varied and difficult to pinpoint. Some households had renewed confidence in traditional foods after receiving information and health advice from the Oil Spill Health Task Force. Others returned to using subsistence foods despite their misgivings because of economic and cultural reasons. Still others have travelled to unoiled areas, sometimes outside their traditional use areas, to harvest subsistence resources.

Even in 1993, more than four years after the *Exxon Valdez* oil spill, some subsistence users of the spill area were still raising questions and still looking for answers, as they had since the first post-spill year. Although subsistence harvests and use had bounced back to pre-spill levels for most people and communities, a view persisted in the Prince William Sound communities, and to a lesser extent in the other communities in the oil spill impact area, that the natural environment had changed in ways that still posed a potential threat to their health and their way of life.

There are several factors preventing the complete recovery of subsistence harvests and uses to pre-spill levels. Many subsistence users in the oil spill impact area remain concerned over the possible long term health effects of using resources which may have been contaminated by oil. There has been a loss of confidence on the part of subsistence hunters and fishermen in their

own abilities to determine if their traditional foods are safe to eat. Residents of a number of impacted communities have expressed the fear that animals which came into contact with the oil have been altered in some way that can not be seen or detected in laboratory tests. In addition, people have reported the scarcity of some resources, most notably the failure of pink salmon and herring runs in Prince William Sound in 1993, as well as a decline in the population of harbor seals in Prince William Sound since the oil spill. Subsistence users in the spill area have also observed abnormalities in resource species. These include herring, sea lions and chitons with lesions, evidently malnourished ducks, and herring, salmon and clams of abnormally small size. There is a cultural proscription among Alutiq peoples against the harvesting or eating of animals which appear sick or abnormal. All of these factors continue to impede the recovery of subsistence in the oil spill area.

The Oil Spill Health Task Force and Hydrocarbon Testing

In 1989, an unofficial, interagency advisory group, the Oil Spill Health Task Force, was formed to address concerns about subsistence food safety in the wake of the Exxon Valdez oil spill. Members of the Task Force included the Indian Health Service, the Governor's Office, the Department of Fish and Game, the Department of Health and Social Services, the Department of Environmental Conservation, the National Atmospheric and Oceanic Administration, the North Pacific Rim (now known as Chugachmuit), the Kodiak Area Native Association, and Exxon. Samples of subsistence resources were collected from harvest areas used by the impacted communities, and tested for hydrocarbon contamination, under the auspices of the Task Force in 1989, 1990, and 1991.

Interpreting the results of the tests posed a problem. There were no established guidelines for acceptable levels of aromatic hydrocarbons in foods (Oil Spill Health Task Force, 1990). Further, a literature search by members of the Toxicological Expert Committee, a group organized by the Oil Spill Health Task Force, showed a lack of historical information on oil spills and human health (Toxicological Expert Committee, 1990).

The Oil Spill Health Task Force turned to the United States Food and Drug Administration for assistance. In August, 1990, the Food and Drug Administration issued an advisory opinion on the safety of aromatic hydrocarbon residues in subsistence foods contaminated by the *Exxon Valdez* oil spill, put together by an internal group called the Quantitative Risk Assessment Committee. Based on the assumption that the oil contamination would continue to be found at the same levels in seafood from the oil spill impact area for ten years, the

> Quantitative Risk Assessment Committee conclude[d] that the lifetime upperbound risk of consumption is low for unsmoked salmon, other finfish, crustaceans and oil contaminated molluscan bivalves (United States Food and Drug Administration, 1990).

Moreover, the group found that smoked salmon presented a much greater health risk than crude oil contamination.

The FDA advisory was presented at a meeting of the Oil Spill Health Task Force in Anchorage. The report was met with distrust by representatives of the communities impacted by the oil spill. One community representative commented, "You have to remember, this is the same group that approved the Dalkon Shield"[1].

Community representatives did not believe that one could compare smoked fish with fish contaminated by crude oil, and the idea that contaminated fish could be safe and traditionally prepared fish dangerous, was counterintuitive to them, and therefore, not acceptable. This distrust was heightened because the FDA presenter joked and laughed, giving community representatives the

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[1] The Dalkon shield was an inter-uterine birth control device approved for use in the United States by the USFDA. It was later found to cause tears in the uterine wall, leading to serious problems such as infertility and in some cases death. It was removed from the market.

impression he did not take their concerns seriously.

The health advice of the Toxicological Expert Committee, communicated by the Task Force, and also reported in a State of Alaska Epidemiology Bulletin (State of Alaska, 1990), was that most resources tested by the program, including finfish, deer, and ducks had very low to background levels of hydrocarbons and are safe to eat.

Marine mammals were also found to be safe to eat, with the exception of the blubber of heavily oiled seals, which showed elevated levels of hydrocarbons. These heavily oiled seals were only found in Prince William Sound and only in 1989. Tests on blubber from seals harvested in Prince William Sound in 1993, as part of the present project, demonstrated that the blubber is no longer contaminated.

Elevated levels of hydrocarbons were also found in some marine invertebrates collected from oiled beaches. The Task Force advised that using shellfish from such beaches represents an increased health risk. Consequently, the Task Force recommended that subsistence users not harvest marine invertebrates from obviously contaminated beaches. The Task Force recommended long-term monitoring of such beaches, as without it, it would not be possible to advise local communities when this increased risk has declined or ended.

The Subsistence Division and Minerals Management Service Study

Directly related to the concern about subsistence food safety is the loss of confidence on the part of subsistence hunters and fishermen in their own ability to determine whether their traditional foods are safe to eat. The Task Force studies were designed to provide vital information to subsistence harvesters to augment their own ability to judge whether subsistence resources are usable. The evidence, available from preliminary findings of research in oil spill communities jointly funded by the Division of Subsistence, ADF&G, and the U.S. Department of the Interior, Minerals Management Service, suggests that the Task Force efforts to respond to this loss of confidence were incomplete.

For example, the majority of households interviewed in April 1992 in Chenega Bay, and Nanwalek (formerly English Bay), under the joint Subsistence and Minerals Management Service study, reported that they felt they had still not been adequately informed about the safety of using subsistence foods from the oil spill area. In each community, households expressed concerns about the long term heath effects of using some of these resources, especially shellfish. In April 1993, the percentage of households indicating that they had still not adequately been informed was down to roughly thirty-five percent in Nanwalek. However, the majority of respondents in Chenega Bay still felt they had not been adequately informed. The reasons most commonly given by Chenega Bay residents for not feeling they had been adequately informed include: a lack of definitive advice, or conflicting advice; incomplete information or not enough information available; test results which came too slowly or too late; and, a lack of trust in the health advice.

Respondents were also asked whether they felt specific resources from their harvest areas were safe for children to eat. Their answers are summarized in Table 1. When asked about clams, fifty-seven percent of respondents in Chenega Bay said they were not safe. In Nanwalek, thirty-nine percent said they felt clams were not safe to eat, and an additional three percent said they did not know if they were safe. Significant levels of concern with regard to the safety of clams from local harvest areas were also expressed in Port Graham, Ouzinkie, Kodiak City Cordova,and Valdez. In Kenai, Larsen Bay, and Seldovia the majority of respondents who eat clams said they thought clams were safe to eat, but some respondents said they were not sure. A few respondents in each community said they thought clams were not safe. In Chenega Bay, Ouzinkie, Port Graham, Seldovia and Valdez the leading reason given by those who regarded clams as unsafe was the fear of oil pollution. Other reasons given included paralytic shellfish poison, and other forms of pollution.

When asked whether they thought seals from their harvest areas were safe for children to eat, fifty-seven percent of respondents in Chenega Bay said they were not safe. In all the other communities, a majority of those

TABLE 1: RESPONSES TO SELECTED QUESTIONS FROM THE SOCIAL EFFECTS SURVEY PRESENTED BY COMMUNITY, FOR 1992

Total number of respondents in each community

CHENEGA BAY	CORDOVA	NANWALEK	KENAI	KODIAK CITY	LARSEN BAY	OUZINKIE	PORT GRAHAM	SELDOVIA	VALDEZ
21	41	33	37	99	36	52	47	65	100

Are clams from your harvest areas safe for children to eat?

ANSWERS	CHENEGA BAY	CORDOVA	NANWALEK	KENAI	KODIAK CITY	LARSEN BAY	OUZINKIE	PORT GRAHAM	SELDOVIA	VALDEZ
NO RESPONSE	4.8	0.0	3.0	5.4	1.0	0.0	0.0	2.1	0.0	4.0
NOT APPLICABLE	9.5	7.3	6.1	13.5	25.0	2.8	5.8	0.0	10.8	29.0
DO NOT KNOW	0.0	9.8	3.0	5.4	12.0	11.1	1.9	8.5	1.5	11.0
NOT SAFE	57.1	12.2	39.4	5.4	18.0	2.8	26.9	21.3	1.5	14.0
SAFE	28.6	70.5	48.5	70.3	44.0	83.3	65.4	68.1	86.2	42.0

Are seals from your harvest areas safe for children to eat?

ANSWERS	CHENEGA BAY	CORDOVA	NANWALEK	KENAI	KODIAK CITY	LARSEN BAY	OUZINKIE	PORT GRAHAM	SELDOVIA	VALDEZ
NO RESPONSE	4.8	0.0	3.0	0.0	1.0	0.0	0.0	0.0	1.5	0.0
NOT APPLICABLE	23.8	90.2	9.1	97.3	90.0	47.2	32.7	2.1	73.8	97.0
DO NOT KNOW	0.0	2.4	3.0	0.0	1.0	11.1	3.8	17.0	1.5	1.0
NOT SAFE	57.1	2.4	24.2	0.0	1.0	2.8	3.8	10.6	0.0	1.0
SAFE	14.3	4.9	60.6	2.7	7.0	38.9	59.6	70.2	23.1	1.0

Are bidarkies (chitons) from your harvest areas safe for children to eat?

ANSWERS	CHENEGA BAY	CORDOVA	NANWALEK	KENAI	KODIAK CITY	LARSEN BAY	OUZINKIE	PORT GRAHAM	SELDOVIA	VALDEZ
NO RESPONSE	4.8	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
NOT APPLICABLE	38.1	92.7	0.0	97.3	89.0	30.6	15.4	4.3	58.5	95.0
DO NOT KNOW	0.0	2.4	3.0	0.0	1.0	2.8	1.9	12.8	0.0	1.0
NOT SAFE	42.9	0.0	30.3	0.0	3.0	2.8	11.5	6.4	3.1	1.0
SAFE	14.3	4.9	63.6	2.7	7.0	63.9	71.2	76.6	38.5	2.0

Numbers under the three questions represent the percentage of respondents in each community giving the answer indicated.
Not applicable means that household does not use the resource.

respondents who indicated that they eat seal oil or seal meat said they thought seals from their harvest areas were safe. However, twenty-four percent of respondents in Nanwalek, and ten percent of respondents in Port Graham sad they thought seals from their harvest areas were not safe for children to eat. In Cordova, Larsen Bay, and Ouzinkie, there was a small group of respondents who said they did not think seals were safe. Most of the respondents who did not think seals were safe did not cite a specific reason for their concern.

When asked if they thought chitons from their harvest areas were safe for children to eat, forty-two percent of respondents in Chenega Bay said they were not safe. Thirty percent of respondents in Nanwalek said they were not safe. In Kodiak City, Larsen Bay, Ouzinkie, Port Graham, Seldovia, and Valdez, a small minority of the respondents who eat chitons said they did not think their chitons were safe for children to eat. Fear of oil contamination was given as the leading cause for concern about the safety of eating chitons in all of the communities where a continuing concern was indicated.

OBJECTIVES

The overall goal of the project was to work with subsistence users to restore the subsistence uses of fish and wildlife damaged by the Exxon/Valdez Oil Spill. Specific goals are as follows:

1) To answer lingering questions about oil contamination and subsistence food safety, such as,

- Are bottomfish still safe to eat with the increased exposure to hydrocarbons?
- Do seals in Prince William Sound still show high levels of aromatic contaminants in their blubber?
- Do ducks from Prince William Sound show hydrocarbon contamination in their adipose tissue?

2) To monitor selected shellfish harvest areas, as recommended by the Toxicological Expert Committee, to determine whether the health risks associated with using shellfish from oiled beaches have diminished or remained the same.

3) To involve subsistence users in every phase of the food testing program, in hopes of increasing their understanding of and trust in the test results and health advice resulting from the project;

4) To communicate test results and health advice to residents of communities impacted by the oil spill.

5) To integrate information from other restoration projects with that already developed through the Oil Spill Health Task Force studies.

METHODS

In order to achieve the objectives outlined above we adopted a plan to maximize community involvement in every phase of the project. We assessed the level and nature of continued spill related subsistence food safety concerns, as expressed in interviews conducted in communities throughout the spill impact area, under a study jointly conducted by the Division of Subsistence and the U.S. Minerals Management Service. We held both community and regional meetings which served the purpose of; 1) affording an additional opportunity to relate the advice of the Oil Spill Health Task Force with regard to subsistence food safety in the wake of the oil spill, 2) allowing community residents to express any continued concerns, 3) helping us to plan the subsistence food sampling portion of the project, and 4) to report results of tests on the subsistence food samples.

Community leaders and residents were involved in the selection of sites and resources to be tested. The actual collection of samples was coordinated by the Pacific Rim Villages Coalition under a government to government cooperative agreement with the Alaska Department of Fish and Game. The Pacific Rim Villages Coalition is a joint undertaking of the village and regional native corporations of the Chugach region, and is endorsed by the village councils of the region. Local assistants and skiff drivers (where needed) were hired and trained in the collection and handling of the subsistence food samples.

Collection of Subsistence Food Samples

Samples of subsistence foods were collected from representative harvest areas identified as either being persistently oiled, or of especial importance to subsistence users. Site selection was done by the Subsistence Division in consultation with the communities.

Samples were collected in such a way as to avoid contamination. For example, sampling personnel were instructed not to collect any subsurface samples through surface slicks. Organisms to be analyzed for petroleum hydrocarbons had to be freshly killed. Decomposed organisms were not collected.

Each sampling site was carefully defined and described in field notes and sketch maps, to allow the site to be resampled if necessary. At least one member of the sampling team was present at both the June and September sampling events to ensure consistency.

Samples were wrapped in aluminum foil, which had first been cooked at 350 degrees Fahrenheit for one hour to remove any wax or other residue. All other sampling equipment were washed using detergent and rinsed before and after each sample collection. Instruments used for exterior dissection were cleansed before being used for internal dissection. After they were wrapped and labelled, the samples were placed in insulated coolers containing ice packs. All samples from the same station were kept together by placing them in a separate large plastic bag.

Chain of custody and collection forms were used. The beach and water conditions were clearly noted on the collection forms,as were the results of sight and smell tests conducted in the field. These waterproof forms were placed in a zip lock bag with each individual tissue sample, with the species identification and sample location displayed. Whenever samples were split, a separate chain of custody record was prepared for each portion and marked to indicate with whom the samples were split.

Field notes were recorded in Rite-in the-rain note books. Any deviation from the protocol or the study plan were documented in the field notes. The locations of sampling sites were noted on USGS grid maps.

Entries into the field logbooks or field data sheets were initialed and dated by the person making the entry at the time of entry. Each days entries were closed out with a horizontal line, date and initial. Errors in field logbooks or other records were corrected by drawing a single line through the error, entering the correct information, and signing and dating the correction.

At least one field blank and replicate sample were taken at each collection site. A field blank is a sample container (foil and zip lock bag or bile container) opened in the field, closed and stored as if it contained a sample. Chain of custody forms accompanied blanks, and blanks were sent to the laboratory.

Samples were kept cool in the field, and frozen as soon after collection as possible. Once frozen, the samples were kept frozen until extracted or prepared for analysis. Care was taken that the samples remain frozen throughout the shipping process.

Evidence tape was affixed to the shipping container before the samples left the custody of the sampling personnel. The seal was signed and dated before the container was shipped. The original chain of custody record accompanied the shipment; a copy was retained by the sample shipper.

Finfish and Shellfish.--

Fish were always handled with latex gloves. Each fish was brought on board the boat in a manner so as not to contaminate it with any petroleum products such as fuel, plastics, or fuel-soaked material. The fish were then dissected in an appropriately clean container or on aluminum foil.

At least three fish of the same species were sampled from each finfish sampling site. Approximately 0.6 to 1.0 kilograms of edible tissue was excised from each fish. The dissected tissue was then double-wrapped in aluminum foil and placed in a zip lock bag.

The bile of all finfish was collected by drawing it from the gall bladder with a sterile disposable syringe and injecting it into a collection vial. The vial was then placed in a zip lock bag. If the gall bladder was punctured

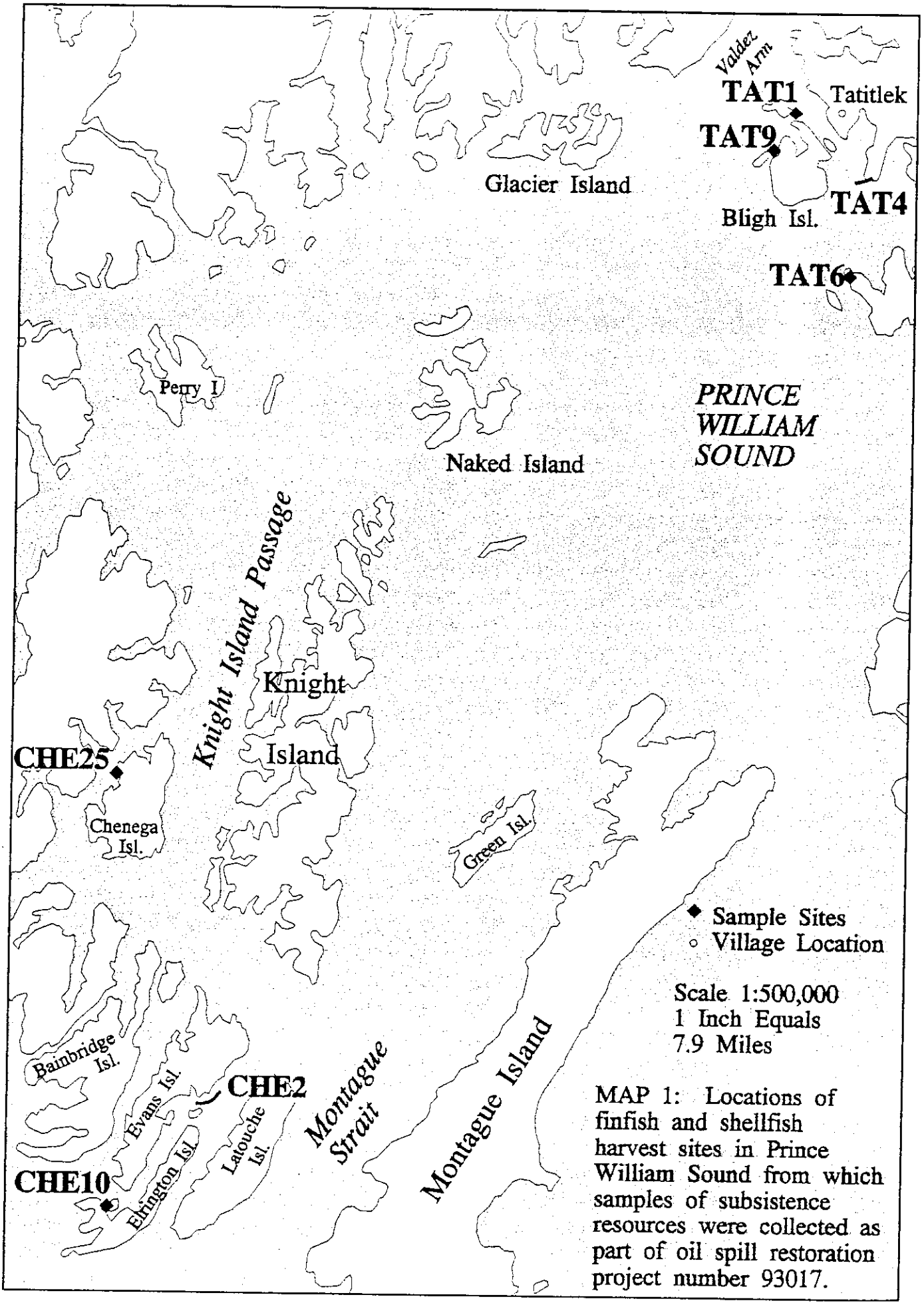
TABLE 2: COLLECTION INFORMATION AND HYDROCARBON TEST RESULTS ON SEAL SAMPLES COLLECTED FROM CHENEGA BAY HARVEST AREAS IN 1993 AS PART OF RESTORATION PROJECT 93017

COLLECTION INFORMATION							TEST RESULTS			
									BILE	
SAMPLE NUMBER	LOCATION	SEX	AGE	LENGTH	GIRTH	DATE	LIVER [1]	BLUBBER [1]	PHN FACs [2]	PROTEIN [3]
93-CHE-SEAL-1	South end of Mummy Island	Female	Adult	61.50	40.00	9/17	3/1	2/5	1,500	10
93-CHE-SEAL-2	South end of Mummy Island	Male	Sub-adult	36.00	27.75	9/17	2/0.7	2/6	490	10
93-CHE-SEAL-3	West side of LaTouche Island	Male	Adult	47.50	31.50	9/18	3/1	5/3	230	23
93-CHE-SEAL-4	Ship Island	Female	Adult	59.00	41.00	9/21	3/0.9	4/3	3,200	35
93-CHE-SEAL-5	Iktua Bay, Evans Island	Male	Adult	51.00	34.25	9/21	3/1	2/2	1,900	15

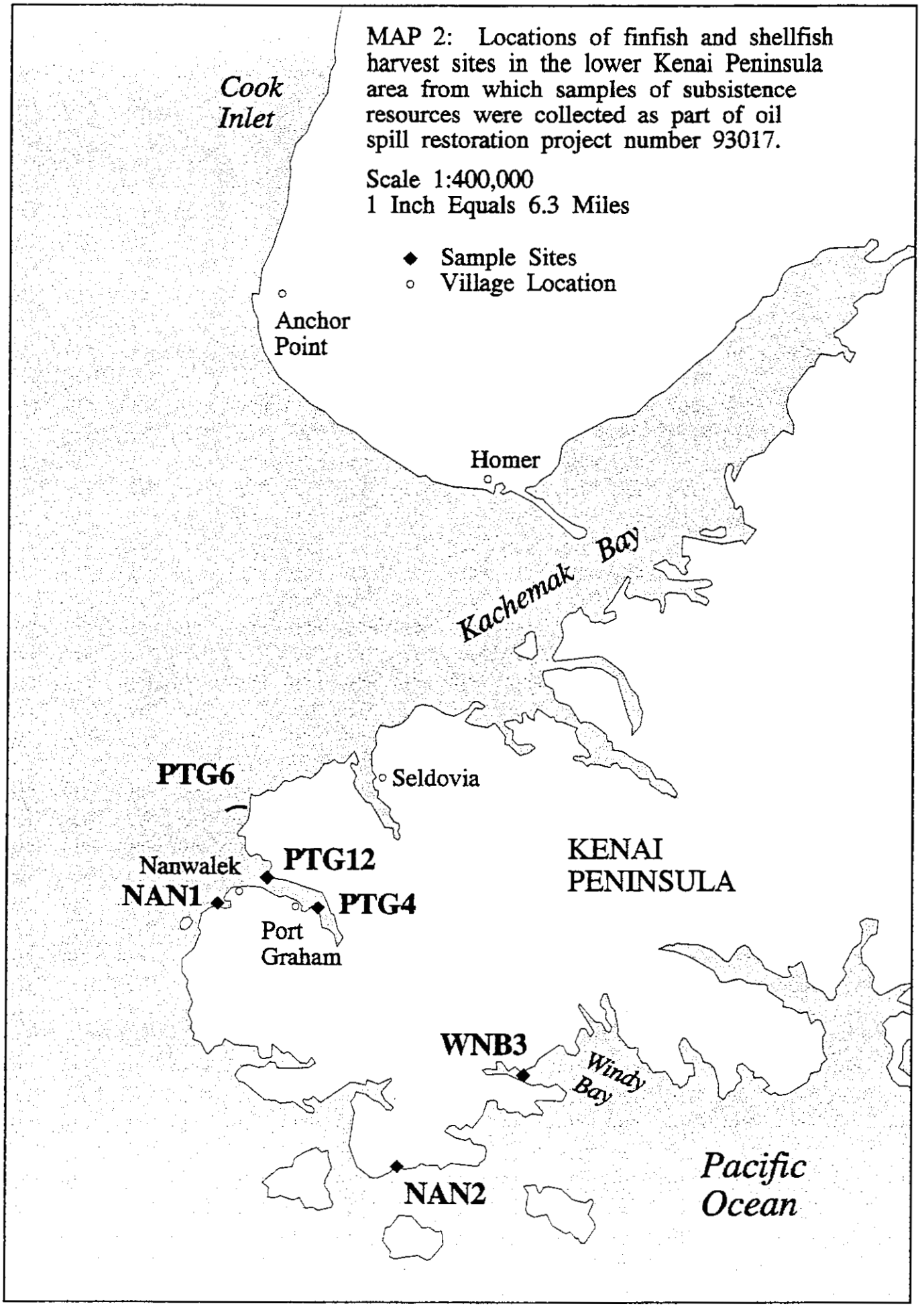
1: Aromatic hydrocarbons reported in total Polycyclic Aromatic Hydrocarbons light/heavy (2 or 3 rings/greater than 3 rings) parts per billion, nanograms per gram, wet weight.

2: These values are reported on the basis of volume of bile. Fluorescence response of bile converted to equivalent response of a phenanthrene (PHN) standard. Reported in nanograms of Phenanthrene per gram of bile.

3: These values are reported on the basis of level of protein in bile. Fluorescence response of bile converted to equivalent response of a phenanthrene standard. Reported in milligrams of phenanthrene equivalents per milliliter of bile.



MAP 1: Locations of finfish and shellfish harvest sites in Prince William Sound from which samples of subsistence resources were collected as part of oil spill restoration project number 93017.


MAP 2: Locations of finfish and shellfish harvest sites in the lower Kenai Peninsula area from which samples of subsistence resources were collected as part of oil spill restoration project number 93017.
Scale 1:400,000
1 Inch Equals 6.3 Miles
Sample Sites
Village Location
Cook Inlet
Anchor Point
Homer
Kachemak Bay
PTG6
Seldovia
Nanwalek
PTG12
NAN1
PTG4
Port Graham
KENAI PENINSULA
WNB3
Windy Bay
NAN2
Pacific Ocean

while the fish was being eviscerated, causing the bile to be lost, this was noted on the chain of custody form.

Invertebrates were collected with clean shovels. Samples from each shellfish site were taken at the same location and tidal elevation on both the June and September sampling trips. The samples were then double wrapped in aluminum foil, in groups of ten to twelve individuals, comprising a composite sample, and placed in a ziplock bag. At least three composite samples were collected from each shellfish sampling site.

Sampling personnel were directed to identify the species of finfish and shellfish as clearly as possible, to allow the species dependent differences in bile metabolites to be ascertained by the laboratory. In cases where they were unsure of the species, field workers were directed to write detailed descriptions of the animal in the field note book, including color, size, and shape.

Ideally, the goal was to sample two shellfish sites in the harvest area of each community. This allowed us to return to at least one previously tested site for trend assessments, while still giving each community the option to add one site not previously tested. Samples were taken of several types of shellfish from each site. However, due to the limited funds available for testing, we generally tested mussels. Of all the indigenous shellfish species, mussels take up contamination the most readily, and take a longer time to get rid of it than other shellfish species. For this reason, mussels can be used as an indicator. If the mussels showed no contamination, we would not expect to find contamination in the other shellfish from the same location. If significant contamination was found in the mussels, we would have samples of other species of shellfish taken from the same beach at the same time, which could then be tested. The goal was to take four samples of each species from each shellfish site during every sampling trip.

Samples of rockfish were also collected from the harvest areas of Chenega Bay, Tatitlek, Port Graham and Nanwalek. Rockfish were tested because no bottomfish had been tested since 1990, and DEC had reported that the oil did not hit the bottom in any appreciable amounts until 1991. Rockfish were selected as a representative bottomfish species, because they are more plentiful and therefore easier to catch than halibut or flounder. Ideally, the sample collection team was expected to sample between six and eight fish of the same species from each sampling location.

It is necessary to test the fish and shellfish at different times of the year, because uptake and accumulation of hydrocarbons is influenced by both ambient temperature, and the animals' reproductive cycle. Ideally, there should have been four rounds of sampling over the course of the year, winter, spring, summer and fall. Unfortunately, due to limited funds and a shortened study period, only two rounds of sampling were conducted, one in the summer, the other in the fall.

The collection of finfish and shellfish samples was coordinated by the Pacific Rim Villages Coalition under a cooperative agreement with the Alaska Department of Fish and Game. A copy of the agreement is attached as Appendix 3. The Pacific Rim Villages Coalition subcontracted with Dames and Moore to provide a biologist to supervise the collection of samples. The Pacific Rim Villages Coalition was also responsible for hiring local assistants and skiff drivers from each community involved in the sampling, and for making travel and lodging arrangements for the biologist. Dames and Moore assigned the task of supervising the collection of the samples to Dave Erikson. Under a Dames and Moore contract with Exxon, Erikson had participated in the collection of subsistence food samples in 1989, 1990 and 1991, working with staff of the Division of Subsistence, the National Oceanic and Atmospheric Administration and the Oil Spill Health Task Force. He was thoroughly familiar with the protocols involved in the collection of samples to be tested for exposure to hydrocarbons. In addition to supervising sample collection, Erikson was also expected to train the local assistants in proper procedures for collection and handling of the samples. He was also required to provide the Division of Subsistence with a final report on the work. This report is attached as Appendix 4.

Generally, the collection of samples went well. One problem encountered was the difficulty of getting to some of the more remote sampling sites during rough weather. Erikson made two attempts to get to Tanner Head on Kodiak

Island, first in July 1993, and again in September 1993, and was unable to get there either time. In September 1993, he was unable to return to Windy Bay on the Kenai Peninsula, the mouth of the Sturgeon River on Kodiak Island or Delenia Island in Prince William Sound. In some of these cases, he might have had better luck using a helicopter, as opposed to relying on a skiff for transportation. However, the fact that Dames and Moore only had one biologist assigned to this project was also part of the problem. Since Erikson had to try to reach all of the sampling sites in all three regions within one or two low tide cycles meant he could not afford to wait out bad weather. It might be more effective to have more than one biologist assigned to the project. This might increase the cost of the collection contract somewhat, but this is not a problem, as we only expended roughly three quarters of the funds available for this part of the project in 1993.

Seals and Ducks.--

Samples of seals and ducks were collected from the subsistence harvest areas of Chenega Bay, as part of the 1993 project. In 1989, some of the very heavily oiled seals sampled from Prince William Sound showed elevated levels of hydrocarbons in their blubber. Since blubber is used as a food by Alutiq people, this was a matter of concern to subsistence users in the region. For this reason, we decided that seals should be tested again. People were also concerned about ducks, both because ducks and other birds have been scarce in western Prince William Sound since the oil spill, and because people in the communities are aware of the finding of impaired reproduction in Harlequin ducks in western Prince William Sound. For this reason, ducks were added to the list of resources to be tested from the Chenega Bay harvest area.

Because seals and ducks are scarce resources, and seals are protected under the marine mammal protection act, it was thought best to take samples from seals and ducks harvested for subsistence, rather than harvesting animals just for testing. The samples came from animals harvested by local subsistence hunters for food, in the company of a technician with the Alaska Department of Fish and Game. Vicki Vanek, a technician with the Division of Subsistence, accompanied Chenega Bay hunters John M. Totemoff and Eddie Levshakoff on subsistence seal hunts in September 1993. Samples were taken of the blubber, liver and bile of five harbor seals, and the skin, muscle and bile of one duck.

The duck sampling presented a special problem. Since we wanted to take samples from animals actually harvested for subsistence use, we chose to have a Fish and Wildlife Technician accompany a subsistence hunter, and take samples from ducks harvested by the hunter, as opposed to obtaining a scientific collection permit and having department staff harvest the animals. Unlike seals, subsistence users can not simply harvest ducks whenever they need them. It was, therefore, important that the Fish and Wildlife Technician be aware of the regulations regarding which ducks could be taken legally to ensure the project remained within legal bounds.

A section of the skin, with attached adipose tissue and muscle, totalling 40 or 50 grams was taken from each duck. Liver and bile samples were also be taken. The entire liver of each duck was collected, double wrapped in aluminum foil and placed in a plastic bag. The bile was collected by puncturing the gall bladder with a sterile disposable scalpel over a collection vial. The same rules used in the collection of bile from finfish and seals, described above, also applied to the collection of bile from ducks. The bile samples were placed in a plastic bag. Field staff were directed to identify the species, age and sex of the duck as clearly as possible. In cases where there was uncertainty as to the species of the duck, field staff were directed to write detailed descriptions of the animal in the field note book.

The protocol used in the collection of these samples is presented as appendix 5, along with Vaneks' notes and the sample collection forms , the chain of custody forms, and an inventory of the seal and duck samples sent to the NMFS laboratory.

Laboratory Tests on Subsistence Food Samples

The tests were conducted at the National Oceanic and Atmospheric

Administration/National Marine Fisheries Service, Northwest Fisheries Science Center, Environmental Conservation Division laboratory, under the direction of Dr. Usha Varanasi and Dr. Sin-Lam Chan. This provided consistency with earlier studies undertaken by the Division of Subsistence and Exxon. In all, hydrocarbon tests were conducted on ninety samples of shellfish, and bile metabolite analysis was done on the bile of thirty-two rockfish, five seals and one duck from the harvest areas of eight communities, including Chenega Bay, Tatitlek, Port Graham, Nanwalek, Larsen Bay, Ouzinkie, Karluk and Port Lions.

Bile Analyses.--

The concentrations of fluorescent aromatic contaminants in bile were determined using a Waters high performance liquid chromatograph equipped with a Perkin-Elmer hydrocarbon-octadecyl silane/polycyclic aromatic hydrocarbon column (0.26 X 25 centimeters), an automatic injector, and Perkin-Elmer model 40 fluorescence (ultra violet-fluorescence) detectors connected in series (Krahn et al. 1986). Thawed bile was injected directly into the high performance liquid chromatograph and eluted through the column using a linear gradient from 100% solvent A (water containing 5 milligrams per liter of acetic acid) to 100% solvent B (methanol) over 15 minutes. The flow rate was 1 milliliter per minute and the column temperature was 50 degrees Celsius. All solvents were degassed with helium. The ultra violet-fluorescence responses were recorded at the wavelength pairs for naphthalene and phenanthrene, prominent constituents of aromatic contaminants in Prudhoe Bay crude oil. The fluorescence of naphthalene metabolites was monitored using excitation and emission wavelength pairs of 260 and 380 nanometers, respectively.

The total integrated area from each detector was then converted to corresponding equivalents of either napthalene or phenanthrene standards that would give the same integrated response. Concentrations of fluorescent aromatic contaminants in bile are reported on the basis of bile weight and biliary protein. The levels of protein in bile samples were determined by the method of Lowry, et al. (1951).

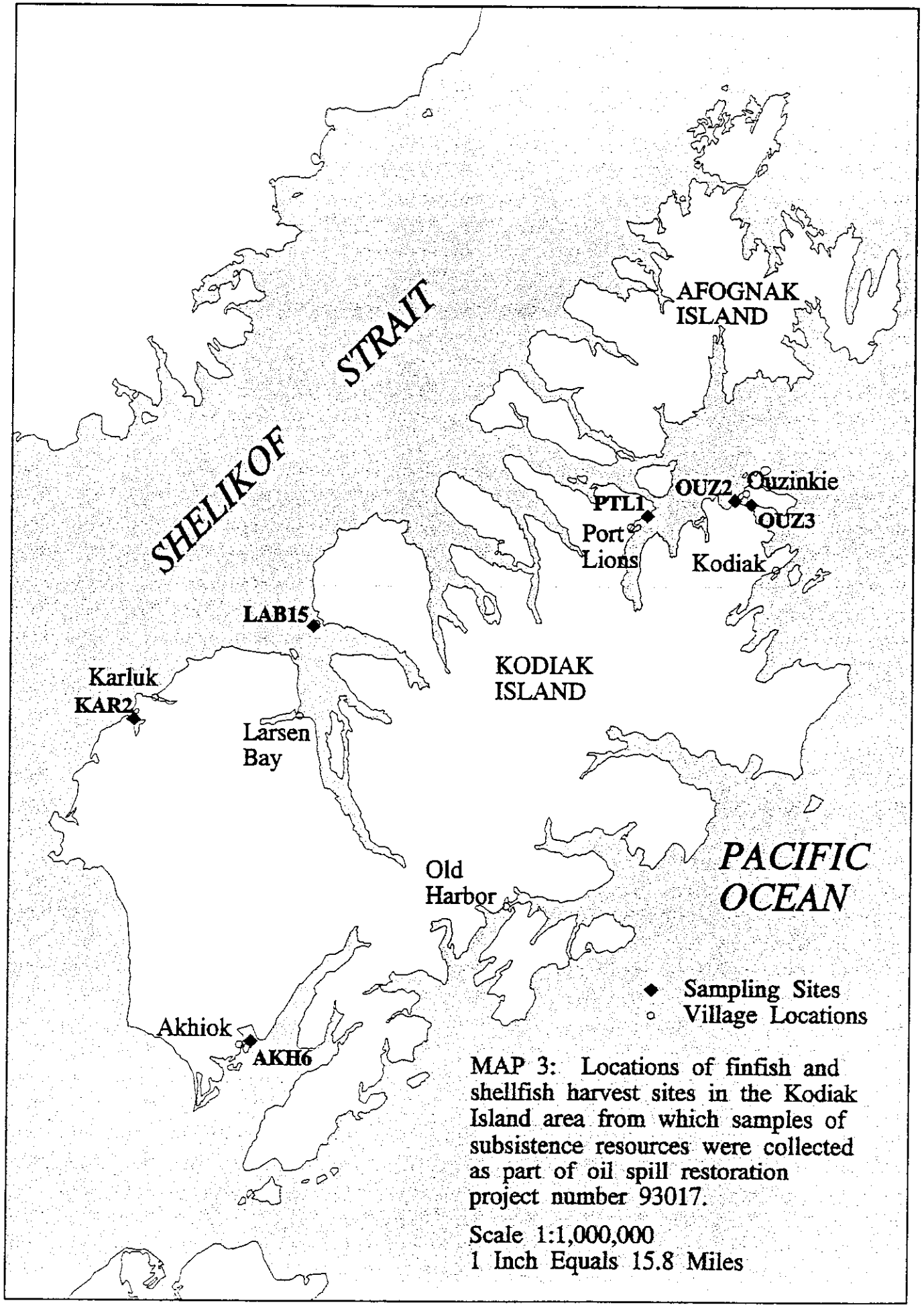
The bile of the fish, seals, and the one duck sampled, were screened for the presence of metabolites of fluorescent aromatic contaminants. With regard to the fish bile, Dr. Varanasi reports:

> The small number of bile samples taken from several species, and the lack of reference samples preclude any rigorous treatment of the data. Based on our experience to date, including the earlier subsistence studies, one would not expect to find elevated concentrations of ACs in fish tissue, and as this is applicable to the summer 1993 fish samples, the tissue samples were therefore not analyzed for aromatic contaminants.

The concentrations of the fluorescent aromatic contaminants in the bile of the five harbor seals were also found to be very low. Dr. Varanasi adds, "Since there was only one bile sample from a duck, little can be said about exposure".

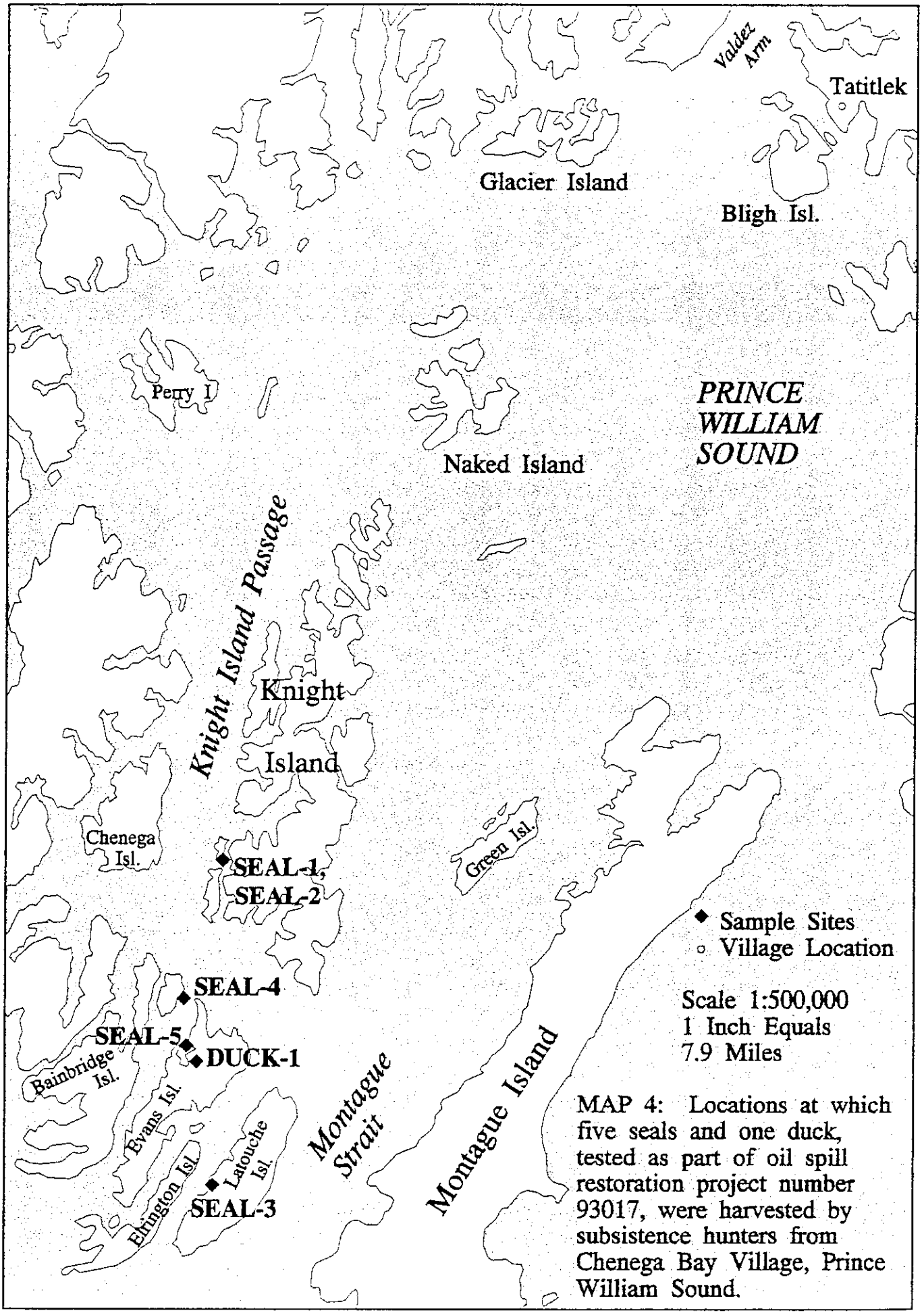
Analyses of Edible Tissue.--

Samples of the edible tissue of mollusks was analyzed for aromatic contaminants using the procedures of Sloan et al. (1993). The analytical protocol consisted of four major steps: 1) extraction; 2) high performance liquid chromatography cleanup; 3) analyte determination by gas chromatography/mass spectrometry; and 4) quality assurance. Generally, ten to thirty mollusks were collected for one representative sample. All samples were received and stored frozen. For analysis, samples were thawed and the edible tissues were removed from the shell and composited. For each species of shellfish tested from a site, three composite samples were analyzed. Each composite sample consisted of 10 to 30 animals. The composited tissue was homogenized. A 5-gram sample of the homogenized tissue was added to a



MAP 3: Locations of finfish and shellfish harvest sites in the Kodiak Island area from which samples of subsistence resources were collected as part of oil spill restoration project number 93017.

Scale 1:1,000,000
1 Inch Equals 15.8 Miles



MAP 4: Locations at which five seals and one duck, tested as part of oil spill restoration project number 93017, were harvested by subsistence hunters from Chenega Bay Village, Prince William Sound.

centrifuge tube containing sodium sulfate and methylene chloride. The method internal standards (surrogate standards) for aromatic contaminants were added, and the mixture was macerated with a Tekmar Tissumizer. The extract was decanted into a centrifuge tube, and the extraction step was repeated one time. The resulting extract was filtered through a column of silica and alumina, and the extract was concentrated to 1 milliliter for cleanup by high performance liquid chromatography.

The extracts were chromatographed using a high performance liquid chromatography method based on size exclusion chromatography with preparatory-size columns containing Phenogel 100-angstrom size-exclusion packing (Phenomenex, Rancho Palos Verdes, California) to obtain an extract fraction that contained the aromatic contaminants separated from the lipids and other interferences (Krahn et al. 1988). Sample extracts were analyzed using capillary-column gas chromatography with mass spectrometry detection (Sloan et al. 1993). An extensive quality assurance program was followed that included analysis of a control material (National Institute of Standards and Technology mussel standard reference material 1974), method blanks and replicate analyses (Sloan et al. 1993).

In general, the tests on the edible tissues showed levels of aromatic contaminants so low as to be within the margin of error for the tests, comparable with levels detected in reference samples collected in 1989 from Yakutat and Angoon, both outside the spill area. According to Dr. Varanasi, "It is important to note that the concentrations of aromatic contaminants in these mollusk and harbor seal samples were very low and did not differ substantially from those found in samples from reference areas, from previous samplings, or from the method blanks. As is common, the method blanks show trace levels (low parts per billion) of unavoidable aromatic contaminants."

The laboratory reported the results of these tests to the Alaska Department of Fish and Game, Division of Subsistence, in six separate reports, these are attached as appendix 6.

An Oil Spill Health Task Force meeting was held in Anchorage, and community representatives were brought in from Prince William Sound, the lower Kenai Peninsula and Kodiak Island to participate. Community representatives were flown to Seattle for a tour of the National Marine Fisheries Center, Environmental Division laboratory, where the subsistence food samples were tested. Two informational newsletters were produced to report the test results and other relevant information to the subsistence users in the area impacted by the oil spill. More detailed information on the community outreach portion of the project is provided below.

RESULTS

Community Meetings and Contacts: May-June 1993

Community leaders throughout the oil spill impact area were contacted to determine whether there were continued concerns about subsistence food safety in relation to the oil spill. Additionally, the Division of Subsistence used the results of a joint study, conducted with the U.S. Minerals Management Service in fifteen communities impacted by the Exxon Valdez oil spill to determine the communities where concern continued to exist, as well as the nature of that concern. Those communities where no concern, or very little concern, was indicated in either the community meetings or the joint Division of Subsistence and Minerals Management Service study would be dropped from the study. Where a significant level of concern was found, we held community meetings in order to identify and map the specific harvest areas and resources of continued concern. The findings from the earlier studies by the Oil Spill Health Task Force were also presented at these meetings.

Based on concerns expressed in the community meetings, and conversations with community leaders and other community residents, decisions were made as to which resources and sites to sample. Since funds were limited, priority was given to sites that were; 1) significantly oiled by the Exxon Valdez spill; 2) constituted important subsistence sites prior to the spill, and; 3) have either been avoided or used less after the spill due to concerns of oil contamination.

A summary of the community meetings and contacts is presented below.

Meetings.--

Unfortunately, the first round of community meetings was held in the late spring and early summer, a time of year when most subsistence users are busy harvesting and processing resources. Because of this, the turnout at the community meetings was not as large as we had hoped. However, informal household visits confirmed that this was due to poor timing rather than a lack of interest on the part of community residents. Another problem that very often occurs when we have a meeting dealing with the oil spill, is that some people end up with the mistaken impression that it is an "Exxon meeting", i.e., a meeting being conducted by Exxon, and stay away for that reason.

PRINCE WILLIAM SOUND

CHENEGA BAY

The Chenega Bay community meeting was held on May 24, 1993, and was attended by Rita Miraglia with the Division of Subsistence, and Una Swain with the Alaska Department of Fish and Game, Division of Habitat and Restoration. Six community residents attended the meeting; two of these were very knowledgeable, active subsistence harvesters.

There were questions about the 1993 herring run in Prince William Sound. Only one-third the expected number of herring returned to Prince William Sound in 1993, and many of the herring that did return had visible lesions. Miraglia explained that the lesions were caused by a fish virus, and are not a threat to human health. Residents said that tiny herring , only about two inches long came into the dock area at Chenega Bay this March. One woman said "They were so thick that you could just put in a dipnet and come up full. The crows were picking them out of the shallow water, that's how close they came". Since the establishment of the Chenega Bay settlement, at Crab Bay on Evans Island in 1984, herring have not been seen there. The herring that came this March were all about the same size, and did not have any sores. One of the men told me "They were just perfect. Nothing wrong with them". "I cooked them up whole and ate them like popcorn," another man said. Miraglia later discussed this with Evelyn Brown, a fisheries biologist with the Alaska Department of Fish and Game, Division of Habitat and Restoration. She was not surprised that these juvenile herring showed no sign of disease for two reasons. First, fish biologists with the Alaska Department of Fish and Game think the disease is latent and the lesions only manifest themselves in the last stages of the disease. Secondly, until they are about three years old, herring stay in a cohort group all of the same age. The fish observed in Chenega Bay were probably spawned in 1992, and may not have been exposed to the infected fish. Some Chenega Bay residents have reported seeing sores on bottomfish, probably cod.

A number of shellfish sampling sites were suggested at the meeting. One man, who did not attend the meeting, wanted us to go back to Port Ashton. Miraglia told him we would most likely not test there, and that people should not consume shellfish from that location. Although some oil did reach there during the spill, the main source of contamination at that site is unrelated to the spill. Creosote on pilings and diesel spilled from a ruptured tank on the hill above the site are two suspected sources of the hydrocarbon contamination found there. The man said he does eat shellfish from that beach. Unfortunately, considering the degree of contamination there, it is one of the few places on the east side of Evans Island where people can find clams large enough to make the trip worthwhile.

Delenia Island in Dangerous Passage, a tiny island just off the northwest shore of Chenega Island was also suggested as a sampling site. The island was an important subsistence shellfish harvest site both before the earthquake and after the establishment of the new settlement at Crab Bay, and was heavily oiled in the 1989 spill. According to the village council president, Larry Evanoff, there was renewed interest in going there to harvest, but in 1993 people were still afraid of contamination there. The same is true of Kake Cove on Chenega Island. Both these sites are more important than they might have been in the recent past because Chenega Island has recently become the site of periodic community picnics by residents of Chenega Bay. The emphasis at these picnics is to eat native foods and participate in traditional activities. While other native foods have been harvested and used at these gatherings, shellfish have been avoided because of uncertainty about their safety.

Whale Bay, just below Claw Peak, and the head of Shelter Bay on Evans Island were also suggested as important clam beaches, which could be tested.

Most of the other shellfish sites mentioned at the meeting were important before the earthquake, but are too far from the present community site to be accessible for most residents. Golden, north of Esther Island in Port Wells was described as an important place for harvesting cockles before the earthquake. People also used to get clams from the Esther Island side of Esther Passage, and the reef at the west end of the passage.

People did not have specific suggestions for locations for bottomfish sampling, but thought it was a good idea to test bottomfish.

At the meeting, Miraglia also discussed plans to take samples from seals and ducks harvested for subsistence. Miraglia was told that hunters were seeing a lot fewer seals along the west side of Knight Island. This is interesting because over the previous two years some Chenega Bay seal hunters had been saying the seals were disappearing, while others were saying they were not sure whether the numbers were declining or the seals were just moving away from the areas immediately adjacent to the village and toward the west side of Knight Island. The hunters present at the meeting also said there used to be a lot of seals at Iktua Rocks at the north end of Evans Island, as well as at Gibbons Anchorage on Green Island and Fox Farm on Elrington. They said they were no longer seeing seals at any of these places.

One of the men at the meeting indicated he might be willing to work with ADF&G to get duck samples.

Although the poor turnout for the meeting was disappointing, this was more likely a result of bad timing than lack of interest. Several key people were out of the village either because of medical emergencies or because they were commercial fishing. Many were presently working full time, and didn't get off work in time for the meeting. A significant amount of input was provided by both those who did attend the meeting, and the people Miraglia and Swain spoke to informally during the day.

Based on the discussion at the meeting, as well as conversations with other community residents, two shellfish sampling sites and two rockfish sampling sites were selected in the areas used by Chenega Bay residents for subsistence. The two shellfish sites were Delenia Island, in Dangerous Passage, northeast of Chenega Island, and Fox Farm, east of North Twin Bay on Elrington Island. The plan was to collect samples of mussels, butterclams, and littleneck clams from these sites. The two rockfish sites were just north of Shelter Bay, on the north end of Evans Island, and east Sawmill Bay, just southeast of Johnson Cove on Evans Island. Additionally, it was decided to take samples of five seal and twenty ducks from the harvest areas of Chenega Bay.

TATITLEK

On June 8, 1993, Jody Seitz, a subsistence resource specialist with the Division of Subsistence, made a presentation on the subsistence restoration project at a meeting of the Tatitlek Village Council. The meeting was attended by two community residents in addition to the members of the village council. Concern in Tatitlek was high because of the observation of lesions on herring returning to the waters in front of the community. The herring were also abnormally small, only thirty percent of the expected number had returned, and they did not spawn in front of the village as they normally do. Biologists had determined that the lesions were caused by a fish virus called Viral Hemorrhagic Septicemia virus (VHS). VHS is discussed in greater detail in the section on the Oil Spill Health Task Force meeting, below.

Another source of renewed concern at Tatitlek was a sea lion harvested near the community, which had external sores. Local marine mammal hunters said they had never seen such sores. Seitz was in Tatitlek when this animal was harvested. She took photographs of the sores. Don Calkins, a marine mammal biologist with the Alaska Department of Fish and Game, reviewed these photographs. He identified the sores as target lesions. In a memorandum to James Fall with the Division of Subsistence dated May 10, 1993, Calkins wrote in part,

> These lesions are very common throughout the sea lion population in Alaska. They appear to be caused by a fungus which attacks the

> hair follicles and radiates out in a circle from the initial infection site, killing hair follicles in the process...I know of no evidence which suggests these lesions, in any quantity may pose a human health threat. Because the lesions are so common, I believe many sea lions which have been consumed in recent years must have had these lesions.

This information was relayed to Tatitlek Village Council President Gary Kompkoff by Seitz.

A number of the sampling sites identified at the meeting were more related to logging operations on Tatitlek Corporation lands than they were to the oil spill. These included Knowles Head at the tanker anchorage, and Two Moon Bay. However, interest was also shown in testing shellfish from Bligh Island and Reef Island.

This meeting occurred late in the process, after the list of sites to be sampled was due in to the sub-contractor. Based on testimony presented at an Oil Spill Health Task Force meeting held in Tatitlek in the summer of 1992, as well as more recent conversations between community residents and Seitz, staff had suggested testing shellfish from North Bligh Island, and southwest Boulder Bay, and rockfish from near Bidarki Point. In the end, North Bligh Island and Reef Island were designated as the shellfish sampling sites, and Bidarki Point was slated to be sampled for bottomfish.

LOWER KENAI PENINSULA

PORT GRAHAM

Rita Miraglia conducted a community meeting in Port Graham on June 2, 1993. The meeting was attended by the traditional village Chief, Elenore McMullen, the Village Administrator, Fran Norman, and two other community residents. Evidently, there was no notice posted for the meeting. This was also a bad time because there was a work crew repairing local housing, as well as a crew with BIA forestry present in the community. Local people were working with both groups. In the main, though, it seemed people just didn't know about the meeting.

Mrs. McMullen said her son recently caught flounder and halibut just outside Port Graham Bay, a little to the south, with "cancers" on them. She described these cancers as external blisters. She also said the herring run was better this year (1993) than it was the year before. She said tomcod showed up for the first time in years. She saw more of everything this year, even hummingbirds. She pointed out areas that people like to use for clams and for seaweed and also the places where tar balls have washed up recently. Miraglia drew the areas indicated on maps. These maps are reproduced as appendix 1.

People are the most concerned with a site called Duncan Slough. It was oiled and tar balls have been seen there recently. It is a favorite clamming site. It is away from the sewer outfall, but right after the spill a boat cleaning station was located nearby. Residents of Port Graham report that people who worked at the boat cleaning station suffered burns from the chemicals used. People are afraid to harvest flounder in that area. Mrs. McMullen said the residents of Port Graham want to know what chemicals were used at the boat cleaning station in 1989, and what the possible effects from these chemicals are.

One community resident told Miraglia he has never had any concerns about contamination from the spill in this area, because it didn't hit here the way it did in Prince William Sound or Windy Bay. He said the depletion of the clam beds and the tomcod is unrelated to the spill. He attributes the problems with shellfish to slime that resulted from fish wastes from the cannery. He said when the cannery was planned they had expected the tides to wash the wastes out of the bay, but that's not what happened. It stayed and caused what he referred to as "a smothering effect" on the shellfish beds. He said that consumption of shellfish by sea otters as well as by community residents also contributed to the decline in shellfish. Although he did see some tar patties floating around right after the spill "that didn't cause me to be worried when I went out to get my bidarkies that year." The opinions expressed by this particular resident were very different from those of any other community resident contacted.

Based on the discussion at the meeting, as well as the conversations Miraglia had with other community residents, a shellfish sampling site and a bottomfish sampling site were selected in the areas used by Port Graham residents for subsistence. The shellfish site was Duncan Slough in Port Graham Bay. Samples of mussels, bidarkis, softshelled clams and snails were to be collected there. The bottomfish site was just outside the mouth of Port Graham Bay, rockfish were to be sampled at this location. This area is also used by residents of Nanwalek to harvest bottomfish, and was to serve as the bottomfish sampling site for both communities.

NANWALEK

Rita Miraglia gave a presentation on the subsistence food testing project for the Nanwalek Village Council on April 1, 1993. Miraglia returned to the community in June, 1993. It was not possible to schedule a community meeting in Nanwalek at that time, because people were too busy. Miraglia informally visited with individual households, asking people what they thought about an oil spill testing project, and what they would like to see tested, and where. Where appropriate, this information was added to the Port Graham maps. These maps are reproduced as appendix 1. The following observations are based on some of the conversations with community residents.

People are worried about deep-sea fish in Nanwalek. Tar balls are still seen floating around in the area.

One couple said they thought the lagoon should be tested, because the local children go swimming there and get sick. They said their children have been coming home with water blisters on their legs. They would like to see goosetongues and bullheads tested from the lagoon.

One man said he wanted to see testing at Elizabeth Island. He said, "During the spill the barnacles there fell off in sheets. This was a seal hunting spot. No one has hunted there since the spill". He added that there was some oil left behind there because of the difficulty of access to the area. He thought Anderson Beach should be tested. "There was oil in puddles there, and it was never properly cleaned", he said. He reported finding a big tarball in Dogfish Bay last year.

Another resident said that clams from Kasitsna Bay have lost their flavor since the oil spill, he wanted to see testing there. He said there is still oil under the beach at Port Chatham, and it was never properly cleaned. He also wanted to see testing at Elizabeth Island and Anderson Beach.

One man wanted to see testing at Russian Point and on the Flat Islands.

A woman also mentioned Anderson Beach as an important place for testing.

Based on these discussions, two shellfish sampling sites and a bottomfish sampling site were selected in the areas used by Nanwalek residents for subsistence. The two shellfish sites were Russian Point, just below the village and Anderson Beach at the south end of the Kenai Peninsula, between Elizabeth and Pearl Islands. Samples of mussels, clams, snails and bidarkis were to be collected at Russian Point. Samples of mussels and clams were to be taken at Anderson Beach.

It was also decided to return to Windy Bay to collect mussel samples. The land surrounding Windy Bay belongs to Port Graham Corporation, and is used for subsistence by residents of both Port Graham and Nanwalek. Windy Bay was heavily oiled in 1989, and in 1989 and 1990 mussels from this site showed the highest levels of contamination of any of the sites sampled as part of the subsistence food testing project. For this reason, Dr. Varanasi and Dr. Chan felt it was important to continue sampling at this site.

Informal Visits.--

ALASKA PENINSULA

In March of 1993, Lisa Scarbrough, a subsistence resource specialist with the Division of Subsistence, visited the Alaska Peninsula communities of Chignik Bay, Chignik Lake, Chignik Lagoon, Perryville and Ivanof Bay to conduct marine mammal harvest surveys. While there, she asked several people if they were still concerned about the safety of eating wild resources in their area as a result of the Exxon Valdez oil spill.

Her impression overall, is that most of the people in these communities no longer fear for the safety of their subsistence foods due to oil contamination as a result of the oil spill. However, many people said they thought the

numbers of clams, salmon, birds and marine mammals were down considerably since the oil spill. Most of them blamed these declines on the effects of oil contamination. Ocean currents carry oil from the north to the southwest past their beaches. Some of this oil ends up on their beaches in the form of tar balls and patties. People in these communities believe that any animals traveling in the path of the oil, or eating the oil die. Many feel that the oil has not been cleaned up, but rather has sunk. They say when storms churn up the water, the oil gets dredged up and deposited on the beaches again.

Concerns about human health in relation to the oil spill were less prevalent in the Alaska Peninsula communities that they were in Prince William Sound, the lower Kenai Peninsula and on Kodiak Island. Given that we had limited funds available, we therefore decided not to test any subsistence resources from the Alaska Peninsula.

The following comments were made to Scarbrough during her March, 1993 community visits.

CHIGNIK LAKE

Before the oil spill, we used to see a lot of seals around Chignik Lake and along the beach. We used to see a lot more ducks too, we don't see them like before. This winter there didn't seem to be as much salmon in the lake as there used to be. However, there are more bears.

CHIGNIK LAGOON

There were tar balls along the beach of the lagoon, last summer. Recently, I saw many dead murres on the beach of the lagoon by the village. I don't know what caused them to die. I haven't seen many seals in the area since the oil spill.

I still don't have a lot of confidence in the clams, birds and salmon. I have seen horrible looking salmon since the spill--Reds and silvers with black sores, some with yellow meat. We caught a lot of these in our nets in the lagoon last summer.

In the last three years, I have harvested salmon with red splotches on them. I never noticed this before with a fish. I have found others with two backbones, and one was puffed out with water. You could still see oil on the beaches along the eastern Pacific Alaska Peninsula last summer. I feel during the stress of the oil spill, many of the pregnant seals aborted their young.

We used to get Eider ducks this time of year, but ever since the oil spill, fewer and fewer birds are here. I only saw a dozen this year. The oil spill hurt the birds the worst in this area. I feel it is safe to eat clams. There are fewer of them though, due to an increase in the number of sea otters.

CHIGNIK BAY

I worked on the clean-up in Kodiak, chartered my boat. The spill came here too. Mousse balls and sheen came here, but I was never concerned about getting any shellfish or anything here, but if I lived in Kodiak, I would be asking more questions. I also worked on test fishery here in Chignik in 1989 summer. In 1989 we would make sets and test all the fish for oil. We never found any oiled fish. We spotted sheen.

PERRYVILLE

While Scarbrough was in Perryville, in March of 1993, there were tarballs and dead murres washing up on the beach in front of the community. Many residents of Perryville were very concerned about the oil, and most thought it was oil from the *Exxon Valdez* oil spill. They were afraid to harvest shellfish from the local beaches. They wondered if the murres had died from

oil ingestion.

Some community residents took Scarbrough out to the beach. She saw oil in the form of tarballs and patties, averaging one to three inches in diameter, spaced every twenty feet or so along the beach.

Scarbrough collected one dead murre, and some tar balls. She turned the murre over to Vivian Mendenhall, a biologist with the U.S. Fish and Wildlife Service in Anchorage. The USFWS determined that the murre had died from starvation. According to Mendenhall, this might be indirectly related to the oil spill, as the oil may have depleted the food murres eat.

The tarballs were collected at the request of Dennis Lundine with the Alaska Department of Environmental Conservation in Anchorage. Scarbrough gave some of the tarballs to ADEC and some to Richard Jameson, the attorney for the village of Perryville. When we called ADEC to get the results of the tests on the tarballs, Lundine said Perryville would have to pay for the tests. Mark Kuwada with ADF&G, Division of Habitat and Restoration, spoke to ADEC's Bruce Erikson in Juneau in mid-June 1993, regarding the testing of the tarballs from Perryville. Erikson told Kuwada that ADEC would send Mark Broderson to Perryville to collect more samples. Evidently, ADEC staff were concerned because Scarbrough had not filled out ADEC's standard chain of custody forms for the samples, though she did send ADEC her field notes indicating how the samples had been collected and handled. Scarbrough contacted Broderson on April 20, 1994. Broderson said he was aware of the tarballs coming up on the beaches near Perryville, but had been unsuccessful in working with the villages to organize a trip to collect samples. He was unaware of the samples collected by Scarbrough, but added that ADEC would not want to test those tarballs now because of the age of the samples. He said ADEC is still willing to collect and test tarballs from Perryville, if they get the chance. As of April 1994, tarballs continue to wash up on the beach in front of Perryville, according to some residents of Perryville and Ivanof Bay.

The following are comments made to Scarbrough during her March 1993 visit to Perryville.

> Tar balls are coming in more and more near the village. I haven't seen any near the river. We've been finding some with tarred feathers stuck to the oil. I collected some. Our salmon runs have been very poor since the oil spill. It [the spill] must have something to do with the decline.
>
> I haven't seen many seals around since the Exxon deal. There are some dead birds washing up on the beach, more than usual--tar balls coming up too. They are all over. We used to see seals all along the beach. Now we don't see many. We're finding a lot of tar balls along the beach west of here. I saw one two feet in diameter. All winter we've been seeing dead birds along the beach. I haven't noticed if any were oiled or not. It would be nice to have more testing done, I'm not sure how safe shellfish are to eat.
>
> I saw a half dozen murres dead on the beach. I told the Refuge [staff] about it, but they weren't interested. We have no more silvers left in our river. The sea lions are starving, and there aren't many here anymore.
>
> *IVANOF BAY*
>
> I saw sick murres on the beach about six months ago. I don't know what caused their death. There should be a tissue sample collected to see if they are being affected by the aftermath of the *Exxon Valdez* oil spill. There are still oil balls coming up on the beach.
>
> A couple of years ago, I wasn't feeling too confident. Along the coast, I found black crude oil inside of barnacles. I still dig and eat clams, but wonder about their safety.

I don't really know what is causing the declines of seals and sea lions in our area. Maybe it is pollution, or lack of food. It might have something to do with the oil spill. We are still finding oil outside of the bays.

I saw some tar balls at Humpback Bay the other day. There were big ones. I found some at Ivanof Bay too, near First Creek.

Phone Contacts.--

KENAI PENINSULA

SEWARD

Jean Galzano of Qutekcak, the local native association in Seward, was contacted by telephone on June 26, 1993, and informed about the subsistence restoration project. She was asked whether there were any concerns regarding subsistence foods and the oil spill among subsistence users in Seward. She said she didn't know. She offered to talk to the president of Qutekcak and get back to the Division. She was faxed information on the subsistence foods testing project, that same day. We never heard back from Qutekcak.

KODIAK ISLAND

Division of Subsistence staff, Rachel Mason and Jeffrey Barnhart, contacted community leaders on Kodiak Island, between May 19 and May 24, 1993 to determine whether oil spill related subsistence food safety concerns persisted in these communities. We considered the concerns expressed by community residents and leaders, the recommendations of the Kodiak staff, and information available from earlier studies. We decided not to test any finfish from the Kodiak area. Little concern was expressed by the residents of Kodiak Island about bottomfish, as compared with the concerns residents of the Prince William Sound and Lower Cook Inlet communities expressed about these resources. Although a number of the people the Kodiak staff contacted wanted to see salmon tested, we decided not to test them. We knew from tests conducted in Prince William Sound and elsewhere, in the two years after the spill, that even salmon swimming through oil slicks did not show signs of contamination in their edible flesh. Rachel and Jeff contacted the same people again between June 11 and June 16, 1993, to tell them which sites would be sampled, and the reasons for our decisions. Their report on the results of these conversations is attached as appendix 2 and is summarized below.

KODIAK CITY

Four people were contacted, including two representatives of the Kodiak Area Native Association and two members of the city government.

Margie Derenoff of the Kodiak Area Native Association thought that shellfish, birds, sea otters and seals should all be tested. She also thought there should be some follow up to studies on intertidal resources and algae on the Alaska Peninsula shores.

Margaret Roberts of the Kodiak Tribal Council wanted to see a priority placed on the testing of sea mammals and mollusks. She said that people in the Kodiak area are "still finding oil all over--in areas that were heavily impacted."

Gary Bloomquist, Kodiak City manager, said he did not know of any resources or any areas that need to be tested for oil. He had not heard of any problems with subsistence foods. He said he would check around and get back to Jeff and Rachel if he heard of anything.

Jerome Selby, Kodiak Borough Mayor, said he did not know of any current problems with subsistence foods in the Kodiak area. However, he thought the sites which showed elevated hydrocarbon levels in 1989 should be tested again in 1993 as a follow-up. He mentioned Izhut Bay and Chief Cove as likely locations.

Based on these conversations, and the advice of the Kodiak staff, it was decided not to test any resources from the subsistence harvest areas of Kodiak City. Although some interest was expressed by community leaders in seeing resources tested there, the concerns expressed by other communities took priority for the limited funds available for testing.

OUZINKIE

Arthur Haakanson, Lands Manager for the Ouzinkie Native Corporation, offered the observation that people in Ouzinkie have been eating the clams and they seem to be alright. He said that people have complained of oil and tar, but he himself did not know specifically where it was. If there were to be testing, he suggested Camel's Rock, Doctor's River, Garden Point, and both sides of Sourdough Flats. These are all popular subsistence harvesting areas for Ouzinkie residents. Arthur thought that the people doing the sampling should be sure to dig beneath the surface. He also mentioned that anadromous streams should be checked, since the salmon seem "off" in population. Although there are reports of widespread bird deaths, Arthur did not think these were linked to the oil spill.

Zach Chichenoff, Ouzinkie Mayor, said that cockles and clams should be tested from Camels' Rock. Zach indicated he does not do much subsistence harvesting himself. He reported that Andy Anderson, while digging clams at Camels' Rock, found an unknown oily substance in the substrate. Zach also said there were not many Old Squaw ducks around since the oil spill.

Theodore Squartsoff, active subsistence harvester, emphatically stated that no more testing is needed. He said his family is still eating the same wild foods they were eating before the oil spill and have eaten since then, and he is still harvesting in the same places. He has noticed a decline in the population of clams, and that those clams that are there are limp and lifeless, but he does not think this has to do with oil. He believes that either sea otters are getting them, or they have been over-harvested by humans.

Herman Squartsoff, of the Ouzinkie Tribal Council, had not personally seen any recent problems in the area with subsistence foods as a result of the oil spill. But he said he would talk it over with others in the community, and call us back if he heard anything. He said that shellfish and possibly ducks ought to be tested this year. He didn't know about seals or deer. He did not offer suggestions on specific areas to be tested, saying only that these should be "local" areas.

We decided to collect samples of mussels, butterclams, littleneck clams, and chitons from Camels' Rock, and mussels, butterclams, littleneck clams, and sea urchins from Sourdough Flats.

PORT LIONS

Bobby Nelson, president of the Port Lions Tribal Council, said he had been eating everything himself and had not seen any problems with subsistence foods. He promised to ask around at the tribal office and call if he heard anything new.

Sue Girard, Vice president of the Port Lions Tribal Council, expressed more concern about the social impacts of the oil spill than about hydrocarbons now in the foods. "They won't find anything," she predicted when she heard that the 1993 testing will be for oil contamination. However, she said if it were up to her that all the resources should be tested this year. She suggested that samples be taken in Barabara Cove and in the clam beds by the Port Lions airstrip as well as in Litnik, Marka Bay, Danger Bay, and other bays on Afognak Island. She emphasized that the testers would have to dig in the sand to find oil: "Of course they're not going to see any oil on the surface."

Pete Squartsoff, an active subsistence harvester, was skeptical of the value of doing any testing. He stated that he had never had any problems with any subsistence resource. Even during the oil spill, he said, he was critical of the testing program and didn't see any need for it.

Initially, we decided not to test any resources from Port Lions, but after additional conversations with Sue Girard, we agreed to test mussels and butterclams from a site near the airstrip.

LARSEN BAY

Allen Panamaroff, Larsen Bay City Mayor, thought the 1993 samples should be taken of the same resources and in the same areas tested in 1989 or 1990, so the results could be compared. He suggested testing clams, mussels, bidarkies, sea urchins, bottomfish (especially halibut), and crab. He thought that some resources, including crab, had been dropped from earlier testing programs because of bad weather. He would like to be sure that crab are tested this year. He would also like to see salmon from the Karluk River

tested. Although he does not think these resources are as critical as others, he would also like to see berries tested, along with land mammals that go down to the beaches and might encounter oil there. Allen added that although there are still people in Larsen Bay who won't go to get clams, in the last year they seem to be coming around. There is less and less concern about oil contamination.

Frank Carlson, former Larsen Bay Tribal Council President, thought that clams, sea urchins, halibut, and harlequin and goldeneye ducks should be tested. In recent months, he has not personally seen any oil-related problems with subsistence foods. He commented that the Chief Point area was used prior to the oil spill for harvesting clams, and is no longer used because of the fear of oil contamination. No bivalves were ever tested from Chief Point. Frank said he spoke to setnetters who said they found oil at Chief Point this spring.

Mike Carlson, Deputy Mayor of Larsen Bay, said that crab and other shellfish (especially clams), halibut, harlequin ducks, and goldeneye ducks should be tested this year. In his opinion, Spiridon Bay should be tested, as well as areas closer to Larsen Bay. Mike has not recently seen any problems with subsistence foods as a result of the oil spill.

Brad Aga, Village Public Safety Officer and active subsistence harvester, said he did not see any need for testing. He said most shellfish harvesting occurs close to the community. People do not seem hesitant about harvesting these resources. Harvesting occurs on most every low tide. He said no one has indicated any problems associated with the oil spill.

Alex Panamaroff, postmaster of Larsen Bay, thought that clams and deer should be tested. He would like deer to be tested because they eat kelp. He thought that the butterclam beds in Larsen Bay should be tested, as well as the razor clam beds at Long Beach. He was particularly concerned about clams taken from "across the bay". He mentioned that people had found clams with "black stuff" in them. He said, "Since the oil spill I and my family have eaten less than twenty-five percent of what we used to. We won't know the effects for many years. We've had some bad commercial salmon fishing years."

We decided to collect samples of mussels and clams from Chief Point.

KARLUK

Larry Sugak, former Tribal Council President in Karluk, said that 1993 tests should look at returning salmon to see whether they have been affected by oil. He also thought that clams should be tested, especially the razor clams at Sturgeon Bay, in the lagoon. In 1989, Larry found some sheen in the water while harvesting clams here. He still doesn't trust the clams. He sees tarballs drifting in now and then in the Karluk Lagoon.

Eli Malutin, Tribal Council member, thought that halibut and clams from the Sturgeon River area should be tested.

Katherine Reft, Tribal Council Member, said that bottomfish, especially halibut, ought to be tested. There seem to be less bottomfish since the oil spill. Not many people have been catching halibut lately. She also thought sea urchins and chitons should be tested. She wanted to see the whole area around Karluk tested. According to Katherine, people are still finding tarballs with dead birds in them near the Sturgeon River.

We decided to collect samples of mussels, butterclams, and littleneck clams from the intertidal area at the mouth of the Sturgeon River.

AKHIOK

David Eluska, Deputy Mayor of Akhiok, said that razor clams from Tanner Head, and butterclams and chitons from Akhiok Island should be tested. He said the pink salmon run had been pretty poor around Akhiok in 1993. He wondered if there might be some tests done on this species, not necessarily for oil contamination, but to see if there were population changes, possibly oil related. Mr. Eluska said people in Akhiok were still wondering if it was OK to eat subsistence foods. He said that some people were still harvesting in the inner bay, because there was less oil spill activity there than in the outer bay. He would like to see some samples taken from both the inner and outer bays.

We decided to collect samples of mussels and clams from Tanner Head.

OLD HARBOR

Sven Haakanson, former Mayor of Oil Harbor, thought that mussels, clams, and other shellfish need to be tested this year. He suggested that testing be done in the Sitkalidak Straits. Sven reported that people in Old Harbor were still finding a few tarballs. He mentioned that there are people who haven't eaten any clams since the oil spill.

Wanda Price, Old Harbor City Clerk, said that the 1993 test should take "a sampling of everything." She was most concerned about Fox Lagoon and the Sitkalidak Straits.

We decided not to test any resources from the subsistence harvest areas of Old Harbor, because what concern there was seemed to be more related to paralytic shellfish poisoning than oil contamination.

Surveys.--

The Division of Subsistence conducted surveys of harvests of fish and wildlife for home use, and on the social effects of the Exxon Valdez oil spill, in communities throughout the spill area. Based on our finding comparatively little continued concern in Valdez and Cordova over contamination to subsistence foods by the oil spill, these communities were dropped from the list of communities where testing would occur. Valdez residents did, however, express concern about the effects of chronic oil pollution in the Port of Valdez, resulting from operations at the Alyeska pipeline terminal and tanker dock, on shellfish there.

Oil Spill Health Task Force Meeting

On August 24th and 25th 1993, representatives began travelling from their home communities to Anchorage to participate in a meeting of the Oil Spill Health Task Force (OSHTF). The OSHTF meeting took place on August 25th at the Alaska Native Medical Center. Of the ten community representatives who were expected, only five managed to make it to the Anchorage meeting. The rest were delayed by bad weather on Kodiak Island. One representative did make it in from Kodiak Island, Sven Haakanson, Sr. from Old Harbor. He avoided the bad weather by coming to Anchorage a day early. The other community representatives who were present were Larry Evanoff from Chenega Bay, Roy Totemoff from Tatitlek, Robert McMullen from Port Graham and Ephim Moonin from Nanwalek (formerly English Bay). In addition to the community representatives we had invited two Alaska Department of Fish and Game employees to attend the meeting; Evelyn Brown from Cordova, and Ted Meyers from Juneau. We also invited Bruce Wright and Jeff Short who work for the National Oceanic and Atmospheric Administration at the Auk Bay laboratory.

Rita Miraglia presented information on the collection of subsistence food samples for hydrocarbon testing.

Four of the five community representatives made statements about the situation in their communities with regard to the oil spill. Roy Totemoff brought a written statement from Gary Kompkoff, President of the Tatitlek Village Council, which he asked Miraglia to read aloud. A copy of this statement is attached as part of appendix 7.

Larry Evanoff from Chenega Bay, said that he agreed with Gary Kompkoffs' statement. He added that seals were scarce in his area, and that no one from Chenega Bay was even trying to harvest clams from near their community, because they were afraid to. He said, "The beaches around Chenega Bay continue to ooze oil".

Ephim Moonin from Nanwalek said that a lot of people from his community still don't trust the safety of the seafood. He also said tar balls were still being found on the shores of the lower Kenai Peninsula.

Sven Haakanson from Old Harbor said that many people in his community still would not eat clams because they were afraid to eat them. He said that the previous last summer (1992) four people got sick from eating clams. It seemed that the issue here was paralytic shellfish poisoning (PSP), rather than the oil spill, but that people did not make that distinction. Judy Meidinger, representing Exxon at the meeting, pointed out that the Alaska Department of Environmental Conservation tests commercial beaches for PSP, but will not test subsistence beaches.

The next topic of discussion was viral hemorrhagic septicemia (VHS) in herring in Prince William Sound. Only one third the expected number of

herring returned to Prince William Sound in the spring of 1993. Many of the herring that did return had lesions. Residents of Tatitlek reported that there was very little spawning observed. Residents of Chenega Bay and Tatitlek use both the herring, and the herring roe on kelp, for food. Evelyn Brown, a biologist with the Division of Habitat and Restoration gave a brief chronology of the problem including a description of actions taken in the field. Ted Meyers, a pathologist with the Alaska Department of Fish and Game, Division of Commercial Fisheries Management and Development discussed steps taken in the laboratory to determine the cause of the problem. According to Meyers, VHS was the only pathogen identified in the herring. A diagnosis of VHS is consistent with the observed symptoms. Meyers said that it is likely that VHS has always been present in the herring population, but that something had stressed the fish and weakened their resistance to the virus. One possible source of stress is the *Exxon Valdez* oil spill and clean up. However, such a connection is difficult to prove conclusively. Meyers emphasized that the virus is not a threat to human health, although he acknowledged that the lesions are not very appetizing. According to Meyers, fish viruses do not transmit to humans. Laboratory tests have shown that salmon are not easily infected with VHS, but rainbow trout are susceptible.

Next, discussion focused on a paper delivered at the Atlanta conference: Fingerprinting Hydrocarbons in the Biological Resources of the *Exxon Valdez* Spill Area by Bence and Burns. The OSHTF was interested in this paper in particular, because it purports to discredit data from the studies undertaken by the OSHTF, and it received wide attention in the press. Jeff Short, from the NOAA laboratory in Auk Bay explained that the paper contains a few valid points, but in general it represents a misuse of raw data collected as part of discovery for the legal cases pending against Exxon.

Several times during the course of the meeting, the community representatives were asked what could be done to "convince" them that their subsistence foods were safe to eat. Larry Evanoff of Chenega Bay said, "Get the oil off the beaches". The advice of the OSHTF has been and continues to be that shellfish from beaches where oil is observed on the surface or subsurface should not be consumed. It was also pointed out that as long as people continue to see abnormalities, such as those observed in the herring, they will be wary of consuming local wild foods. Additionally, there continues to be a scarcity of some resources.

Subsistence users in Prince William Sound, especially residents of Chenega Bay have found it necessary to travel long distances to harvest foods to replace resources which are either unavailable or deemed unsafe to eat in their pre-spill harvest areas. These trips are being paid for by individual harvesters, at a time when few jobs are available in their communities, and those who rely on commercial fishing for their income are hurting with the failure of the herring and pink salmon runs this year. At the OSHTF meeting, funding for such harvesting trips and support for an exchange of resources between communities were again identified as urgent needs in the Prince William Sound communities. The *Exxon Valdez* Trustee Council declined to fund such activities in 1993, because it was the opinion of lawyers working for the U.S. Department of the Interior that it would constitute economic restoration, and would not be a legal use of the settlement dollars. It is estimated that fifty thousand dollars a year would suffice to fill these needs.

Tour of the National Marine Fisheries Service Laboratory

The next day, the same five community representatives travelled to Seattle, accompanied by Alaska Department of Fish and Game personnel Rita Miraglia with the Division of Subsistence and Dean Hughes with the Division of Habitat and Restoration.

The tour of the laboratory took place on August 27, 1993. One of the people sent by the laboratory to pick the group up at the hotel was Tom Merculieff, an Aleut originally from Saint George, Alaska. He is a technician at the laboratory, and has been involved in the subsistence food testing for the last two years. At the laboratory the group was greeted by Dr. Usha Varanasi, director of the laboratory. Dr. Varansi introduced the group to her staff, and there followed brief talks on the history of the laboratory, bile metabolite screening, the analysis of flesh samples for the presence of hydrocarbons, fingerprinting of oil and the meaning of one part per billion.

This brief instructive program was followed by a question and answer period. The community representatives had quite a few questions, many of them very insightful. There was some confusion about the function of the laboratory, and it had to be explained that the laboratory does not make any determinations about the safety of foods for human consumption. That role had been undertaken in the response to the *Exxon Valdez* Oil Spill by the Oil Spill Health Task Force, the U.S. Food and Drug Administration, and the Expert Toxicological Committee.

Next the group was given a tour of the laboratory itself. They were not able to follow a single batch of samples through the testing process, because it takes about one week for each batch of samples to be run through all the steps. However, they did get to see actual samples go through the various steps. The laboratory staff did a very good job of explaining the process. Dr. Sin-Lam Chan, assistant director of the laboratory and Catherine Sloan laboratory supervisor accompanied the group throughout the tour to answer any questions that came up. After the tour, there was another question and answer session.

During this second question and answer session, a lot of very pointed questions were raised. Larry Evanoff asked, "Who signs off on your [the laboratory's] expertise?" Don Brown, a research chemist at the laboratory, said "Other laboratories test our methods, and must be able to reproduce our results".

Sven Haakanson asked, "Do you get any money from Exxon?" Dr. Chan replied, "No". Robert McMullen asked, "Has any of your staff worked for Exxon in the past?" The answer, provided by Don Brown, was "No.

A number of the community representatives made comments to the effect that they were coming away with a better sense of how the tests are done. Some also said that they now had more trust that there is a sincere attempt on the part of the laboratory to get accurate test results.

The group returned to Anchorage the next morning. From there the community representatives caught their connecting flights home.

Production of Informational Newsletters

As part of the effort to keep subsistence users informed about the progress of the project, an informational flyer and two newsletters were produced. Copies of these are attached as appendix 8.

It was considered important that the findings of damage assessment and restoration studies be integrated into this communication effort. As new information is released, it sometimes causes renewed concern among subsistence harvesters. It is not always possible to anticipate the effect a technical report, or the media accounts derived from it, will have in these communities. The newsletter serves to put this information in context for subsistence users, following an evaluation of the information by the Oil Spill Health Task Force. It is also important to follow distribution of the newsletter with community visits. These involve informal visits to households and formal meetings. The purpose is to enable a dialogue to develop between the researchers and the communities regarding the study findings.

The flyer and newsletters were mailed out to approximately 4,100 people, including residents of communities impacted by the *Exxon Valdez* oil spill, agency staff, and anyone else who has indicated interest in receiving the newsletter. In addition, copies of the newsletter have been distributed during community meetings, and other visits to the impacted communities.

The flyer was sent out in April 1993. It announced that the Trustee Council had funded a Subsistence Restoration Project, and outlined the goals of the project, as well as the methods that would be used to achieve them. The flyer also summarized the earlier subsistence food testing projects, and the advice of the Oil Spill Health Task Force.

The first newsletter was produced in November 1993. It contained an article presenting the results of tests on samples of subsistence foods collected in June and July 1993. Another article described a tour of the NOAA/NMFS laboratory in Seattle for representatives from some of the communities impacted by the oil spill. The results of the earlier studies were again summarized. The newsletter also contained an article describing how the hydrocarbon tests are done.

The second newsletter was sent out in February 1994, and reported results

of tests on the fish, shellfish, seal and duck samples collected in September 1993. It also included an article on the Oil Spill Health Task Force meeting held in Anchorage in August 1993, including information on Viral Hemorrhagic Septicemia presented at that meeting by Dr. Ted Meyers, a fish pathologist with the Alaska Department of Fish and Game. The advice of the Oil Spill Health Task Force was again summarized, and a round of community meetings planned for February and March 1994 was announced.

During the community meeting held in Tatitlek in March 1994, John Wilcock, a fish biologist was asked by village council president, Gary Kompkoff whether the information from his project on herring would be available to the public. "I don't mean as a technical report, I mean as something we can understand, like this", Mr. Kompkoff said, pointing to a stack of the Subsistence Restoration Project newsletters. The results of other restoration projects could be included in future issues of the newsletter.

Community Meetings and Contacts: February-April 1994

A second round of community meetings were held in February and March 1994. These meetings served three purposes; 1) to report the results of hydrocarbon tests on samples of subsistence resources collected in 1993; 2) to assess the level and nature of any continued oil spill related concerns, and; 3) to plan the 1994 subsistence food sample collection and testing.

Meetings.--

KODIAK ISLAND

On February 22, 1994, a meeting was held for representatives of communities in the Kodiak Island region at the Lions Den Lodge in Port Lions. Alaska Department of Fish and Game staff attending the meeting were Rita Miraglia and Craig Mishler with the Division of Subsistence and Dean Hughes with the Division of Habitat and Restoration. The community representatives were Ron Lind and Donny Lind from Karluk, Roy Jones and Randy Christensen from Larsen Bay, Tony Azuyuk from Old Harbor, Mark Olsen from Kodiak City, and Nicholas Pestrikoff and Herman Squartsoff from Ouzinkie. Sue Lukin Girard, Ivan Lukin, and Robert J. Nelson, all of Port Lions, attended the meeting. Kate Wynne a marine mammal biologist and John French, both from Kodiak City, also participated. John French had been invited to attend as a member of both the Expert Toxicological Committee and the Public Advisory Group to the *Exxon Valdez* Oil Spill Trustee Council, and turned out to be an invaluable asset during the meeting.

Miraglia started a short presentation by telling the attendees that they should interrupt if they had any questions or comments. She began by talking about the Oil Spill Health Task Force, and the Expert Toxicological Committee. After one slide, and two transparencies, the questions started. Mark Olsen from Kodiak City wanted to know where the members of the expert toxicological committee were from. His concern was that people from outside the area couldn't know anything about the subsistence resources people rely on. Ron Lind from Karluk echoed this concern. John French explained what the committee looked at, and that clams in the lower-48 react to oil the same way as clams on Kodiak Island.

The group was very lively, and had many questions. Miraglia abandoned the slides and overhead transparencies early on. All of the important points got covered, by answering the questions from the group. It was a good, dynamic meeting, and the community representatives seemed satisfied with the answers to their questions.

In general, though subsistence users on Kodiak Island are not experiencing the kind of resource scarcity or abnormalities that those in Prince William Sound are, the contamination concern is similar. In fact, it seemed there was more concern about immediate health effects to humans from eating oil contaminated resources among the Kodiak representatives than in the other regions impacted by the oil spill during this round of community meetings. This may be because the residents of the Kodiak Island communities have been less exposed to the information coming out of the Oil Spill Health Task Force and the Subsistence Restoration Project, and have definitely had less one-on-one attention in this respect. It will be important to concentrate more on Kodiak Island in this year's subsistence restoration project than has been the case in the past.

There was a general concern among the Kodiak Island representatives that even if there is no oil in the edible flesh, that processing the oil contamination has somehow changed the animals in such a way as to make them toxic. There were also several references made to oil in the beaches of Kodiak Island. Miraglia was surprised by this, as it was the first time she had heard about subsurface oil on Kodiak Island. We do not know whether ADEC has documented this.

The community representatives all agreed that they do not think the Trustee Council has heard their concerns. There is also dissatisfaction with the way in which testimony from the communities is handled by the Trustee Council. Roy Jones of Larsen Bay said, "A community representative represents a lot of people and their testimony shouldn't be counted as that of one person". Mark Olsen from Kodiak City added, "We're not just talking about oil here, we're also talking about credibility. The problem won't be resolved until we have mutual respect".

The representatives unanimously expressed the opinion that the Trustee Council should come to Kodiak and visit their communities. They think this is necessary if the Trustee Council wants to understand the problems the people there are having. At a minimum, it would be a good idea for the Trustee Council staff to contact these communities and offer them the opportunity to be included in the Trustee Council meetings by teleconference.

The community representatives were asked whether there were any continued concerns in their communities with regard to subsistence food safety and the *Exxon Valdez* oil spill. They were also asked what resources and sites, if any, should be tested from their area in 1994. Their responses to these questions are summarized below.

PORT LIONS

The Port Lions representatives said the red salmon that returned here in 1993 were smaller than normal. They are not sure if this is due to the oil spill. They would like to know if there is still oil laying on the bottom and if so, whether it is dangerous. They are especially concerned about the bottom where beaches were cleaned, near the old village.

Ivan Lukin said he and his wife were part of a beach clean up crew in 1989. Locally, in some places, the oil was two feet and deeper down in the beach sediments. The straits were loaded with sheen.

In 1994, they would like us to test clams at the airstrip, and butterclams from across the bay, at Port Bailey.

LARSEN BAY

Randy Christensen said people are still seeing tarballs at the tideline and oil stained drift wood on the beaches in the Uyak Bay area and the outer shores, especially Sourdough Bay.

Roy Jones, who participated in the 1993 sample collections as a local assistant, commented that the last two sampling sites were too far from the community. He asked whether we are only looking for oil in the samples. He is concerned about changes in the animals as a result of processing the oil. He emphasized that there are lingering questions. People are worried about abnormalities in the resources. "The oil was there, where did it go?", he asked.

Randy Christensen said he is concerned about the intertidal area. There are only steamer clams at Jakes Beach (LAB 10) now, there used to be other clams there. Even the steamer clams there are not as plentiful as they used to be. He wants to see that beach tested again. He does not think the problem there is due to sea otters, because sea otters are rarely seen there. He added, "You still see tiny wisps of sheen coming off the beaches today".

Their top priorities for testing in 1994 are sea urchins in the lagoon, directly across from the village (LAB 3), and clams from Jakes beach (LAB 10) and the mouth of Larsen Bay (LAB 2). They would also like to see chitons tested. If possible, they think we should test pinkneck clams from Amook Island, but this is the lowest priority.

KARLUK

Ron Lind said their biggest concern is the decline of salmon, especially red salmon, and mallard ducks. They are afraid to use clams and mussels.

Very few people go to the Sturgeon River to harvest anymore. On some warm days, oil flows out of the beaches, and tar balls have been seen in Karluk Lagoon itself. They are worried about where the oil is, and they are concerned about the risk of cancer.

The representatives listed the testing of razor clams and butterclams from Halibut Bay as their first priority. Mishler pointed out that Halibut Bay is about twenty-five miles from Karluk. They would also like to see us test butterclams from inside the lagoon, and bidarkis from inside the entrance to the lagoon as well as butterclams at Sturgeon River, and red salmon from the lagoon.

OUZINKIE

Herman Squartsoff says they are concerned about deer, clams, sea urchins, bottomfish, especially halibut, and crab. They are eating subsistence foods, but are still in doubt about their safety. The main concern is about the people getting cancer ten or fifteen years down the road. Oil is still seen floating around in the area.

Herman said there needs to be more study on the effects of oil on the clams. There has been a big decline in clams everywhere. At Sourdough Flats (OUZ 7) there are now lots of big empty clam shells. There has also been a big decline on Cat Island. "There is a massive amount of empty adult clam shells on the beaches near Ouzinkie", he said.

He observed, "Society has changed the way of living for the people, the oil spill made it worse, it scared everyone a lot more. We need to get back to the subsistence lifestyle, or we'll lose it".

Herman said someone recently harvested a deer near Ouzinkie that smelled bad, and it was discarded.

They would like us to test horse clams from between the narrows and the airstrip, across from Gardens Point. They also want to see chitons tested.

KODIAK CITY

Mark Olsen said that people took subsistence for granted before the oil spill. He doesn't go out harvesting anymore since the spill. He has deferred the enjoyment, trust and desire to eat subsistence food because of concerns about oil contamination. He wants to see someone look at the food chain. He said people have reluctantly gone back to the beaches to harvest. They are still seeing deformities in the resources.

Mark Olsen said his first priority was to have butterclams and steamer clams tested on the spit running between Sheep Island and Gull Island. John French pointed out that is next to the boat harbor. Craig added that we have already tested there. Mark said he would also like to see clams on Kalsin Island tested, and bottomfish from the Chiniak Bay area. He said sea otters should be tested as an indicator of what's going on with shellfish.

OLD HARBOR

Tony Azuyak said there was an outbreak of paralytic shellfish poisoning in Old Harbor a few years ago, which really scared people. He eats clams anyway. Recently, birds have been found with oil mousse on their feathers, and people have been seeing tarballs.

Tony tentatively said he thought we should test butterclams and sea urchins from Sheep Island, the Narrows or Amy Bay. He asked that we check back with him after he has had time to talk with other people in Old Harbor about this.

AKHIOK

The Akhiok representatives were unable to make it to the regional meeting due to bad weather. Craig Mishler spoke over the telephone with David Eluska Sr., Vice President of the Akhiok Tribal Council on March 8, 1994. David echoed the complaints were heard from Ouzinkie and Larsen Bay that butterclams are increasingly harder to find, but also acknowledged people have not been attempting to harvest as much lately.

David asked that we test razor clams from Tanner Head and butterclams outside Akhiok Island near the village.

LOWER KENAI PENINSULA

NANWALEK

The community meeting in Nanwalek was scheduled for 2 PM on February 24, 1994. No one showed up for the meeting, so Rita Miraglia visited informally with residents of Nanwalek to discuss the subsistence restoration project.

Miraglia was later told that the meeting conflicted with a tsunami workshop at the school, and the community's traditional dance group was performing in Fairbanks. Very few people knew about the meeting, and many of those that did were under the misunderstanding that it was an Exxon meeting.

Miraglia met with Vincent Kvasnikoff, the Village Council President, in his home. He wants to see clams, bidarkies and sea weed tested from the Flat Islands. He said people used to get seals at the Flat Islands, but "you don't see seals there anymore". He said some people are still afraid to eat seafood. He told me that in 1989 oil mousse hit the shore at Russian Point, and it also hit the beach below the runway. He said there was oil mousse on his native allotment, too. He noted that the red salmon coming in last year were smaller than usual, but he doesn't know whether that is because of the oil spill or if it is because of the English Bay River sockeye salmon enhancement project.

One man Miraglia spoke to said we should test bidarkies and octopus from Dogfish Bay. He would also like to see red salmon tested from the English Bay River.

Another resident she visited with, suggested testing fish and shellfish at Port Chatham. He said there used to be butterclams and cockles there. Before the oil spill those shellfish beds seemed depleted. There was a lot of oil clean up in Port Chatham. He said people get a lot of fish out of there, especially pinks, chums, flounder and halibut. While he would like to see the resources there tested, he did not feel this should be the first priority. He agreed that testing shellfish from the Flat Islands and Dogfish Bay were both good suggestions. The need to set up an easy way to get abnormal specimens that people encounter to Anchorage so a pathologist or biologist can look at them was also discussed. Division of Subsistence staff need to talk with pathologists and biologists, and possibly set up an account with Southcentral Air, so community residents don't have to pay to ship the samples.

PORT GRAHAM

Rita Miraglia attended a community meeting on the subsistence restoration project in Port Graham on February 25th. The meeting began at one in the afternoon. About a dozen people attended, most of them active hunters.

Miraglia summarized the results of the 1993 testing. When she said that the clams from Duncan Slough tested low, so low as to be within the margin of error for the tests, Chief Elenore McMullen said, "Wonderful, that is just what I have been waiting to hear. Now we can harvest our clams again". The group said they wanted to see whelks tested from the same location (Duncan Slough) in 1994, because whelks were observed eating the oil in 1989.

Miraglia mentioned that she has been trying to run down information on the boat cleaning station in Port Graham Bay, and has had trouble finding records regarding the chemicals used there. A number of people at the meeting worked at the station in 1989. They said VECO actually ran the station, and were able to give partial names of the VECO foremen. One concern people here have is the effect of inhaling the chemicals used in cleaning the boats.

One of the men who worked at the boat cleaning station said they did not use the vacuum system Exxons' Rob Dragnich has described for cleaning the outside of the boats here. That system was only used for cleaning the inside of fish holds. Outside, the spread of the chemicals was only controlled by boom.

The people attending the meeting also made the following observations about local resources in relation to the oil spill:

- The mussels in this area all died when the oil hit, and they have been growing very slowly since the spill.
- The birds have finally started coming back here. All the Arctic terns died after the spill.
- This past year there were more herring and tomcods than the year before.
- One man said there were not very many chum or silver salmon last year.

The Village Chief, Elenore McMullen, said there were more reds, and she

thought there were enough silvers. She also saw more ducks in the past year than she has in a while; The hunters agreed they are seeing somewhat fewer sea lions. People here are not concerned about any decline in sea otters. Some locals have been hunting them recently.

Miraglia also attended the annual Port Graham Village Council meeting on March 1, 1994. She was the last speaker on the agenda before the nominations for Village Council elections.

Miraglia presented the 1993 test results from the subsistence food safety testing project, emphasizing that all of the samples showed very low levels, so low they were within the "margin of error". She talked about the planned future testing, and summarized the discussions at the community oil spill meeting the previous Friday. There were a few questions, mainly about abnormalities people had heard about from Prince William Sound such as seals with yellow pus under their flippers, and viral hemorrhagic septicemia in herring.

There was little discussion about any of the information presented. This was partly because people were already tired. Another important factor was that a potluck dinner was scheduled to start as soon as Miraglia finished speaking. People could already smell the food, which was laid out on the tables and waiting.

During the visit to Port Graham, Miraglia was given a tarball which had been collected by a community resident from Johnson Slough the last week in February. It was collected in a glass jar. When Miraglia returned to the community to conduct harvest surveys at the end of March, she was shown another tarball which had recently been collected in the area. This second tarball was highly aromatic.

PRINCE WILLIAM SOUND

CHENEGA BAY

Jody Seitz and Rita Miraglia participated in a health fair in Chenega Bay on March 12, 1994. The Division of Subsistence had a table there with information on the subsistence food testing program, and staff were prepared to answer any questions. Unfortunately, very few adults attended the health fair, which drew mostly children and teens.

Miraglia visited informally with community residents and discussed the subsistence food testing project in the afternoon.

One hunter said he got five ducks that day. He said he's been having good luck with them, he got about ten other ducks in the previous couple of weeks.

One man said he would like to see clams tested from just below the village again for hydrocarbon contamination. Another wants to see deer from Sleepy Bay tested. He said deer are more scarce than they were before the oil spill.

There was a potluck dinner in the evening. A formal community meeting had been scheduled after the potluck. However, there had been a change in plans. The Village Council President, Larry Evanoff, asked Miraglia to make her presentation at the potluck.

She gave a brief summary of the most recent test results, and asked that people let the Division of Subsistence staff know what they would like to see tested this year.

There were only a few questions, most of them from one person. There was no clear indication of what should be tested or where. Miraglia pointed out that she and Seitz would be available if anyone had questions or suggestions.

The next morning Miraglia visited the Village Council President at home. She told him she had not gotten the needed feedback from the community, in order to plan for this years sample collection and testing. She agreed to send him a list of all the sites that had been tested in the Chenega Bay area and all the test results, so the village council could review what had already been done before making a decision on what they want done in 1994. He was told that sample collection would not begin until May, at the earliest.

TATITLEK

Alaska Department of Fish and Game staff, Rita Miraglia with the Division of Subsistence and John Wilcock, a fish biologist with the Alaska Department of Fish and Game in Cordova, who works with herring, attended a community meeting in Tatitlek. The Tatitlek community meeting took place at 2 PM on March 17, 1994. At that time, in addition to the Village Council President,

there were two adults and a child present. Another adult came in later.

Miraglia talked a little about the test results from 1993. She then opened the floor for comments or questions.

There continues to be concern in Tatitlek about the safety of subsistence foods, these result from a basic distrust of the advice they have been given, observed abnormalities in many of the resource species, and scarcity of most resource species. People here blame both the abnormalities and the scarcity on the oil spill.

Gary Kompkoff, the village council president said that stress related illnesses were up in the community. He blames this on the oil spill.

He referred to a comment he says Steve Behnke made at a meeting a number of years ago. According to Mr. Kompkoff, Behnke, who was then the Director of the Division of Subsistence, said whoever was telling people in the communities that the subsistence foods were safe to eat didn't know what they were talking about. Despite repeated attempts to assure him either Behnke misspoke, or he misunderstood what Behnke said, this comment evidently still rankles.

Mr. Kompkoff said that there were no herring in this area last summer, and because of this, there has been a scarcity of the animals that follow the herring. He said this has been a bad year for subsistence. There are no seals, no sea lions, and even very few deer.

Roy Totemoff, who participated in the Oil Spill Health Task Force meeting and visit to the National Marine Fisheries Center laboratory in Seattle last August, made the comment that the meeting and trip didn't help ease fears here. When he reported back to the community on the trip, people said "Let them come here and eat the food. Then we'll believe it's safe". Mr. Kompkoff added that Oil Spill Health Task Force members declined to eat local food when they were offered it. I think this may refer to Tom Nighswander's negative response when he was asked whether he would eat shellfish from an oiled beach.

According to Mr. Kompkoff the community would like invite the members of the Trustee Council to come to Tatitlek. He said he thinks it is very important that the people making the decisions come to the community and meet the people who are affected by those decisions.

There were a lot of questions for John Wilcock, it was good that he was there. He said that the winter of 1992-1993 was a hard one for herring. A poor plankton bloom meant that the herring were malnourished. He doesn't expect to see the same problem this year. Based on the herring he's already seen here, which are fat, he expects this years' herring will be more healthy (This is now known to have been an overly optimistic prediction. "The herring population continued to decline in 1994, although the incidence of disease was less (Brown, draft NRDA report)"

One of the residents present at the meeting said no one ever remembers seeing herring with lesions like that. He also said they were concerned because the herring didn't spawn. Wilcock said some herring did spawn at Montague Island, but that the herring there also had lesions. Wilcock agreed that the oil spill may well be part of the problem with the herring, but the link would be difficult, if not impossible to prove. He said other factors include El Nino, and changes in ocean currents which change conditions in Prince William Sound.

There were also questions about viruses found in the salmon. These include something called IHN virus, which was found in hatchery sockeye salmon. This particular virus is transmitted to the eggs. Another virus mentioned goes by the acronym VEN.

One resident said they had seen unusually small red salmon with small eggs, which had blood spots at the end of the egg sac. He wanted to know where he could send samples of the abnormal sockeyes he finds. John Wilcock said he could send them to Sam Sharr in Cordova. He recommended sending the whole fish, fresh and not frozen. The fish should be kept cold and sent within twenty-four hours of death.

Mr. Kompkoff said he would like to see seals tested from Tatitlek's harvest areas. He said the numbers of seals, sea lions, and everything else are down even from last year. He said we probably would have to have someone stay there at least a week in order to get samples of five seals.

Mr. Kompkoff said he fears that the future holds a drastic economic change for his community. He sees much more reliance on store bought foods.

Mr. Kompkoff wanted to take time to talk to some people in the community before getting back to us about what sites and resources they want to see tested.

The meeting ended at three. Since they had nearly an hour before they were scheduled to leave the community, Miraglia and Wilcock took the opportunity to visit with one of the community's elders. The elder was glad for the company, and invited them in for coffee and tea. He had a lot of questions for Wilcock, about herring and salmon and enhancement.

The elder said the octopus dens in the intertidal are still empty. Wilcock asked him how they caught octopus. The elder said "We used to go by the moon. When there was a good moon, the tide would go out, and we'd go down there and get them. We knew where they lived, their places under the rocks, and we had a long stick with a hook on the end, we'd push that under there, and pull them out". He also mentioned that people used to occasionally catch king crab on their halibut hooks. He said there aren't any king crab out there now.

Phone Contacts

ALASKA PENINSULA

Since there was no testing in the Alaska Peninsula communities in 1993, we did not do a systematic canvassing of these communities in 1994. However, Lisa Scarbrough spoke to some residents of Perryville and Ivanof Bay, in April 1994.

Several people in Perryville recently got sick from eating razor clams from Humpback Bay. This was due to the presence of paralytic shellfish poison in the clams. One resident of Perryville told Scarbrough, "We are still concerned about our wild resources following the oil spill. We harvest what we can, but wonder what happened to seals and octopus and other foods that used to be plentiful".

Residents of Ivanof Bay said that the clam population was down in 1993, and the clams were not as big, and "puffy" as normal. However, they say the clams look good this spring (1994). One person said they thought it might be some sort of a cycle, not related to the oil spill.

Residents of both communities said there are still tar balls coming up on the beaches after big storms, but there does not appear to be as much as oil as there was a year ago.

It is Scarbrough's opinion that there would be interest in testing clams for paralytic shellfish poison, but not for oil contamination.

DISCUSSION

Concern over the effects of the oil spill on subsistence resources persists. Although some people are still concerned about the possibility of adverse health effects on humans consuming resources contaminated with oil, many have accepted the advice of the Oil Spill Health Task Force. However, it must be remembered that while the Task Force found that most resources were safe to eat, even if they had been in contact with oil, there were exceptions to this. The Expert Toxicological Committee found that most animals including finfish, birds and land mammals are able to metabolize hydrocarbons and excrete the toxins in their bile. Because of this the hydrocarbons never get into the edible flesh of the animal.

Some of the very heavily oiled seals found in Prince William Sound in 1989 showed elevated levels of low molecular weight hydrocarbons in their blubber, but not in other tissues in their bodies. According to Kathy Frost, a biologist with the Alaska Department of Fish and Game, this is because oil based contaminants are attracted to fat, so blubber collects more of these contaminants than the muscle or organs. In 1990, seals from some of the same areas showed much lower levels of the low molecular weight hydrocarbons, and slightly higher levels of the high molecular weight hydrocarbons. The blubber of seals taken from the harvest areas of Chenega Bay in 1993 did not show elevated levels of hydrocarbons. The levels of hydrocarbons found in the 1993 blubber samples were as low as the levels found in the laboratory's method blanks. Unless they find a seal that is covered in oil, as many seals were in Prince William Sound in 1989, subsistence users do not need to be concerned about hydrocarbon contamination in seal blubber.

Shellfish also constitute an exception to the general advice of the Expert Toxicological Committee. Shellfish, including clams, mussels, and cockles do

not have the ability to get rid of hydrocarbons quickly. They accumulate these toxins and retain them for a long period of time. The advice of the Oil Spill Health Task Force has always been that while the additional risk of cancer resulting from eating shellfish contaminated with crude oil is minimal, it is an avoidable risk, and people should not harvest or consume shellfish from beaches where they can see or smell oil on the surface or subsurface.

Through community meetings and newsletters, the Division of Subsistence, working in cooperation with the Oil Spill Health Task Force has disseminated the advice of the Expert Toxicological Committee. It became evident in the course of the current project, that the communities on Kodiak Island had not received this message as much as the communities of Prince William Sound and the lower Kenai Peninsula. An effective dialog was begun there with the regional meeting we held there in February 1994. It will be important to concentrate more on Kodiak in the 1994 subsistence restoration effort than we have in the past.

While a few subsistence users may still not be aware of the testing of subsistence resources, or of the advice of the Oil Spill Health Task Force, there are others that are aware, but choose not to accept the advice. Some people have said they do not trust the test results themselves. The tour of the lab in Seattle was intended to help subsistence users a better understanding of how the tests are done. It also gave community representatives an opportunity to meet the people who run the tests. Comments from some of those who participated in the tour indicated that the tour had been at least partly successful in increasing their trust in the test results. However, it is clear this is not the case for Tatitlek. In 1994 we will be conducting a second tour, this time taking the Kodiak Island representatives who were prevented from attending by bad weather last year.

Distrust of the advice of the Task Force has also arisen as a result of poorly worded or misunderstood comments made publicly by members of the Task Force or its member groups. People are also aware that Exxon remains a member group in the Task Force. Exxon has had a much smaller role in the subsistence restoration project than it has in earlier subsistence food testing programs. Exxon's participation in the current project has been limited to sending representatives to the Oil Spill Health Task Force meeting held in Anchorage in August 1993. It seems that the newsletters are received better now that Exxon is no longer involved in editing them. It also helps that people see the newsletter reporting some of the problems they are seeing, and is not painting an unrealistically rosy version of the state of affairs in the oil spill region.

The residents of Tatitlek have suggested that the only thing that would get them to trust the advice of the Task Force would be for one of the scientists to move to Tatitlek and eat local wild foods for a year (As long as the scientist did not get sick). Staff of the Division of Subsistence do eat local foods when we visit these communities, but we probably could not have someone live in Tatitlek for a year (Though we would not have any trouble finding volunteers).

Another factor in the continued concern over subsistence food safety after the oil spill, is the observation of abnormalities in resource species and other animals. The most dramatic example of this is the failure of the herring fishery in Prince William Sound in 1993 (at this writing, it looks like we are experiencing the same thing again in 1994). In addition to a weak return, the herring that did come back were visibly diseased. Because we had funds available to deal with subsistence food concerns, we were able to bring the biologists working with the herring into contact with the subsistence users. Subsistence users indicated that they appreciated the opportunity for direct communication. This is something we anticipate doing more of in 1994. As concern shifts away from the fear of getting sick from eating foods contaminated with oil, to concern about the effects of metabolizing the oil on the exposed animals themselves, these sorts of meetings are likely to be more useful than additional hydrocarbon tests.

A lot of interest has been expressed by subsistence users in the oil spill area in sending in abnormal animals in so they can be examined by biologists, pathologists or others who may be able to explain the reasons for the abnormalities. It may prove necessary to set up a program which allows residents of the impacted communities to do this. Such a program would

involve coming up with a list of researchers willing to work with such samples, training community residents, putting together protocols for the collection and handling of different types of samples, and placing sampling kits and packaging materials in the communities. It would be important to set up accounts with various air carriers, so the community residents would not have to pay to ship the samples.

People continue to report the scarcity of some resources. This is especially the case in Prince William Sound. Subsistence users there report fewer seals, sea lions, and wild birds available to harvest. They are also very concerned about the failure of the herring and pink salmon runs in 1993. Ever since the spill residents of Chenega Bay and Tatitlek have reported that there are no longer any octopus in the dens along the shore where they used to harvest them. People are still getting octopus, but these are larger ones that are caught in pots or on lines out in deep water. The smaller octopus from the dens near shore are preferred for eating. According to Charlie Trowbridge with the Alaska Department of Fish and Game in Cordova, biologists do not know enough about the octopus in Prince William Sound to know whether these two different sizes of octopus are different species or just different life stages in the same species.

Outside of Prince William Sound, people report some scarcity, but it is not as dramatic, and people are generally not as adamant about a connection between these shortages and the oil spill. More common in the lower Kenai Peninsula and the Kodiak Island regions, is a description of animals that appear smaller or seem to be growing more slowly than they should be. We have heard this with regard to clams and mussels throughout the oil spill impact area. This is consistent with laboratory tests which have shown that shellfish exposed to crude oil will grow at a slower than normal rate. Some community representatives at the Kodiak regional meeting reported that the red salmon that returned in 1993 were smaller than normal.

In Prince William Sound and the lower Kenai Peninsula concerns have been raised about the fate and effects of chemicals used in the oil spill clean up. In Prince William Sound, the concern has mostly centered around Inipol and Correxit. In Port Graham, on the lower Kenai Peninsula, people have repeatedly raised concerns about the chemicals used at the boat cleaning station in Port Graham Bay. They are concerned about both the effects of the chemicals on fish and shellfish in the area, as well as the effects of exposure to the chemicals on people who worked at the station. It has proven difficult to get accurate information on what chemicals were used where and in what quantity. Once such information is assembled, an assessment can be made on what the possible effects of these chemicals may have been. This information can then be published in the newsletter.

CONCLUSIONS

The project has been somewhat effective in getting the advice of the Oil Spill Health Task Force out to subsistence users in the communities impacted by the oil spill. It is necessary to do some additional hydrocarbon testing to make sure all of the areas and resources people want to see tested have been tested. 1994 should be the last year for such testing. The emphasis should now shift more towards helping people understand the abnormalities they are seeing. This can be done by continuing and expanding the dialog that has now begun between subsistence users and biologists and pathologists working with the damaged resources. Another possible way to help with these concerns is to set up a system where subsistence harvesters can send samples of abnormal resources in to be examined by biologists or pathologists, and then reporting their interpretations back to the communities.

With Exxon no longer involved in the editing of the newsletter, it has become a more effective tool for the communication of information relating to subsistence food safety and the oil spill. The newsletter should continue, and will be useful for reporting the results of other oil spill restoration and monitoring projects to subsistence users. We will continue efforts to run down information on the various chemicals used in the oil spill clean up for a future issue of the newsletter.

The tour of the lab in Seattle was partly successful at increasing the level of trust in the test results. We will be doing another tour in 1994 for representatives of communities that were not involved in the 1993 tour.

As information from the various restoration projects becomes public, it is important to integrate these findings with the health assessments from the Task Force and with subsistence harvesters' own observations. The findings from these studies are potentially a powerful source of information for subsistence harvesters to more fully understand current conditions in their traditional harvest areas. However, injuries to subsistence uses are likely to remain as long as harvesters believe that they have not been fully informed about the condition of natural resources and habitats in the spill area. Consequently, this information must be communicated clearly and by methods appropriate to these communities.

ACKNOWLEDGMENTS

The author acknowledges the assistance of Dr. Sin-Lam Chan, National Marine Fisheries Service, Environmental Conservation Division, Seattle, and the following Alaska Department of Fish and Game, Division of Subsistence staff: Jeff Barnhart, James Fall, Ana Lewis, Rachel Mason, Craig Mishler, Lisa Scarbrough, Jody Seitz, Ron Stanek, Lisa Tomrdle, Charles Utermohle, and Vicki Vanek.

The author also acknowledges the residents of the affected communities who participated in this project.

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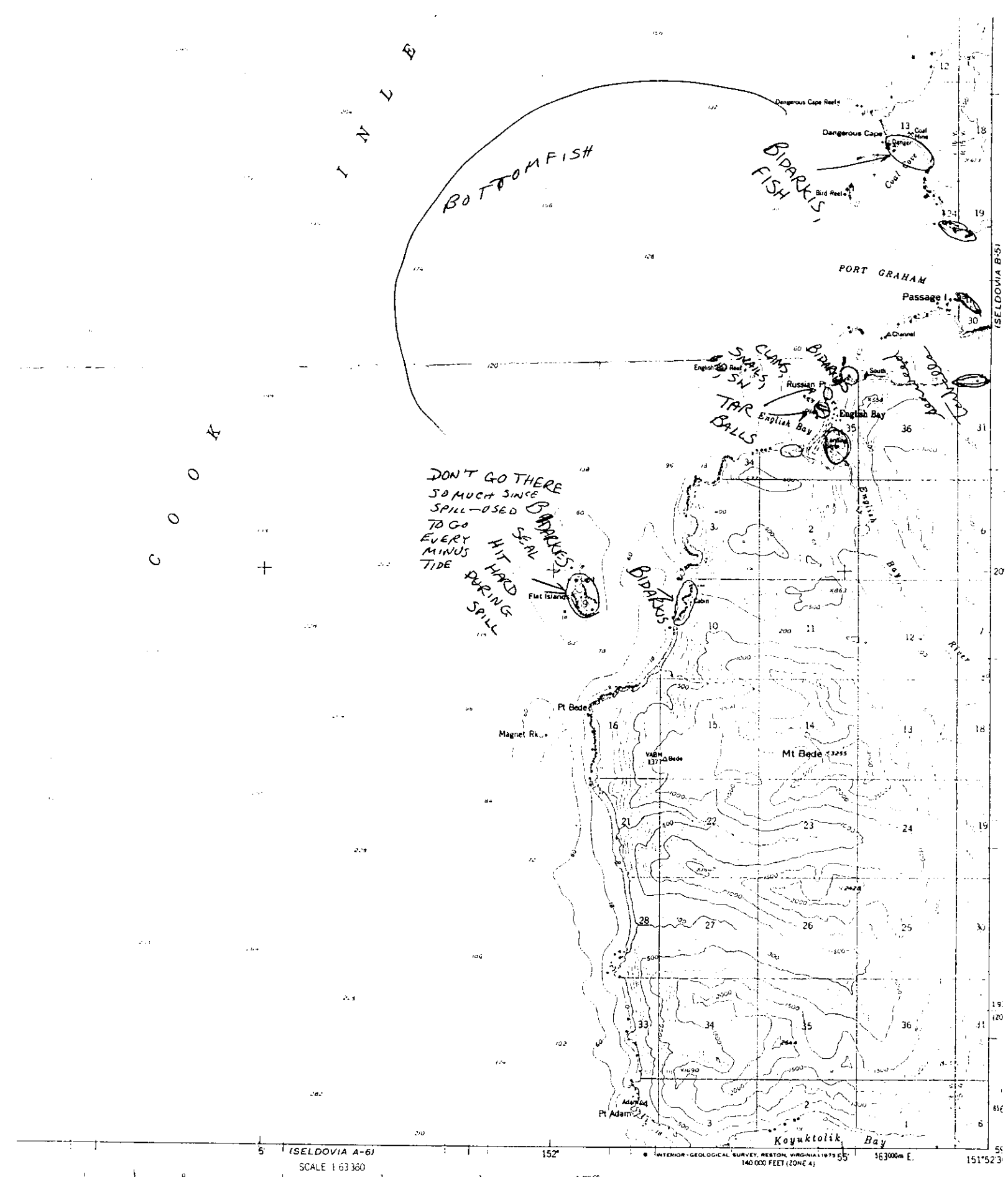
APPENDIX 1:

Maps from Port Graham and Nanwalek Community Meetings



SCALE 1:63360

4 MILES
21000 FEET
5 KILOMETRES

CONTOUR INTERVAL 100 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
DEPTH CURVES AND SOUNDINGS IN FEET DATUM IS MEAN LOWER LOW WATER
SHORELINE SHOWN REPRESENTS THE APPROXIMATE LINE OF MEAN HIGH WATER
THE AVERAGE RANGE OF TIDE IS APPROXIMATELY 14 FEET

INTERIOR-GEOLOGICAL SURVEY, RESTON, VIRGINIA-1975
10,000-FOOT GRID BASED ON ALASKA COORDINATE SYSTEM
140 000 FEET (ZONE 4)

ROAD CLASSIFICATION

No roads or trails in this area

ALASKA
QUADRANGLE LOCATION

FOR SALE BY U. S. GEOLOGICAL SURVEY
FAIRBANKS, ALASKA 99701, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092

SELDOVIA (B-6), ALASKA
N5915-W15152.5/15X22.5

SELDOVIA (B-5)
ALASKA

APPENDIX 2:

Documentation of Kodiak Contacts and Related Correspondence

M E M O R A N D U M

TO: Rita Miraglia, Project Leader

FROM: Rachel Mason and Jeffrey Barnhart, Kodiak

DATE: May 25, 1993

SUBJECT: 1993 Oil Spill Testing Program, Telephone Contacts in Kodiak Area Communities

Between May 19 and May 24, 1993, Jeff Barnhart and Rachel Mason called community leaders and other knowledgeable people in Kodiak City and each of the six Kodiak area villages. We informed these respondents that ADF&G had received funding from the Oil Spill Trustee Council to do another round of testing of subsistence resources; that the work has been contracted out to the Pacific Rim Village Coalition; and that the testing with the help of local assistants will be done some time in June. We asked each telephone contact what resources and specific harvesting areas near their community, if any, need to be tested this year. We also asked whether residents of each community were still seeing any problems with subsistence foods as a result of the oil spill. Following are the responses, organized by community:

Kodiak City:

- Margie Derenoff at KANA thought that shellfish, birds, sea otters and seals were likely candidates for testing. Especially since sea mammals are "pretty mobile critters," she thought there should be tests in a large number of areas. She suggested that testing should take place on both sides of the Shelikof Strait, both on the west side of Kodiak Island from Afognak on down through Larsen Bay and Karluk, and the mainland side. She also thought there should be some follow up to studies done by the state, the University of Alaska School of Fisheries and the USFWS on intertidal resources and algae on the Alaska Peninsula shores.

- Margaret Roberts of the Kodiak Tribal Council wanted to see a priority placed on testing of sea mammals and mollusks. She mentioned that some sea mammals were never tested. Since these animals do so much traveling, she said, they should be tested in a number of areas. She mentioned that people in the Kodiak area are "still finding oil all over--in areas that were heavily impacted." She suggested that the Pacific Rim Village Coalition involve the Intertribal Council (a group of all Kodiak area tribal councils) and KANA in the planning process for 1993 testing.

- Gary Bloomquist, Kodiak city manager, was not in Kodiak at the time of the oil spill, but he is presently in charge of the Emergency Services Council and is the city's contact person for disaster response. He did not know of any resources or areas that presently need to be tested for oil. He had not heard of any problems with subsistence foods that were presently occurring. However, he offered to check around and call us if he heard of anything.

- Jerome Selby, Kodiak borough mayor, did not know of any problems with subsistence foods that people in Kodiak were now seeing. He thought that the 1993 testers should sample the 1989 sites that had been found to have elevated hydrocarbon levels, as a follow-up. His reasoning was that it made the most sense to test where we know there has been oil. He mentioned Izhut Bay and Chief Cove as likely locations. Jeff Barnhart, who made this phone call, pointed out that Kodiak Interagency Shoreline Cleanup Committee (KISCC) had a winter monitoring station set up at the Izhut Bay site in 1989-1990. This site was cleaned by both the Ouzinkie village cleanup crew and by an Exxon-chartered vessel from Homer.

Ouzinkie:

- Andy Anderson of the Ouzinkie Native Corporation could not be contacted. Arthur Haakanson, Lands Manager for the ONC, offered his observation that people in Ouzinkie have been eating the clams and they seem to be all right. He said that people have complained of oil or tar but they have not said exactly where it is, and Arthur has not personally seen any recently. If there is going to be testing, Arthur thought it should be at Camel's Rock, Doctor's River, Garden Point, and both sides of Sourdough Flats. These are all very popular subsistence harvesting areas for Ouzinkie residents. Arthur thought the people doing the sampling should make sure to dig down beneath the surface. He also mentioned that anadromous streams should be checked, since the salmon seem "off" [in population]. Although there are reports of widespread bird deaths, Arthur did not think these have been linked to the oil spill.

- Zach Chichenoff, Ouzinkie mayor, said that cockles were the resource most in need of being tested, along with clams. Camel's Rock, he said, was the area where sampling should take place. This harvesting area is one or two miles from Ouzinkie, on the Kodiak Island side. Zach himself does not do much subsistence harvesting. He reported that Andy Anderson, while digging clams

at Camel's Rock, found an unknown oily substance in the substrate. Zach also said that there were not many oldsquaw ducks around since the oil spill.

- Theodore Squartsoff, active subsistence harvester, emphatically stated that no more testing is needed. He said his family is still eating the same wild foods they were eating before the oil spill and have eaten since then, and he is still harvesting in the same places. He has noticed a decline in the population of clams, and that those clams that are there are limp and lifeless, but he does not think this has to do with oil. He believes that either sea otters are getting them, or they have been over-harvested by humans.

- Herman Squartsoff, of the Ouzinkie Tribal Council, had not personally seen any recent problems in the area with subsistence foods as a result of the oil spill. However, he planned to talk it over with others in the community and call us back if he heard about any thing. He said that shellfish and possibly ducks ought to be tested this year. He didn't know about deer or seals. He did not offer suggestions on specific areas to be tested, only saying that these ought to be "local areas."

Port Lions:

- Bobby Nelson, president of the Port Lions Tribal Council, said he had been eating everything himself and had not seen any problems with subsistence foods. Since he was about to go fishing, he suggested we call around to other people. Meanwhile, he promised to ask around the tribal office and said he would call us if he heard anything new.

- Sue Girard, vice president of the Port Lions Tribal Council, expressed more concern about the social impacts of the oil spill than about hydrocarbons now in the foods. "They won't find anything," she predicted when she heard that the 1993 testing would be for oil contamination. However, she said that if it was up to her all the resources would be tested this year. She suggested that samples be taken in Barabara Cove and in the clam beds by the Port Lions airstrip as well as in Litnik, Marka Bay, Danger Bay, and other bays on Afognak Island. She emphasized that the testers would have to dig in the sand to find oil: "Of course they're not going to see any oil on the surface."

- Pete Squartsoff, active subsistence harvester, was extremely skeptical of the value of doing any testing. He stated that he

had never had any problem with any subsistence resource. Even during the oil spill, he said, he was very critical of the testing program and didn't see any need for it.

Larsen Bay:

- Allen Panamaroff, Larsen Bay city mayor, was one of the people who assisted Craig Mishler in taking samples in 1989 or 1990. He thought that the 1993 tests should be in those areas, and of those resources, that were tested previously, so that the results could be compared. Resources that he thought should be tested included clams, mussels, bidarkies, sea urchins, bottomfish (especially halibut), and crab. He thought that some resources, perhaps including crab, might have been dropped from earlier testing programs because the weather was bad, making it impossible to go out for certain wild foods. He would like to make sure that crab are fully tested in this year's round. He is also interested in tests on salmon, especially in the Karluk River where he says studies have already been done. Although he does not think these resources are as critical as others, he would also like to see berries tested, along with land mammals that go down to the beaches and might encounter oil there. Allen added that although there are still people in Larsen Bay who won't go to get clams, in the last year they seem to be coming around. There is less and less concern about oil contamination.

- Frank Carlson, former Larsen Bay Tribal Council president, thought that clams, sea urchins, halibut, and harlequin and goldeneye ducks were the resources most in need of being tested. He suggested that testing take place at the Chief Point area, in the Larsen Bay area, and at specific locations that can be pointed out by Frank. In recent months, Frank has not personally seen any oil-related problems with subsistence foods. He commented that the Chief Point area was used prior to the oil spill for harvesting clams. It is no longer used because of the fear of oil contamination. No bivalves were ever tested from Chief Point. Frank said he spoke to setnetters who said they found oil at Chief Point this spring.

- Mike Carlson, deputy mayor of Larsen Bay, said that crab and other shellfish (especially clams), halibut, harlequin ducks, and goldeneye ducks should be tested this year. In his opinion, Spiridon Bay should be tested, as well as areas closer to Larsen Bay. Specific areas can be pointed out [by Mike] when the sampling team arrives in Larsen Bay. Mike has not recently seen any problems with subsistence foods as a result of the oil spill.

1993 Oil Spill Testing Program
Telephone Contacts
Page Five

- Brad Aga, VPSO and active subsistence harvester, did not think any resources or areas now need to be tested. He stated that most collecting of resources such as clams, chitons, etc. occurs near the village of Larsen Bay. People do not seem hesitant about harvesting these resources. Harvesting occurs on most every low tide. No one has indicated any problems associated with Exxon Valdez oil. Brad indicated that he personally has not collected any oiled resources and has seen no problem with any resource as a result of the Exxon Valdez oil spill.

- Alex Panamaroff, postmaster of Larsen Bay, thought that clams and deer were most in need of testing. He said that the deer should be tested because they eat kelp. He thought that the butter clam beds in Larsen Bay should be tested, as well as the razor clam beds at Long Beach. He was particularly concerned about clams taken from "across the bay." He mentioned that people had found clams with "black stuff" in them. Perhaps because there has not been enough testing, the population seems to be down. Among his comments were the following: "Since the oil spill I and my family have eaten less than 25% of what we used to. We won't know the effects for many years. We've had some bad commercial salmon fishing years."

<u>Karluk:</u>

- Larry Sugak, former Tribal Council president in Karluk, said that 1993 tests (as well as tests in 1994 and 1995) should look at returning salmon to see whether they have been affected by oil. He also thought that clams should be tested, especially the razor clams at Sturgeon Bay, in the lagoon. In 1989, Larry found some sheen on the water in which he had some clams from Sturgeon Bay. He still doesn't trust the clams. He sees tarballs drifting in now and then in the Karluk Lagoon.

- Eli Malutin, Tribal Council member, thought that halibut and clams were the resources that should be tested. He suggested that the Sturgeon River is the location that needs to be tested. Eli worked as a local assistant for ADF&G in the former testing program.

- Lynn Reft, Tribal Council president, said she was going to talk to other council members and suggested Rachel call back the next day. The next morning, Lynn was not there, but Rachel spoke instead to her sister Katherine Reft, who is also a member of the Tribal Council. Katherine said that bottomfish, especially halibut, ought to be tested. There seem to be less bottomfish

than before the oil spill. Not many people are catching halibut lately. Ouducks (sea urchins) and chiducks (bidarkies) should also be tested. She wanted to see the whole area around Karluk tested. According to Katherine, people are still finding tarballs with birds in them near the Sturgeon River.

Akhiok:

- Marvin Agnot, mayor of Akhiok, was contacted by phone at home after several phone calls to the city office. He stated that he had given up the job of mayor for the summer, but that David Eluska would be taking over and would be able to address the questions of subsistence resource testing. Rachel tried unsuccessfully to contact Nick Peterson, Sr., Tribal Council president, through the city office.

- David Eluska, deputy mayor of Akhiok, said that clams were the resource most in need of being tested. Razor clams should be tested at Tanner Head, and butter clams at Akhiok Island. Gumboots (bidarkies) also should be tested. David said these were found on Akhiok Island as well. He mentioned that the pink salmon return has been pretty poor around Akhiok. He wondered if there might be some tests done on this species--not necessarily for oil contamination, but to see if there were population changes, possibly oil-related. David said people in Akhiok were still wondering if it was OK to eat subsistence foods. He said that some people are still harvesting in the inner bay, because there was less activity than in the outer bay. He would like to see a few samples taken in both the inner and the outer bays.

- Mitch Simeonoff, vice president of the Akhiok Tribal Council, was out of town and could not be contacted. A young man named Roy Rastopsoff answered the phone at Mitch's house and said there were no recent oil-related problems with subsistence foods that he knows about.

Old Harbor:

- Freddie Christiansen, president of the Old Harbor Tribal Council, could not be contacted because he was out of town commercial fishing. Rick Berns, Mayor of Old Harbor, was also out fishing. Carl Christiansen happened to answer the phone at the Sitkalidak Lodge when Jeff called looking for Freddie or

Rick. Carl has not seen any problems with subsistence foods and knows of no one who has.

- Sven Haakanson, former mayor of Old Harbor, thought that mussels, clams, and other shellfish need to be tested this year. He suggested that testing be done in the Sitkalidak Straits. Sven reported that people in Old Harbor are finding a few tarballs. He mentioned that there are people who haven't eaten any clams since the oil spill.

- Wanda Price, Old Harbor city clerk, said that the 1993 tests should take "a sampling of everything." She was most concerned about Fox Lagoon and the Sitkalidak Straits. She did not mention any problems with subsistence foods still being seen in Old Harbor as a result of the spill.

General Conclusions:

Predictably, our telephone inquiries brought a mixed response. Overall, community residents were not extremely enthusiastic about the idea of further testing. However, most were receptive to the idea of more tests, even if they thought the tests probably wouldn't turn up anything new. Some thought that the oil-related problems people were now seeing in subsistence foods were not likely to be ones that could be determined by hydrocarbon testing. There was more concern about population declines and sublethal effects such as reproductive failure than there was about the literal presence of oil. None of the people we talked to indicated that it would be necessary or productive to hold a community meeting to discuss the issue of 1993 oil testing.

If only two communities are chosen for 1993 testing in the Kodiak area, it is our recommendation that these be Ouzinkie and Larsen Bay. As has been true since the oil spill, there is disagreement among Ouzinkie respondents about whether testing is necessary. However, the already-documented negative impacts of the oil spill on quantities of subsistence harvesting, and the high level of concern about oil contamination noted in previous years, seem to warrant further testing. In Larsen Bay, there seems to be more concern reported at the present time than in other villages. Several respondents there mentioned Chief Point, one of the most heavily-oiled places in the Kodiak Island area. One of the Kodiak City respondents also mentioned this specific location.

The communities of Port Lions and Karluk, although respondents there did not seem overwhelmed by concerns about oil, may well feel excluded if testing is only done in the neighboring villages of Ouzinkie and Larsen Bay. It is suggested that some testing be done in harvesting areas that are shared by two communities. Many of the shared areas are salmon harvesting locations, so this might entail adding some tests on salmon. For example, this could include Litnik on Afognak Island, used by residents of both Ouzinkie and Port Lions, or the Karluk Lagoon, used by residents of both Karluk and Larsen Bay. It should be noted, though, that neither of these areas were ever heavily oiled.

Even though some residents of Kodiak City, Akhiok and Old Harbor had specific concerns, these communities appear to have the least significant oil impacts at present of any in the area. Since there seem to be some residents who still have concerns, however, these communities should not be dropped from the testing program if there are funds to take samples in every Kodiak area community.

MEMORANDUM
STATE OF ALASKA
DEPARTMENT OF FISH AND GAME
DIVISION OF SUBSISTENCE

TO: Rachel Mason
Jeff Barnhart
Subsistence Resource Specialists
Division of Subsistence
Kodiak

DATE: June 9, 1993

FROM: Rita A. Miraglia
Oil Spill Coordinator
Division of Subsistence
Anchorage

RE: Subsistence
Restoration Project
on Kodiak

Thanks for your detailed summary of your conversations with leaders as well as other residents of the communities on Kodiak Island with regard to the subsistence restoration project funded by the *Exxon Valdez* Oil Spill Trustee Council. After reading the summary, Jim Fall, Craig Mishler and I met to decide on specific sites to be sampled as part of the project.

Our decisions were based on your conversations with community residents, your recommendations, and information available from earlier studies. Since funds are limited, priority was given to those sites that were significantly oiled in the *Exxon Valdez* spill, constituted important subsistence use sites prior to the spill, and have been either avoided or used less after the spill due to concerns of oil contamination. We will not be testing any fish from the Kodiak region. No concern was expressed about contamination to bottomfish. Although concern was expressed about salmon, we know from tests conducted on salmon in Prince William Sound and elsewhere, in the two years after the spill, that even salmon swimming through oil slicks did not show signs of contamination in their edible flesh.

The sites selected for testing are Camel Rock and Sourdough Flats near Ouzinkie, Chiefs Point near Larsen Bay, Tanner Head near Akhiok, and the intertidal area at the mouth of the Sturgeon River near Karluk. The attached table lists all of the sites to be tested throughout the project area, and also goes into more detail about the species to be tested.

The sample collection will be conducted by Dave Erikson, working as a consultant to the Pacific Rim Villages Coalition. Local residents will be hired to assist in the sample collection, and to receive training. The Kodiak sampling trip is scheduled for the low tide cycle in the latter part of July (July 16 through July 21), a second collection trip will occur in September.

I would appreciate it if you would communicate the decisions and the reasons for them to the residents of the communities on Kodiak Island, especially those who assisted us in defining the continued concerns.

If you have any questions, please feel free to call me (267-2358) or Craig (267-2357).

Thanks again for all your help.

cc: Jim Fall
Craig Mishler

SAMPLING PLAN
SUBSISTENCE RESTORATION PROJECT
ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF SUBSISTENCE

COMMUNITY	SITE NUMBER	SITE NAME	LOCATION DESCRIPTION	RESOURCES TO BE COLLECTED
CHENEGA BAY	CHE10	FOX FARM	East of North Twin Bay, Elrington Isl.	Mussels, Butterclams, Littleneck Clams
CHENEGA BAY	CHE25	DELENIA ISLAND	In Dangerous Passage, NE of Chenega Isl.	Mussels, Butterclams, Littleneck Clams
CHENEGA BAY	CHE2	EAST SAWMILL BAY	SE of Johnson Cove, Evans Isl.	Rockfish
CHENEGA BAY	CHE 26	SHELTER BAY	N of Shelter Bay, Evans Isl.	Rockfish
TATITLEK	TAT1	NORTH BLIGH ISLAND	Intertidal area North of Bligh Island	Mussels, Butterclams, Littleneck Clams
TATITLEK	TAT2	SW BOULDER BAY	E of Tatitlek, on the SW shore of Boulder Bay	Mussels, Butterclams, Littleneck Clams
TATITLEK	TAT4	BIDARKI POINT	.5 KM S of Bidarki Point	Rockfish
PORT GRAHAM	PTG4	DUNCAN SLOUGH	.7 KM SE of Port Graham Village	Mussels, Chitons, Soft-shelled Clams, Snails
PORT GRAHAM	PTG2	MOUTH OF BAY	Outside the mouth of Port Graham Bay	Rockfish
NANWALEK	NAN1	RUSSIAN POINT	.2 KM N of Nanwalek	Mussels, Clams, Snails, Bidarkis
NANWALEK	NAN2	ANDERSON BEACH	S end of Kenai Peninsula, bet. Eliz & Pearl Isls.	Mussels, Clams
PTG/NAN	WNB3	WINDY BAY	Easternmost of 3 small islands in Windy Bay	Mussels, Chitons
OUZINKIE	OUZ2	CAMEL ROCK	Low Island Anchorage	Mussels, Butterclams, Littleneck Clams, Chitons
OUZINKIE	OUZ3	SOURDOUGH FLATS	S end, on Uzinkie Point	Mussels, Butterclams, Littleneck Clams, Sea Urchins
LARSEN BAY	LAB15	CHIEFS POINT	NE side of the entrance to Spiridon & Uyak Bay	Mussels, Clams
AKHIOK	AKH6	TANNER HEAD	S of Rodman Reach, Kodiak Island	Mussels, Clams
KARLUK	KAR2	STURGEON R.	Intertidal at mouth of Sturgeon River	Mussels, Butterclams, Littleneck Clams

MEMORANDUM

TO: Rita Miraglia
Jim Fall
Craig Mishler
Division of Subsistence
Anchorage

DATE: June 14, 1993

FROM: Jeff Barnhart
Division of Subsistence
Kodiak

RE: Subsistence
Restoration Project
on Kodiak

I received your memo on the subsistence restoration project site selection on June 11. After reviewing the memo I have several concerns about the decisions that were made about the project.

1) It is misleading to say "No concern was expressed about contamination to bottomfish". On the contrary, concern was expressed by village residents about oil contamination to bottomfish. In Larsen Bay, Allen Panamaroff and Mike Carlson indicated bottomfish should be tested. In Karluk both Eli Malutin and Katherine Reft wanted bottomfish tested.

2) The three criteria used for site selection fail when applied to Tanner Head. Tanner Head was not significantly oiled. There was little oil found in Alitak Bay. It is the only area I know of on Kodiak Island where commercial salmon fishing was permitted during the summer of 1989. Fishing was permitted because the water was free of oil contamination.

3) In Larsen Bay, Allen Panamaroff and Mike Carlson both thought crab should be tested. Following up on this I contacted Al Spalinger of the ADF&G shellfish management. Al said a few crab were sent in for hydrocarbon testing during 1989. He was not informed of the test results. I also contacted Dr. John French, director of the fisheries industrial technology center. I wanted to know if crab had the ability to metabolize hydrocarbons. Dr. French expressed to me that crab are unique in this respect. Their system is more similar to fish than to mollusks except, of course, they do not have a bile. Research on blue king crab and lobster has shown both species rid themselves of hydrocarbons at a rate slower than fish but faster than mollusks. There were only a few crab samples from Kodiak tested for hydrocarbons. Since there is very little in the way of a database on this resource the restoration project provides an excellent opportunity to add information to this limited database.

4) We know the Uyak Bay area was one of the areas hardest hit by the EVOS on the west side of Kodiak. It would be a good location to collect crab for hydrocarbon testing. Based on my EVOS work with ADF&G habitat division I'd suggest either the Chief Point or

Hook Point areas as potential sites for crab collecting.

If you have any questions, please feel free to call me at 486-4071.

F

M E M O R A N D U M

TO: Rita Miraglia, Project Leader

FROM: Jeff Barnhart, Kodiak Subsistence Office

DATE: June 16, 1993

SUBJECT: 1993 EVOS Subsistence Restoration Project, Kodiak Island. Followup telephone contacts with Kodiak Island communities.

Between June 11 and June 16, 1993, I contacted, by telephone, community leaders and active subsistence harvesters who initially provided input into the 1993 EVOS subsistence restoration project on Kodiak Island. I informed them of the decision made by the Anchorage subsistence division staff with regard to site selection and species to be collected for hydrocarbon testing. I explained who would be conducting the collecting as well as the time period selected for the collecting. Following are the responses, organized by community.

Kodiak City:

Margie Derenoff no longer works at KANA. I was unable to contact her.

Margaret Roberts of the Kodiak Tribal Council had no additional comments.

Gary Bloomquist, Kodiak city manager, was receptive to the testing program. He did not have any additional comments about the restoration project.

Jerome Selby, Kodiak Island Borough mayor, ask why Tanner Head was selected as a site to test bivalves for hydrocarbon contamination when there was no impact from the EVOS in Alitak Bay. This did not make sense to him. He also wanted to know why there was not a site selected near Port Lions.

Ouzinkie:

Authur Haakanson, lands manager for the ONC, agreed that both Camel's Rock and Sourdough Flats were important locations to collect samples.

Zach Chichenoff, Ouzinkie mayor, was satisfied with the information I provided him with.

Herman Squartsoff, active subsistence harvester, formerly with the Ouzinkie Tribal Council, was satisfied with the information I provided him with.

Theodore Squartsoff, active subsistence harvester, was commercial salmon fishing and not at home when I called. I passed the information along to his wife.

Port Lions:

Bobby Nelson, president of the Port Lions Tribal Council, could not be contacted as he is commercial salmon fishing at Sand Point.

Sue Girard, vice president of the Port Lions Tribal Council, was upset with the decision not to collect resource samples for hydrocarbon testing in the vicinity of Port Lions. She expressed concern about the long term effects of the EVOS on the health of Port Lions residents. She said they are finding deformed fish. She also stated several people are ill in the village due to an unknown cause yet to be determined by the doctors. She wants me to send her and the tribal council a copy of the memo you sent me regarding how you selected sites for testing. I have reservations about sending this information to her. Since you made the decision not to sample in the Port Lions area I think it would be best for you to address her concerns about how sites were selected as well as why no sites were selected in the Port Lions area. Her address is P.O. Box 114; Port Lions, AK 99550. The tribal council address is P.O. Box 253; Port Lions, AK 99550.

Pete Squartsoff, active subsistence harvester is currently working at the Olga Bay Lodge. I passed the information along to his teenage daughter.

Larsen Bay:

Allen Panamaroff, Larsen Bay city mayor, expressed hope that Dave Erikson would telephone prior to his arrival to make arrangements for skiff transportation and personnel to assist with collecting resources. Allen can provide skiff transportation to Chief Point.

Frank Carlson, former Larsen Bay Tribal Council president, was unavailable for comment. I passed the information along to his wife.

Mike Carlson, deputy mayor of Larsen Bay, seemed pleased that Chief Point was selected as a sample site. He said Dave Erikson should contact him prior to arriving in Larsen Bay. Mike said he can provide skiff transportation and lodging if required.

Alex Panamaroff, postmaster of Larsen Bay was out of town commercial fishing. I passed the information along to his teenage daughter.

Karluk:

Larry Sugak, former tribal council president in Karluk, said the sampling was ok with him. He said they have been surveyed to

death. He thinks they should each receive $100.00 per survey for every survey the community participates in.

Eli Malutin, tribal council member, said Dave Erikson can call anytime prior to his arrival to schedule a sampling date and time.

Katherine Reft, tribal council member appreciated the information. No additional comments.

Akhiok:

David Eluska, deputy mayor of Akhiok said Dave Erikson should call at least two days prior to arrival so he can have a skiff available for transportation. Mr. Eluska wants to collect at several other locations in addition to Tanner Head.

Mitch Simeonoff, vice president of the Akhiok Tribal Council, is still out of town commercial fishing. I spoke to his wife who will pass the information along to him.

Old Harbor:

Sven Haakanson, former mayor of Old Harbor, had no additional comments.

Wanda Price, Old Harbor city clerk, wanted to know what areas on Kodiak Island were selected for sampling. I informed her of the specific sites. She had no other comments.

General Conclusions:

The communities of Ouzinkie and Larsen Bay seemed most enthusiastic and receptive to the testing program. Predictably, the communities of Port Lions and Old Harbor where no testing is scheduled were less than enthusiastic about the decision. Port Lions expressed the most concern about not being included in the sampling program.

It was difficult for me to justify to respondents the selection of the Tanner Head site based on the criteria that "Priority was given those sites that were significantly oiled in the EVOS". I would appreciate copies of the 1989 or 1990 EVOS survey data that substantiate the claim that Tanner Head was a significantly oiled site.

APPENDIX 3:

Cooperative Agreement Between ADF&G and PRVC

COOP-93-063

Cooperative Agreement
between the
Alaska Department of Fish and Game
and the
Pacific Rim Villages Coalition

This agreement is made and entered into by the Alaska Department of Fish and Game, Division of Subsistence, 333 Raspberry Road, Anchorage, Alaska 99518, and the Pacific Rim Villages Coalition, 3333 Denali Street, Suite 2208, Anchorage, Alaska 99503, for the period June 7, 1993 to October 31, 1993.

I. PURPOSE OF AGREEMENT

Subsistence uses of fish and other wildlife constitute a vital natural resource service that was injured by the *Exxon Valdez* oil spill. Data collected by the Alaska Department of Fish and Game's Division of Subsistence demonstrated this injury. Annual per capita subsistence harvests declined dramatically (from 12 percent to 77 percent decline compared to pre-spill averages) in ten of the communities in the path of the spill during the first year after the event. While some of these communities' harvests demonstrated a limited recovery in the second post-spill year, harvest levels in other affected communities showed no signs of recovery. Concern over the long term health effects of using resources from the spill area, a loss of confidence on the part of subsistence hunters and fishermen in their own abilities to determine if their traditional foods are safe to eat, and a perceived reduction in available resources, all contribute to the reduced harvest levels.

The Alaska Department of Fish and Game, Division of Subsistence (herein after referred to as ADF&G) has obtained funds from the *Exxon Valdez* Trustee Council to initiate a project to attempt to restore the subsistence uses of fish and wildlife damaged by the *Exxon Valdez* Oil Spill. As part of this project, samples of those subsistence species cited in community meetings as being of continued concern will be collected from harvest areas identified by subsistence users. The *Exxon Valdez* Trustee Council has indicated that it is desirable to involve the affected communities as much as possible in the project. The people who live in the area impacted by the Exxon Valdez oil spill suffered by the loss of use of subsistence resources, but they have also suffered from a feeling of helplessness to do anything to repair the damage. There is a need in these communities to actively participate in the restoration of the environment. By actively involving subsistence users in the collection of subsistence food samples for testing, we can partly answer this need. We also increase the chances that we can help people get answers to some of the lingering questions they have concerning the safety of subsistence foods in the wake of the *Exxon Valdez* oil spill. To this end, the Alaska Department of Fish and Game, Division of Subsistence has agreed to cooperatively work with the Pacific Rim Villages Coalition (herein after referred to as PRVC) to collect the samples of subsistence foods for testing, and deliver them to the National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northwest Fisheries Center in Seattle, where the samples will then be analyzed for the presence of hydrocarbon contamination. PRVC is a coalition of the villages of Chenega Bay, Tatitlek, Port Graham and Nanwalek, working with Chugach Alaska Corporation. These four villages were all in the path of the *Exxon Valdez* oil spill. PRVC will be hiring and training local people to

work on the sample collection, along with experienced biologists. Entering into this cooperative agreement with PRVC allows ADF&G to satisfy the need to involve subsistence users in this portion of the project, while insuring that the high technical standards required for the undertaking are also met.

II. COVENANTS OF THE DEPARTMENT OF FISH AND GAME
Division of Subsistence does hereby agree:

1. To provide up to $80,000 to PRVC to carry out their duties under this agreement. This includes all salary, travel and supplies. Payments will be made upon receipt and acceptance of monthly invoices.

2. To carry out the selection of sample collection sites in consultation with the affected communities.

3. To provide the PRVC with a sampling plan, listing the communities, sites and types of resources to be sampled by June 15th, 1993. The sampling plan will be incorporated as part of this agreement (Appendix C).

4. To provide PRVC with a sample collection form, and a chain of custody form.

5. Rita Miraglia will serve as project leader for ADF&G.

III. COVENANTS OF THE PACIFIC RIM VILLAGES COALITION
Pacific Rim Villages Coalition does hereby agree:

1. To submit a collection plan to the Division of Subsistence, including a detailed budget, staffing, and outlining methodology to be used, steps that will be taken to ensure local residents will be trained and involved in the sample collection process, and that there will be a project leader along on each sampling trip with experience in the collection and handling of biological specimens, due by June 14, 1993. This plan must be reviewed and approved by ADF&G prior to commencement of work activities on this project. Once approved, the collection plan and budget will be incorporated and made a part of this agreement.

2 To obtain all permits necessary for collection of samples of fish and shellfish.

3. Upon approval of the collection plan by the Division of Subsistence, and receipt of all necessary permits, to conduct two collection trips to each study community during the first year of the project (June 1993 and September 1993).

4. To collect samples of shellfish and rockfish at predetermined sites near the study communities, handling the samples according to a protocol established by the Division of Subsistence and the National Marine Fisheries Service Laboratory, which is attached (Appendix A), and made a part of this agreement.

5. Following consultation with the ADF&G project leader, to pack the selected

samples, following the protocol, and send them to the National Marine Fisheries Service, Northwest Fisheries Center, 2725 Montlake Blvd. East, Seattle, WA 98112. The remaining samples will be turned over to ADF&G.

6. To provide the Division of Subsistence with a written report after each sampling trip detailing sample collection, handling and delivery, including copies of all relevant field notes, collection forms, chain of custody forms and an inventory of samples.

7. To provide the ADF&G project leader with a detailed monthly invoice for review, approval and payment by ADF&G.

8. To maintain a separate set of records of their activities.

9. To contact the ADF&G project leader immediately if any problems are encountered.

10. Charles W. Totemoff will serve as project leader for PRVC.

IV. IT IS MUTUALLY AGREED THAT

1. Nothing in this agreement shall obligate any party in the expenditure of funds, or for future payments of money, in excess of appropriations authorized by law.

2. Each party agrees that it will be responsible for its own acts and the results thereof and each party shall not be responsible for the acts of the other party; and each party agrees it will assume to itself risk and liability resulting in any manner under this agreement.

3. No member of Congress, or the Commissioner, shall be admitted to any share or part of the agreement or to any benefit that may arise therefrom.

4. Each party will comply with all applicable laws, regulations, and executive orders relative to Equal Employment Opportunity.

5. Nothing herein is intended to conflict with federal, state or local laws or regulations. If there are conflicts, this agreement will be amended at the first opportunity to bring it into conformance with conflicting laws or regulations.

6. Policy and position announcements relating specifically to this cooperative program may be made only by mutual consent of the parties to the agreement.

7. Upon termination of this agreement any equipment purchased for studies initiated in furtherance of this agreement will be returned to the agency of initial purchase.

8. The effective date of this agreement shall be June 7, 1993.

9. All field collection must be completed by September 30, 1993. Delivery of samples to the lab, must be completed by October 15, 1993, and all reports and invoices are due by October 31, 1993.

10. Twenty percent will be withheld by ADF&G pending satisfactory completion of all work items and receipt and acceptance of the final report.

11. A free exchange of research and assessment data among agencies is encouraged and is necessary to insure the success of these cooperative studies.

12. Any material published or data acquired as a result of this cooperative program may be reproduced, with credit given to the agencies, or organizations responsible for the development of the material.

13. This agreement may be revised with mutual consent by issuance of a written amendment, signed and dated by both parties.

14. The PRVC and any agents and employees act in an independent capacity and are not officers or employees or agents of the state in the performance of this contract.

15. The indemnity and insurance provisions in appendix B, which is attached, are incorporated and made a part of this agreement, PRVC shall provide a certificate of the required insurance prior to the effective date of the agreement.

Alaska Department of Fish and Game, Division of Subsistence

By: Robert G. Bosworth (RJW)
Title: Director

Alaska Department of Fish and Game, Division of Habitat and Restoration

By: Frank R. 6-10-93
Title: Director

Alaska Department of Fish and Game, Division of Habitat and Restoration

By: Jerome Montague 6-11-93
Title: Chief of Restoration

Alaska Department of Fish and Game, Division of Administration

By:
Title: Director / Margie Baptiste for Larry Jones

Pacific Rim Villages Coalition

By: Chenlow 6-8-93
Title: President 4 C.E.O.

APPENDIX A

SUBSISTENCE FOODS SAMPLING PROGRAM
Protocols for the Collection and Handling of Samples
Alaska Department of Fish and Game
Division of Subsistence
January 8, 1993

Chain of Custody

Chain of custody and collection forms (attached) will be used. The beach and water conditions (degree of oiling) will be clearly noted on the collection forms as well as the results of sight and smell tests conducted in the field. These waterproof forms will be placed in the zip lock bag with each individual tissue sample. Be sure that the species identification and sample location are displayed through the ziplock bag.

Field note books will be rite-in the-rain. Any deviation from protocol and the study plan can be documented in the field notes. The location of the sampling site will be determined with the aid of USGS grid maps or NOAA charts. The site locations should be plotted on the map.

Whenever samples are split, a separate chain of custody record will be prepared for each portion and marked to indicate with whom the samples are being split.

Evidence tape must be affixed to the shipping container before the samples leave the custody of the sampling personnel. The seal must be signed and dated before the container is shipped. The original chain of custody record accompanies the shipment; a copy is retained by the sample shipper. If samples are sent by common carrier, copies of all bills of lading or air bills must be retained as part of the permanent documentation.

Entries into the field logbooks or field data sheets are signed or initialed and dated by the person making the entry at the time of entry. Each days entries are closed out with a horizontal line, date and initial. Errors in field logbooks or other records are corrected by drawing a single line through the error, entering the correct information, and signing and dating the correction. Never erase an entry or any part of an entry. Do not remove the pages from the logbook.

Preparation

Aluminum foil will be cooked at 350 degrees Fahrenheit for one hour before it can be used to wrap tissue samples. All other sampling equipment will be washed using detergent and rinsed before and after each sample collection. This includes clam shovels, knives, containers, and gloves. Instruments used for exterior dissection must be cleansed before they can be used for internal dissection.

Collection Blank

At least one field blank and replicate sample should be taken for each collection site. A field blank is a sample container (foil and zip lock bag or bile container) opened in the field, closed and stored as if it contained a sample. Chain of custody forms will accompany blanks, and blanks will be sent to the laboratory.

Collection

The method of collection must not contaminate the samples. Do not collect any subsurface samples through surface slicks. Organisms to be analyzed for petroleum hydrocarbons should be freshly killed. Decomposed organisms should not be collected.

Fish will always be handled with latex gloves. Each fish will be brought on board the boat in a manner so as not to contaminate it with any petroleum products such as fuel, plastics, or fuel-soaked material. The fish will then be dissected in an appropriately clean container or on aluminum foil.

At least three fish of the same species must be sampled from each fin fish sampling site. Approximately 0.6 to 1.0 kilograms of edible tissue will be excised from each fish. This will provide sufficient tissue to perform chemical analysis. The dissected tissue will then be double-wrapped in aluminum foil and placed in a zip lock bag.

The bile of all fin fish will be collected by drawing it from the gall bladder with a sterile disposable syringe and injecting it into a collection vial. The vial will then be placed in a zip lock bag. The gall bladder may puncture and the bile get lost while the fish is being eviscerated. This should be clearly noted on the chain of custody form belonging to the fish from which the bile was lost.

Invertebrates will be collected with clean shovels. Samples should be taken at the same location and tidal elevation on both the June and September sampling trips. The samples will then be double wrapped in aluminum foil, in groups of ten to twelve individuals (this is referred to as a composite sample), and placed in a ziplock bag. At least three composite samples must be collected from each shellfish sampling site.

Identify the species of finfish and shellfish as clearly as possible. It is necessary to be very accurate so the species dependent differences in bile metabolites can be ascertained by the laboratory. If you are unsure of the species, write detailed descriptions of the animal in the field note book, including the color, size, shape, etc.

Each sampling site should be carefully defined and described in field notes and sketch maps so that the site can be resampled when desired. At least one member of the sampling team must be present at both the June and September sampling events to ensure consistency.

After they are wrapped and labelled, the samples will be placed in insulated coolers containing ice packs. Keep all samples from the same station together by placing them in a separate large plastic bag.

Sample Preservation

Samples must be kept cool. They should be frozen as soon after collection as possible, and the freezing process should be rapid. Once frozen, the samples must be kept frozen until extracted or prepared for analysis. Therefore, care must be taken that the samples remain frozen throughout the shipping process.

CHAIN OF CUSTODY TRANSMITTAL FORM

Use this form to record all collection, transmittal, analysis and disposition activities. Attach to each batch of samples.

Community Name:
Sample Type:

SAMPLE ID#

Send completed forms to:

Subsistence Division
Alaska Department of Fish and Game
333 Raspberry Road
Anchorage, AK 99518
(907) 267-2358

Date	Action	Signature

Community Name: _____

SUBSISTENCE FOOD SAMPLE COLLECTION FORM

FILL OUT A SEPARATE FORM FOR EACH SAMPLE, AND BAG THE FORM WITH THE WRAPPED SAMPLE.

Collectors Names: _____

Date: _____ Time: _____

Type of Sample: _____ Sample ID Number: _____

Place Collected: _____

Circle your answers to the following questions:

Did oil reach this place? YES NO

Can you see oil on the water now? YES NO

Can you see oil on the beach now? YES NO

If there is oil on the beach now:

How much oil is there on the beach **(circle all that apply)**

small balls of oil large balls of oil
small patches of oil large patches of oil
band of oil less than one foot wide
band of oil 1-9 feet wide
band of oil on beach 10-24 feet wide
band of oil on beach greater than 25 feet wide

Include any other observations you have about the place, here:

Each collector should check the sample for signs of oil soon after collecting it.

1. Look over the fish or shellfish for signs of oil.

Do you see oil on the fish or shellfish? YES NO

If yes, please describe where and how much:

2. Smell the sample. Be sure to smell inside the gills if it is a fish. Open a few mussels or clams to check a batch of shellfish.

How does the sample smell? **(circle only one response)**:

Very strong oil smell
Somewhat strong oil smell
Very faint, almost unnoticeable oil smell
No smell of oil

Include any other observations you have about the sample, here:

Division of Subsistence, Alaska Department of Fish and Game
333 Raspberry Road, Anchorage, 99518 (907) 267-2358

APPENDIX B[1]
INDEMNITY AND INSURANCE

Article 1. Indemnification

The contractor shall indemnify, save harmless and defend the state, its officers, agents and employees from all liability, including costs and expenses, for all actions or claims resulting from injuries or damages sustained by any person or property arising directly or indirectly as a result of any error, omission or negligent act of the contractor, subcontractor or anyone directly or indirectly employed by them in the performance of this contract.

All actions or claims including costs and expenses resulting from injuries or damages sustained by any person or property arising directly or indirectly from the contractor's performance of this contract which are caused by the joint negligence of the state and the contractor shall be apportioned on a comparative fault basis. Any such joint negligence on the part of the state must be a direct result of active involvement by the state.

Article 2. Insurance

Without limiting contractor's indemnification, it is agreed that contractor shall purchase at its own expense and maintain in force at all times during the performance of services under this agreement the following policies of insurance. Where specific limits are shown, it is understood that they shall be the minimum acceptable limits. If the contractor's policy contains higher limits, the state shall be entitled to coverage to the extent of such higher limits. Certificates of Insurance must be furnished to the Contracting Officer prior to beginning work and must provide for a 30 day prior notice of cancellation, nonrenewal or material change. Failure to furnish satisfactory evidence of insurance or lapse of the policy is a material breach and grounds for termination of the contractor's services.

2.1. **Workers' Compensation Insurance:** The contractor shall provide and maintain, for all employees of the contractor engaged in work under this contract, Workers' Compensation Insurance as required by AS 23.30.045. The contractor shall be responsible for Workers' Compensation Insurance for any subcontractor who directly or indirectly provides services under this contract. This coverage must include statutory coverage for states in which employees are engaging in work and employer's liability protection not less than $100,000 per person, $100,000 per occurrence. Where applicable, coverage for all federal acts (i.e. U.S.L.& H. and Jones Acts) must also be included.

2.2. **Comprehensive (Commercial) General Liability Insurance:** with coverage limits not less than $300,000 combined single limit per occurrence and annual aggregates where generally applicable and shall include premises-operations, independent contractors, products/completed operations, broad form property damage, blanket contractual and personal injury endorsements.

2.3. **Comprehensive Automobile Liability Insurance:** covering all owned, hired and non-owned vehicles with coverage limits not less than $100,000 per person/$300,000 per occurrence bodily injury and $50,000 property damage.

SAMPLING PLAN
SUBSISTENCE RESTORATION PROJECT
ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF SUBSISTENCE

COMMUNITY	SITE NUMBER	SITE NAME	LOCATION DESCRIPTION	RESOURCES TO BE COLLECTED
CHENEGA BAY	CHE10	FOX FARM	East of North Twin Bay, Elrington Isl.	Mussels, Butterclams, Littleneck Clams
CHENEGA BAY	CHE25	DELENIA ISLAND	In Dangerous Passage, NE of Chenega Isl.	Mussels, Butterclams, Littleneck Clams
CHENEGA BAY	CHE2	EAST SAWMILL BAY	SE of Johnson Cove, Evans Isl.	Rockfish
CHENEGA BAY	CHE 26	SHELTER BAY	N of Shelter Bay, Evans Isl.	Rockfish
TATITLEK	TAT1	NORTH BLIGH ISLAND	Intertidal area North of Bligh Island	Mussels, Butterclams, Littleneck Clams
TATITLEK	TAT2	SW BOULDER BAY	E of Tatitlek, on the SW shore of Boulder Bay	Mussels, Butterclams, Littleneck Clams
TATITLEK	TAT4	BIDARKI POINT	.5 KM S of Bidarki Point	Rockfish
PORT GRAHAM	PTG4	DUNCAN SLOUGH	.7 KM SE of Port Graham Village	Mussels, Chitons, Soft-shelled Clams, Snails
PORT GRAHAM	PTG2	MOUTH OF BAY	Outside the mouth of Port Graham Bay	Rockfish
NANWALEK	NAN1	RUSSIAN POINT	.2 KM N of Nanwalek	Mussels, Clams, Snails, Bidarkis
NANWALEK	NAN2	ANDERSON BEACH	S end of Kenai Peninsula, bet. Eliz & Pearl Isls.	Mussels, Clams
PTG/NAN	WNB3	WINDY BAY	Easternmost of 3 small islands in Windy Bay	Mussels, Chitons
OUZINKIE	OUZ2	CAMEL ROCK	Low Island Anchorage	Mussels, Butterclams, Littleneck Clams, Chitons
OUZINKIE	OUZ3	SOURDOUGH FLATS	S end, on Uzinkie Point	Mussels, Butterclams, Littleneck Clams, Sea Urchins
LARSEN BAY	LAB15	CHIEFS POINT	NE side of the entrance to Spiridon & Uyak Bay	Mussels, Clams
AKHIOK	AKH6	TANNER HEAD	S of Rodman Reach, Kodiak Island	Mussels, Clams
KARLUK	KAR2	STURGEON R.	Intertidal at mouth of Sturgeon River	Mussels, Butterclams, Littleneck Clams

APPENDIX 4:

Fish and Shellfish Collection Documentation

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Identify the species of finfish and shellfish as clearly as possible. It is necessary to be very accurate so the species dependent differences in bile metabolites can be ascertained by the laboratory. If you are unsure of the species, write detailed descriptions of the animal in the field note book, including the color, size, shape, etc.

Each sampling site should be carefully defined and described in field notes and sketch maps so that the site can be resampled when desired. At least one member of the sampling team must be present at both the June and September sampling events to ensure consistency.

After they are wrapped and labelled, the samples will be placed in insulated coolers containing ice packs. Keep all samples from the same station together by placing them in a separate large plastic bag.

Sample Preservation

Samples must be kept cool. They should be frozen as soon after collection as possible, and the freezing process should be rapid. Once frozen, the samples must be kept frozen until extracted or prepared for analysis. Therefore, care must be taken that the samples remain frozen throughout the shipping process.

SUBSISTENCE FISH AND SHELLFISH RESOURCE SAMPLING IN THE PRINCE WILLIAM SOUND, LOWER COOK INLET, KENAI PENINSULA AND KODIAK ISLAND AREAS

Final
Field Sampling Report

by

David E. Erikson

DAMES & MOORE

November 1, 1993

DAMES & MOORE
5600 B STREET, SUITE 100, ANCHORAGE, ALASKA 99518-1641
(907) 562-3366 FAX: (907) 562-1297

November 1, 1993

Rita Miraglia
Division of Subsistence
Alaska Department of Fish and Game
333 Raspberry Rd.
Anchorage, AK 99518-1599

Re: Subsistence Fish and Shellfish Resource Sampling in Prince William Sound, Lower Cook Inlet, Kenai Peninsula and Kodiak Island areas.

Dear Rita,

Enclosed is a copy of our final Field Sampling Report along with copies of the sample logs, chain-of-custody forms, site location maps, subsistence sample forms for each sampling cycle and a printout of the sample database. An electronic copy of the spreadsheet is also included in Microsoft Excel 3.0 (3.5" high density disc).

I'm looking forward to seeing the results from the lab and any report which may come out as a result of this sampling program.

It has been a pleasure working the many people who assisted me in the villages and the people at Pacific Rim Village Coalition. I have also enjoyed working with you again and I hope we can work together again in the future on similar projects. If you have any questions or comments, please feel free to call me in Homer at 235-3487 or 235-7260.

Sincerely,

DAMES & MOORE

Mary E. Cocklan-Vendl
for David E. Erikson
Project Manager

Final Trip Report

Subsistence Food Quality Study

Sampling Cycle 1 and 2

Summer and Fall 1993

David Erikson

Dames and Moore

The first cycle of sampling of marine subsistence food items was conducted between June 23 and July 24, 1993 in nine representative villages of Prince William Sound, Cook Inlet and Kodiak Island. A total of 20 fish samples and 106 shellfish samples were taken for petroleum hydrocarbon testing. An additional 16 field blanks and 13 samples splits were also taken during the field sampling activity. Samples were initially chilled on ice and frozen as soon as possible, then transported to freezers in Dames and Moore's offices in Anchorage or Homer.

After consultations with the Project Manager, Rita Miraglia, of the Subsistence Division of Alaska Department of Fish and Game, a select number of the samples were shipped to Dr. Sin Lam Chan at the Northwest Fisheries Laboratory, Seattle on August 2 for analysis. The remainder of the samples were held in the freezers in the Anchorage Dames and Moore warehouse in Anchorage until final disposition at Alaska Department of Fish and Game.

The second sampling cycle was conducted from September 1 to 27 in seven of the nine villages. Two villages were missed, Karluk and Akhioh, and two site, Delenia Island (CHE25) in Prince William Sound and Windy Bay (WNB3) on the outer coast of the Kenai Peninsula, due to adverse weather. A total of 18 fish samples and 76 shellfish samples were collected over the course of the sampling effort. In addition, one field blank and one sample split were collected at each site. A selected number of these samples were shipped to the Northwest Fisheries Lab on September 29 for analysis. The rest were stored at the Dames and Moore wharehouse until October 26 when were transferred to Fish and Game freezers in Anchorage.

The following is a antidotal account of sampling activity by village and sampling cycle.

Port Graham

Cycle 1 - June 23

Two sites were originally selected in the Port Graham area; Duncan's Slough (PTG4), a shellfish site, and the mouth of Port Graham (PTG2), a fish collection site. An additional site (PTG12) was selected in the field as a good site to collect chitons, which were a local concern.

The Duncan Slough site as sampled with the assistance of local resident, Pat Norman. Species collected at this site included soft shell clams (Mya spp.), littleneck clams (Protothacea staminea) and mussels (Mytilus edulis). Three replicate samples of each species were collected. The substrate at this site was muddy sand at the lower tidal elevations.

At the new chiton sampling site, located 1.5 miles northwest of the village on the north side of the bay at Johnson Point (Figure 1) was established as a good area for this species. A total of three samples of the large black chiton (Katherina tunicata) were collected at this location.

For the fish collection at the mouth of Port Graham, we used the fishing vessel "Lady Mary" skippered by Dale Malchoff. Samplers included Damian Sigler and Pat Norman. The target species was the black rockfish (Sebastes melanops) but we were unable to catch any at the mouth of the bay. We tried a spot just north of Dangerous Cape but were similarly unsuccessful. The only fish caught were a very small halibut (Hippoglossus stenolepis) and a small rock sole (Lipidosetta bilineata), both of which were not sampled.

Cycle 2 - September 1

The second sampling cycle was conducted on September 1 after several days of stormy weather. Pat Norman was not available to accompany the sampling party but arranged for Neil Hedrick to assist with collecting samples. The vessel we used was the "Terri Lynn" skippered by Cliff McGhan.

We went to the same spot in Duncan's Slough as the first time but the tide was not as low as in July so it was harder to find clams. We got only enough solfshell clams for two samples. Mussels and littlenecks were abundant enough to get three samples each with one sample split of mussels.

After getting the clam samples, we took a skiff over to the chiton site on the north side of the bay near Johnson slough (PTG12). The tide was still low enough to get three chiton samples.

It was apparent once I was back to the site, that I had marked the wrong location on the map in June. The correct site was marked on the original site map.

Nanwalek

Cycle 1 - June 24 and 25

Collection sites near this village were sampled with the assistance of local residents Bobby Kvasnikoff and Efim Moonin. Only one site had previously been selected for sampling, Russian Point (NAN1), located just east of the village. I was told that many people no longer use this site because of the local dump site located on the hill above this area. Both mussels and chitons, three samples of each species were collected from the rocks at this location.

We attempted to collect clams at one location, on the east side of Passage Islands but the tide was coming in and we were not able to get any samples. My assistants told me very few people get clams around this area anymore since otters have taken so many in recent years. Most people apparently get their clams from Kasitsna Bay.

After completing the invertebrate sampling, we again tried to catch rockfish at the mouth of Port Graham. We had no luck at PTG2 or at several other locations in the immediate area around English Bay and Port Graham and at a site just outside mouth between Point Pogibshi and Dangerous Cape. We also fished off of every point south of English Bay all the way to Flat

Island. We did manage to catch one black rockfish 100 meters south of Flat Island, a site we labeled NAN6.

The following day, we tried again fishing at Flat Island and several more headlands along the coast without any luck. We did manage to find rockfish back at the spot between Dangerous Cape and Point Pogibshi (PTG6). A total of eight black rockfish were collected at this site.

A separate site on the outer coast of the Kenai at Anderson Beach (NAN2) was sampled on sampled on 5 July by Helicopter. This site is a very exposed gravel beach with no clam habitat. Several large boulders on the east side of a small creek had a fairly dense growth of mussels so we collected three samples at this site.

An other site on the outer coast of the Kenai Peninsula, a small island in Windy Bay (WNB3) was also sampled on this same trip. The mussels came from an area of the lower beach called on previous trip "lower East". As total of three mussel samples and three chiton samples were collected at this site. This was the only site where residual tar was obvious in the upper intertidal zone. This site was hit very hard by oil and mousse according to Pat Norman who was working in the area after the spill.

Cycle 2 - September 1

The second sampling cycle for Nanwalek sites was conducted on the same tide as the Port Graham sites due to the limited number of minus tides during September. Since no one was available from the village to help with sampling, I used Neil Hedrick from Port Graham. The Russian Point site (NAN1) was sampled just after we finished the Port Graham sites. Three samples of chitons and three of mussel were collected from the same area as on the first cycle in June.

After finishing the intertidal site, we motored aboard the "Terri Lynn" to the place between Point Pogibishi and Dangerous Cape where we caught the rockfish in June (PTG6). The weather was fairly rough but we were able to fish for several hours. Three people were fishing but we were able to land only one small black rockfish.

Because we did not get the minimum number of rockfish from this area, a second trip was made to this site on September 23 to try again at PTG6, the same place where we caught the rockfish in June. We caught the optimum number of eight black rockfish in approximately 15 minutes. On this trip, we used a skiff from Nanwalek to get to the site. The assistant and skiff driver was Demetri Tanape of Nanwalek.

Chenega Village

Cycle 1 - June 30, July 1

A total of two intertidal sites and two fish collection sites were selected for sampling in the region of Prince William Sound area near Chenega Village and included Fox

Farm (CHE10), Delenia Island (CHE25), both intertidal sites, and two fish sampling locations; east Sawmill Bay off Johnson Cove (CHE2) and Shelter Bay (CHE26). All site on this sampling trip were accessed using the "Strike" skippered by Peter Kompkoff and assisted by Richard Kompkoff.

When the Fox Farm site (CHE10) was sampled on 30 June, I noticed that the location of this site was incorrect on the maps which were provided at the beginning of the project. I was familiar with the original sampling location so I was able to find the right area after a short reconnaissance of the area. A total of four samples of butter clams (Saxidomus gigantea) and two samples of littleneck clams were collected with butters being the dominant species. Littleneck clams were relatively scarce so we were only able to get two samples.

The fish site just east Sawmill Bay (CHE2) turned out to be a good site for rockfish. We collected a total of four black rock fish and five yelloweye rockfish and obtained bile and tissue samples from each.

On July 1, we went up to Delenia Island to sample clams and mussels but the map had the clam habitat on the Island was very limited. Peter Kompkoff thought that the place where people used to get clams was actually on Grassy Island, just a short distance to the north. We sampled this area and collected three samples of mussels and butter clams. After leaving the island, I wanted to take a closer look at Delenia Island to see if there was any significant clam habitat on the island. We found some clams on a small beach on the east side of the island but they were all small and few in number. I decide to collect three clam samples from this beach after seeing a brownish material approximately 4-6 inches under the surface which looked like old mousse. This material had no odor, was not sticky and didn't give off any sheen. This site was not given a new site name but these sample numbers were 93TISS0064, 93TISS0065 and 93TISS0066.

The fish collection site at Shelter Bay (CHE26) was fished for the rest of the day on July 1 but no fish were caught. Peter Kompkoff said he had never fished this area for rockfish before so this is probably not prime habitat for these fish.

Cycle 2 - September 2-3

I made the second trip to Chenega during the first week in September to sample the same site as in July. The vessel used on this trip was the "Shaker" owned and operated by John Totemoff. The tides were not as favorable and there were the limitations of daylight for the early morning tides. The Fox Farm site (CHE10) was sampled on the morning of September 2. Three samples of both littleneck clams and mussels were collected but butter clams were hard to find and we only got enough for one sample.

We fished the rest of the day at CHE2 of Johnson's Cove but were unable to catch any rockfish. One small halibut was the only fish landed in over five hours of fishing.

The vessel we were using was having engine trouble and the trip to Delenia Island was going to take about 3.5-4 hours and we would have to leave in the dark to get there by low

water. I decided to use the time to try to get rockfish at CHE2 since were as yet unsuccessful. I also wanted to try to get some fish at the mouth of Shelter Bay (CHE26).

After daybreak on September 3, we motored up to Shelter Bay and tried fishing in several spots but were unable to locate any rockfish in the area. We fished the remainder of the afternoon at the CHE2 site and did manage to catch one black rockfish.

An additional trip was made to Chenega on September 27 to try and get to Delenia Island (CHE25) and to try and get some more rockfish at CHE2 off Sawmill Bay. Dr. Steve Shaner conducted the sampling from the "Strike" with the help of local residents Sean Wilson and Clint Gregorioff.

The weather was too rough to get to Delenia Island for invertibrate sampling during this trip. They did manage to catch two tiger rockfish (Sebastes nigrocinctus), two yelloweye rockfish and one china rockfish (Sebastes nebulosus) at the CHE2 site the first day but two additional days of fishing did not yeild any additional fish.

Tatitlek

Cycle 1 - July 2,3

A total of three sites were sampled in the area of Tatitlek; north Bligh Island (TAT1) and Reef Island (TAT9), both intertidal collection sites, and Bidarki Point (TAT4), a fish collection site. The site on Reef Island was a new site and is located on the southeastern end of the island and the only gravel beach on the island.

Field assistance was provided by Jerry Totemoff and Brian Zachen. The sites were accessed by a small open skiff owned by Jerry Totemoff.

At the Reef Island site, three samples of mussel and four samples of littleneck clams were collected but butter clams were not found in sufficient number to get even one sample. The Bligh Island site had both species of clams but the were quite scarce. The largest clams were found around the edges of boulders where the sea otters could not get at them which indicated that otters were having an effect on the repopulation of these species since the earthquake. The largest butter clams were still only about three inches in diameter. We managed to get three samples each of mussels, littlenecks and butter clams at this site.

The fish collection site at Bidarki Point was fished on 2-3 July but only two quillback rockfish (Sebastes maliger) were caught and sampled. Jerry Totemoff said that local do not fish this area for rockfish but usually go to a site at the head of Boulder Bay. At the end of the last day, we went up to this site but we could not catch any rockfish here either.

Ouzinkie

Cycle 1 - July 18-19

Similar to all the Kodiak Villages, only intertidal sites were sampled in the vicinity of Ouzinkie Village and included a beach east of Camel Rock (OUZ2) and Sourdough Flats (OUZ3). Both of these sites had been sampled in the past. The distance between these site made it necessary to sample the sites on consecutive days.

The field assistance for these sites was Andy Christofferson, who was also the skipper of the boat we used to get to the sites. The name of the boat was the "Natasha".

Clams and mussels were abundant at the Camel Rock site and it was not difficult to get the three samples of mussels, littlenecks and butter clams. However, the Sourdough Flats site was much more difficult to sample since the large cobbles on the beach had to be moved before we could dig the clams. The substrate under the cobbles was also quite hard which made digging difficult. We were able to get all the samples we needed.

Andy said this beach is only infrequently used for getting clams but is the only clam beach within walking distance from the village. It appeared that very little digging had occurred here in recent times.

Cycle 2 - September 13

Because of the limited number of low tides on this cycle, both intertidal sites at Ouzinkie were sampled on the same day. The field assistant at both of the sites was Roger Johnson. The boat was the same as last time.

The OUZ2 site was sampled first and in spite of the moderate tide, clams were very easy to dig. Three samples each of butter clams, littleneck clams and mussels were collected.

The tide had come in quite a ways by the time we reached the OUZ3 at Sourdough Beach. We managed to get three small samples of littlenecks under the boulders but we didn't get enough butter clams for a sample. Three samples of mussels were also collected.

Port Lions

Cycle 1 - July 20

There was only one site to be sampled near Port Lions and I was able to access the area on foot so I didn't need to use a skiff. The collection site (PTL1) is located at the northern end of the runway on a split which extends between the mainland and a small tree-covered Island. Butter clam samples are taken on the northern side of the spit approximately 100 meters from the island. Mussels are collected on the higher elevations of the spit in the same general area.

The density of both clams and mussels are very high at this site but like all other areas of Kodiak, the red tide this summer has prevented the harvest of clams from this site. Susan Voskofski, the local assistant for this village, said people do not eat mussel in this area.

Cycle 2 - September 14

People from the village were still not eating clams by the time I sampled here again in September. The field assistant on this sampling trip was Bobby Nelson, president of the Village Counsel. We sampled the same location on the beach as last time and collected three samples of both butter clams and mussels.

Larsen Bay

Cycle 1 - July 21

Only one site was designated for sampling in the Larsen Bay area and that was an area of sheltered lagoons at Chief Point, at the mouth of Spirodon Bay about a 45 min skiff ride from Larsen Bay. My field assistant and skiff operater for this site was local Larsen Bay resident Roy Jones.

The area selected for sampling was the outflow of a small lagoon located just behind the point. This gravel intertidal area had lots of butter clam shell which appeared to have died in recent years. Very few live clams were found and all of these were the same general size which was about two inches in length. Local setnetters near the site said that sea otters had wiped out the clams but very few clam shells had any sign of breakage.

Three samples of both butter clams and mussels were collected at this site. There was a lot of boating activity around this area between year-round residents and several setnet operations.

Cycle 2 - September 15

The same site at LAB15 was sampled again on September 15. Littleneck clams appeared to be more abundant this time but it was probably due to the higher tide level than last time so we were sampling a little higher on the beach. I decided to collect an three littleneck clam samples in addition to the three butter clam and three mussel samples.

I desided to look for clams inside the small lagoon adjacent to the site and it appears that densities were greater inside the lagoon than at our sampling site.

Karluk

Cycle 1 - July 22

The collection site for Karluk village was inside the mouth of the Sturgeon River (KAR2), located several miles south of the Karluk River. The site is on a old bar in the river which has a small tide pool on top of the bar that retains water throughout the tide cycle.

The field assistant and skiff operator for this site was local Karluk resident John Reft. He said he did not recall people comming to this site to get clams and that better clam digging sites are farther down the coast.

Three samples of both butter clams and littleneck clams were collected in the small tide pool at this site. Three mussel samples were collect on top of the bar near the mouth of the river.

This entire area receives a tremendous amount of flushing with the ebb and flow of the tide and the normal flow of the river. This would likely not be a site one would expect to find any residual petroleum from the spill.

Cycle 2 - September 16

The second trip to Karkuk was canceled do to high winds which were preventing planes from landing. The site at Sturgeon River (KAR2) is a difficult site to reach because the skiffs in Karluk are generaly small and weather conditions have to just right to get around Karkuk Point and to get into the mouth of the Sturgeon River. Future sampling at Sturgeon River may require aircraft support.

Akhiok

Cycle 1 - July 23

The site designated for sampling in the vicinity of Akhiok was listed as AKH6 and shown on the map as on the west side of Amik Island to the east of the village. This location was sampled but it turned out to be the wrong site. The actual site which was to be sampled was a razor clam beach located southwest of Alitak Bay, on Rodman Reach. The weather and level of the tide was would have not allow for sampling of this site in any case. Effort will be made on the next sampling trip to try and get to this site.

Cycle 2 - September 17

The site selected for the sampling on the second trip was
Rodman Reach but the sampling trip was canceled because of adverse weather in Akhiok.

Id. No	Village	Site	Date	Time	Species	Bile Id. No	Disposition
93TISS0001	Port Graham	PTG4	6/23/93	11:35	Soft shell clam		ADF&G
93TISS0002	Port Graham	PTG4	6/23/93	11:40	Soft shell clam		ADF&G
93TISS0003	Port Graham	PTG4	6/23/93	11:40	Soft shell clam		ADF&G
93TISS0004	Port Graham	PTG4	6/23/93	11:40	Littleneck clam		NMFS
93TISS0006	Port Graham	PTG4	6/23/93	12:00	Mussel		ADF&G
93TISS0007	Port Graham	PTG4	6/23/93	12:05	Mussel		NMFS
93TISS0008	Port Graham	PTG4	6/23/93	12:10	Littleneck clam		NMFS
93TISS0009	Port Graham	PTG4	6/23/93	12:15	Littleneck clam		NMFS
93TISS0010	Port Graham	PTG4	6/23/93	12:30	Mussel		NMFS
93TISS0011	Port Graham	PTG4	6/23/93	12:40	Littleneck clam		NMFS
93TISS0012	Port Graham	PTG4	6/23/93	12:50	Blank		ADF&G
93TISS0013	Port Graham	PTG12	6/23/93	13:30	Chiton		NMFS
93TISS0014	Port Graham	PTG12	6/23/93	13:50	Chiton		NMFS
93TISS0015	Port Graham	PTG12	6/23/93	14:10	Chiton		NMFS
93TISS0016	Nanwalek	NAN1	6/24/93	13:15	Chiton		ADF&G
93TISS0017	Nanwalek	NAN1	6/24/93	13:20	Chiton		ADF&G
93TISS0018	Nanwalek	NAN1	6/24/93	13:25	Chiton		ADF&G
93TISS0019	Nanwalek	NAN1	6/24/93	13:40	Chiton		ADF&G
93TISS0020	Nanwalek	NAN1	6/24/93	13:45	Mussel		NMFS
93TISS0021	Nanwalek	NAN1	6/24/93	13:45	Mussel		NMFS
93TISS0022	Nanwalek	NAN1	6/24/93	13:50	Mussel		NMFS
93TISS0023	Nanwalek	NAN1	6/24/93	13:50	Mussel		ADF&G
93TISS0024	Nanwalek	NAN6	6/24/93	18:50	Black Rockfish	93BILE0024	ADF&G
93TISS0025	Nanwalek	PTG6	6/25/93	13:40	Black Rockfish	93BILE0025	NMFS
93TISS0026	Nanwalek	PTG6	6/25/93	13:45	Black Rockfish	93BILE0026	NMFS
93TISS0027	Nanwalek	PTG6	6/25/93	13:45	Black Rockfish	93BILE0027	NMFS
93TISS0028	Nanwalek	PTG6	6/25/93	14:00	Black Rockfish	93BILE0028	NMFS
93TISS0029	Nanwalek	PTG6	6/25/93	15:30	Black Rockfish	93BILE0029	NMFS
93TISS0030	Nanwalek	PTG6	6/25/93	15:30	Black Rockfish	93BILE0030	NMFS
93TISS0031	Nanwalek	PTG6	6/25/93	15:35	Black Rockfish	93BILE0031	NMFS
93TISS0032	Nanwalek	PTG6	6/25/93	15:30	Black Rockfish	93BILE0032	NMFS
93TISS0033	Nanwalek	PTG6	6/25/93	16:00	Blank		ADF&G
93TISS0036	Chenega	CHE10	6/30/93	5:40	Butter clam		ADF&G
93TISS0037	Chenega	CHE10	6/30/93	5:50	Butter clam		ADF&G
93TISS0038	Chenega	CHE10	6/30/93	6:05	Butter clam		ADF&G
93TISS0039	Chenega	CHE10	6/30/93	6:15	Blank		ADF&G
93TISS0040	Chenega	CHE10	6/30/93	6:25	Littleneck clam		ADF&G
93TISS0041	Chenega	CHE10	6/30/93	6:45	Mussel		NMFS
93TISS0042	Chenega	CHE10	6/30/93	6:45	Mussel		NMFS
93TISS0043	Chenega	CHE10	6/30/93	6:50	Mussel		NMFS
93TISS0044	Chenega	CHE10	6/30/93	6:50	Mussel		ADF&G
93TISS0045	Chenega	CHE10	6/30/93	6:55	Littleneck clam		ADF&G
93TISS0046	Chenega	CHE10	6/30/93	6:55	Butter clam		ADF&G
93TISS0047	Chenega	CHE2	6/30/93	8:30	Yelloweye Rockfish	93BILE0047	NMFS
93TISS0048	Chenega	CHE2	6/30/93	9:00	Black Rockfish	93BILE0048	NMFS
93TISS0049	Chenega	CHE2	6/30/93	9:15	Black Rockfish	93BILE0049	NMFS
93TISS0050	Chenega	CHE2	6/30/93	9:38	Black Rockfish	93BILE0050	NMFS
93TISS0051	Chenega	CHE2	6/30/93	10:00	Yelloweye Rockfish	93BILE0051	NMFS

Id. No	Village	Site	Date	Time	Species	Bile Id. No	Disposition
93TISS0052	Chenega	CHE2	6/30/93	10:30	Yelloweye Rockfish	93BILE0052	NMFS
93TISS0053	Chenega	CHE2	6/30/93	10:30	Yelloweye Rockfish	93BILE0053	NMFS
93TISS0054	Chenega	CHE2	6/30/93	11:55	Yelloweye Rockfish	93BILE0054	NMFS
93TISS0055	Chenega	CHE2	6/30/93	12:00	Black Rockfish	93BILE0055	ADF&G
93TISS0056	Chenega	CHE2	6/30/93	12:00	Blank		ADF&G
93TISS0057	Chenega	CHE2	6/30/93	10:00	Yelloweye Rockfish	93BILE0057	ADF&G
93TISS0058	Chenega	CHE25	7/1/93	6:30	Butter clam		ADF&G
93TISS0059	Chenega	CHE25	7/1/93	6:45	Butter clam		ADF&G
93TISS0060	Chenega	CHE25	7/1/93	6:45	Butter clam		ADF&G
93TISS0061	Chenega	CHE25	7/1/93	7:20	Mussel		NMFS
93TISS0062	Chenega	CHE25	7/1/93	7:20	Mussel		NMFS
93TISS0063	Chenega	CHE25	7/1/93	7:20	Mussel		NMFS
93TISS0064	Chenega	CHE25	7/1/93	8:15	Butter clam		ADF&G
93TISS0065	Chenega	CHE25	7/1/93	8:15	Butter clam		ADF&G
93TISS0066	Chenega	CHE25	7/1/93	8:15	Butter clam		ADF&G
93TISS0067	Chenega	CHE25	7/1/93	8:20	Blank		ADF&G
93TISS0068	Tatitlek	TAT9	7/2/93	7:45	Mussel		NMFS
93TISS0069	Tatitlek	TAT9	7/2/93	7:45	Mussel		NMFS
93TISS0070	Tatitlek	TAT9	7/2/93	7:45	Mussel		NMFS
93TISS0071	Tatitlek	TAT9	7/2/93	8:15	Mussel		ADF&G
93TISS0072	Tatitlek	TAT9	7/2/93	8:15	Mussel		ADF&G
93TISS0073	Tatitlek	TAT9	7/2/93	7:30	Littleneck clam		NMFS
93TISS0074	Tatitlek	TAT9	7/2/93	7:40	Littleneck clam		NMFS
93TISS0075	Tatitlek	TAT9	7/2/93	8:00	Littleneck clam		NMFS
93TISS0076	Tatitlek	TAT9	7/2/93	8:10	Blank		ADF&G
93TISS0077	Tatitlek	TAT4	7/2/93	13:10	Quillback Rockfish	93BILE0077	ADF&G
93TISS0078	Tatitlek	TAT4	7/2/93	13:45	Quillback Rockfish	93BILE0078	ADF&G
93TISS0079	Tatitlek	TAT1	7/3/93	7:40	Butter clam		ADF&G
93TISS0080	Tatitlek	TAT1	7/3/93	7:55	Butter clam		ADF&G
93TISS0081	Tatitlek	TAT1	7/3/93	8:30	Butter clam		ADF&G
93TISS0082	Tatitlek	TAT1	7/3/93	8:00	Littleneck clam		ADF&G
93TISS0083	Tatitlek	TAT1	7/3/93	8:45	Littleneck clam		ADF&G
93TISS0084	Tatitlek	TAT1	7/3/93	9:30	Littleneck clam		ADF&G
93TISS0085	Tatitlek	TAT1	7/3/93	9:25	Mussel		NMFS
93TISS0086	Tatitlek	TAT1	7/3/93	9:30	Mussel		NMFS
93TISS0087	Tatitlek	TAT1	7/3/93	9:40	Mussel		NMFS
93TISS0088	Tatitlek	TAT1	7/3/93	9:45	Mussel		ADF&G
93TISS0089	Tatitlek	TAT1	7/3/93	10:00	Blank		ADF&G
93TISS0090	Nanwalek	NAN2	7/5/93	9:45	Mussel		NMFS
93TISS0091	Nanwalek	NAN2	7/5/93	9:45	Mussel		NMFS
93TISS0092	Nanwalek	NAN2	7/5/93	9:50	Mussel		NMFS
93TISS0093	Nanwalek	NAN2	7/5/93	9:50	Mussel		ADF&G
93TISS0094	Nanwalek	NAN2	7/5/93	9:50	Mussel		ADF&G
93TISS0095	Nanwalek	NAN2	7/5/93	9:30	Blank		ADF&G
93TISS0096	Nanwalek	WNB3	7/5/93	10:40	Mussel		NMFS
93TISS0097	Nanwalek	WNB3	7/5/93	10:40	Mussel		NMFS
93TISS0098	Nanwalek	WNB3	7/5/93	10:40	Mussel		NMFS
93TISS0099	Nanwalek	WNB3	7/5/93	10:45	Mussel		ADF&G

Id. No	Village	Site	Date	Time	Species	Bile Id. No	Disposition
93TISS0100	Nanwalek	WNB3	7/5/93	10:45	Mussel		ADF&G
93TISS0101	Nanwalek	WNB3	7/5/93	10:45	Blank		ADF&G
93TISS0102	Nanwalek	WNB3	7/5/93	10:30	Chiton		ADF&G
93TISS0103	Nanwalek	WNB3	7/5/93	10:30	Chiton		ADF&G
93TISS0104	Nanwalek	WNB3	7/5/93	10:30	Chiton		ADF&G
93TISS0105	Nanwalek	WNB3	7/5/93	10:30	Blank		ADF&G
93TISS0106	Ouzinkie	OUZ2	7/18/93	7:40	Butter clam		NMFS
93TISS0107	Ouzinkie	OUZ2	7/18/93	7:45	Butter clam		NMFS
93TISS0108	Ouzinkie	OUZ2	7/18/93	7:50	Butter clam		NMFS
93TISS0109	Ouzinkie	OUZ2	7/18/93	8:10	Littleneck clam		ADF&G
93TISS0110	Ouzinkie	OUZ2	7/18/93	8:12	Littleneck clam		ADF&G
93TISS0111	Ouzinkie	OUZ2	7/18/93	8:15	Littleneck clam		ADF&G
93TISS0112	Ouzinkie	OUZ2	7/18/93	8:30	Mussel		NMFS
93TISS0113	Ouzinkie	OUZ2	7/18/93	8:35	Mussel		NMFS
93TISS0114	Ouzinkie	OUZ2	7/18/93	8:40	Mussel		NMFS
93TISS0115	Ouzinkie	OUZ2	7/18/93	8:40	Mussel		ADF&G
93TISS0116	Ouzinkie	OUZ2	7/18/93	8:50	Blank		ADF&G
93TISS0117	Ouzinkie	OUZ3	7/19/93	8:30	Butter clam		ADF&G
93TISS0118	Ouzinkie	OUZ3	7/19/93	8:30	Butter clam		ADF&G
93TISS0119	Ouzinkie	OUZ3	7/19/93	8:45	Butter clam		ADF&G
93TISS0120	Ouzinkie	OUZ3	7/19/93	8:35	Littleneck clam		ADF&G
93TISS0121	Ouzinkie	OUZ3	7/19/93	8:35	Littleneck clam		ADF&G
93TISS0122	Ouzinkie	OUZ3	7/19/93	9:30	Littleneck clam		ADF&G
93TISS0123	Ouzinkie	OUZ3	7/19/93	9:00	Mussel		NMFS
93TISS0124	Ouzinkie	OUZ3	7/19/93	9:00	Mussel		NMFS
93TISS0125	Ouzinkie	OUZ3	7/19/93	9:00	Mussel		NMFS
93TISS0126	Ouzinkie	OUZ3	7/19/93	8:35	Littleneck clam		ADF&G
93TISS0127	Ouzinkie	OUZ3	7/19/93	9:30	Blank		ADF&G
93TISS0128	Port Lion	PTL1	7/20/93	9:30	Butter clam		ADF&G
93TISS0129	Port Lion	PTL1	7/20/93	9:35	Butter clam		ADF&G
93TISS0130	Port Lion	PTL1	7/20/93	9:40	Butter clam		ADF&G
93TISS0131	Port Lion	PTL1	7/20/93	9:45	Mussel		NMFS
93TISS0132	Port Lion	PTL1	7/20/93	9:50	Mussel		NMFS
93TISS0133	Port Lion	PTL1	7/20/93	9:50	Mussel		NMFS
93TISS0134	Port Lion	PTL1	7/20/93	10:10	Mussel		ADF&G
93TISS0135	Port Lion	PTL1	7/20/93	10:10	Blank		ADF&G
93TISS0136	Larson Bay	LAB15	7/21/93	10:30	Butter clam		ADF&G
93TISS0137	Larson Bay	LAB15	7/21/93	10:35	Butter clam		ADF&G
93TISS0138	Larson Bay	LAB15	7/21/93	10:50	Butter clam		ADF&G
93TISS0139	Larson Bay	LAB15	7/21/93	10:55	Mussel		NMFS
93TISS0140	Larson Bay	LAB15	7/21/93	11:10	Mussel		NMFS
93TISS0141	Larson Bay	LAB15	7/21/93	11:15	Mussel		NMFS
93TISS0142	Larson Bay	LAB15	7/21/93	11:15	Mussel		ADF&G
93TISS0143	Larson Bay	LAB15	7/21/93	11:45	Blank		ADF&G
93TISS0144	Karluk	KAR2	7/22/93	11:00	Butter clam		ADF&G
93TISS0145	Karluk	KAR2	7/22/93	11:10	Butter clam		ADF&G
93TISS0146	Karluk	KAR2	7/22/93	11:15	Butter clam		ADF&G
93TISS0147	Karluk	KAR2	7/22/93	11:00	Littleneck clam		ADF&G

Id. No	Village	Site	Date	Time	Species	Bile Id. No	Disposition
93TISS0148	Karluk	KAR2	7/22/93	11:10	Littleneck clam		ADF&G
93TISS0149	Karluk	KAR2	7/22/93	11:15	Littleneck clam		ADF&G
93TISS0150	Karluk	KAR2	7/22/93	12:10	Mussel		NMFS
93TISS0151	Karluk	KAR2	7/22/93	12:10	Mussel		NMFS
93TISS0152	Karluk	KAR2	7/22/93	12:15	Mussel		NMFS
93TISS0153	Karluk	KAR2	7/22/93	12:15	Mussel		ADF&G
93TISS0154	Karluk	KAR2	7/22/93	12:20	Blank		ADF&G
93TISS0155	Akhiok	AKH6	7/24/93	11:00	Littleneck clam		ADF&G
93TISS0156	Akhiok	AKH6	7/24/93	11:10	Littleneck clam		ADF&G
93TISS0157	Akhiok	AKH6	7/24/93	11:15	Littleneck clam		ADF&G
93TISS0158	Akhiok	AKH6	7/24/93	11:45	Mussel		ADF&G
93TISS0159	Akhiok	AKH6	7/24/93	12:00	Mussel		ADF&G
93TISS0160	Akhiok	AKH6	7/24/93	12:10	Mussel		ADF&G
93TISS0161	Akhiok	AKH6	7/24/93	12:15	Mussel		ADF&G
93TISS0162	Akhiok	AKH6	7/24/93	12:15	Blank		ADF&G
93TISS0169	Port Graham	PTG4	9/1/93	9:00	Littleneck clam		NMFS
93TISS0170	Port Graham	PTG4	9/1/93	9:10	Littleneck clam		NMFS
93TISS0171	Port Graham	PTG4	9/1/93	9:20	Littleneck clam		NMFS
93TISS0172	Port Graham	PTG4	9/1/93	9:30	Softshell clam		ADF&G
93TISS0173	Port Graham	PTG4	9/1/93	9:35	Softshell clam		ADF&G
93TISS0174	Port Graham	PTG4	9/1/93	9:45	Mussel		NMFS
93TISS0175	Port Graham	PTG4	9/1/93	9:45	Mussel		NMFS
93TISS0176	Port Graham	PTG4	9/1/93	9:50	Mussel		NMFS
93TISS0177	Port Graham	PTG4	9/1/93	9:50	Mussel		ADF&G
93TISS0178	Port Graham	PTG12	9/1/93	10:15	Chiton		NMFS
93TISS0179	Port Graham	PTG12	9/1/93	10:15	Chiton		NMFS
93TISS0180	Port Graham	PTG12	9/1/93	10:30	Chiton		NMFS
93TISS0181	Port Graham	PTG12	9/1/93	10:35	Blank		ADF&G
93TISS0182	Port Graham	PTG12	9/1/93	10:30	Chiton		ADF&G
93TISS0183	Nanwalek	NAN1	9/1/93	11:00	Mussel		NMFS
93TISS0184	Nanwalek	NAN1	9/1/93	11:05	Mussel		NMFS
93TISS0185	Nanwalek	NAN1	9/1/93	11:10	Mussel		NMFS
93TISS0186	Nanwalek	NAN1	9/1/93	11:10	Mussel		ADF&G
93TISS0187	Nanwalek	NAN1	9/1/93	11:12	Chiton		ADF&G
93TISS0188	Nanwalek	NAN1	9/1/93	11:15	Chiton		ADF&G
93TISS0189	Nanwalek	NAN1	9/1/93	11:15	Chiton		ADF&G
93TISS0190	Port Graham	PTG6	9/1/93	12:00	Black Rockfish	93BILE0190	D&M
93TISS0191	Chenega	CHE10	9/2/93	9:10	Littleneck clams		ADF&G
93TISS0192	Chenega	CHE10	9/2/93	9:15	Littleneck clams		NMFS
93TISS0193	Chenega	CHE10	9/2/93	9:17	Littleneck clams		ADF&G
93TISS0194	Chenega	CHE10	9/2/93	9:15	Butter Clams		ADF&G
93TISS0195	Chenega	CHE10	9/2/93	9:35	Mussels		NMFS
93TISS0196	Chenega	CHE10	9/2/93	9:40	Mussels		NMFS
93TISS0197	Chenega	CHE10	9/2/93	9:50	Mussels		NMFS
93TISS0198	Chenega	CHE10	9/2/93	9:50	Mussels		ADF&G
93TISS0199	Chenega	CHE10	9/2/93	10:10	Blank		ADF&G
93TISS0200	Chenega	CHE2	9/3/93	15:00	Black Rockfish	93BILE0200	ADF&G
93TISS0201	Chenega	CHE2	9/3/93	15:15	Blank		ADF&G

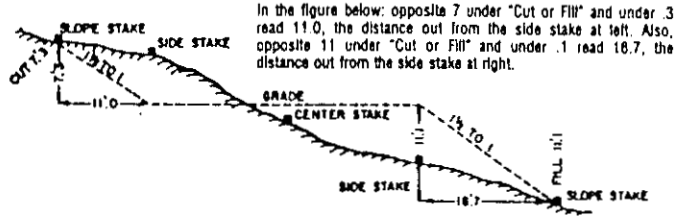
Id. No	Village	Site	Date	Time	Species	Bile Id. No	Disposition
93TISS0202	Tatitlek	TAT9	9/4/93	9:15	Littleneck clams		NMFS
93TISS0203	Tatitlek	TAT9	9/4/93	9:20	Littleneck clams		NMFS
93TISS0204	Tatitlek	TAT9	9/4/93	9:40	Littleneck clams		NMFS
93TISS0205	Tatitlek	TAT9	9/4/93	9:50	Mussels		NMFS
93TISS0206	Tatitlek	TAT9	9/4/93	9:55	Mussels		NMFS
93TISS0207	Tatitlek	TAT9	9/4/93	10:00	Mussels		NMFS
93TISS0208	Tatitlek	TAT9	9/4/93	10:00	Mussels		ADF&G
93TISS0209	Tatitlek	TAT1	9/4/93	10:25	Littleneck clams		ADF&G
93TISS0210	Tatitlek	TAT1	9/4/93	10:35	Littleneck clams		ADF&G
93TISS0211	Tatitlek	TAT1	9/4/93	10:45	Littleneck clams		ADF&G
93TISS0212	Tatitlek	TAT1	9/4/93	10:50	Mussels		NMFS
93TISS0213	Tatitlek	TAT1	9/4/93	10:55	Mussels		NMFS
93TISS0214	Tatitlek	TAT1	9/4/93	11:05	Mussels		NMFS
93TISS0215	Tatitlek	TAT1	9/4/93	11:10	Mussels		ADF&G
93TISS0216	Tatitlek	TAT1	9/4/93	10:00	Blank		NMFS
93TISS0217	Tatitlek	TAT1	9/4/93	11:15	Blank		ADF&G
93TISS0218	Tatitlek	TAT4	9/4/93	13:10	Quillback Rockfish	93BILE0218	NMFS
93TISS0219	Tatitlek	TAT4	9/4/93	15:10	Quillback Rockfish	93BILE0219	NMFS
93TISS0220	Tatitlek	TAT4	9/4/93	15:35	Quillback Rockfish	93BILE0220	NMFS
93TISS0222	Tatitlek	TAT4	9/4/93	15:35	Quillback Rockfish	93BILE0222	NMFS
93TISS0223	Tatitlek	TAT4	9/4/93	16:10	Blank		ADF&G
93TISS0224	Ouzinkie	OUZ2	9/13/93	7:45	Littleneck clams		ADF&G
93TISS0225	Ouzinkie	OUZ2	9/13/93	7:50	Littleneck clams		ADF&G
93TISS0226	Ouzinkie	OUZ2	9/13/93	7:55	Littleneck clams		ADF&G
93TISS0227	Ouzinkie	OUZ2	9/13/93	8:00	Butter Clams		NMFS
93TISS0228	Ouzinkie	OUZ2	9/13/93	8:05	Butter Clams		NMFS
93TISS0229	Ouzinkie	OUZ2	9/13/93	8:05	Butter Clams		NMFS
93TISS0230	Ouzinkie	OUZ2	9/13/93	8:10	Mussels		NMFS
93TISS0231	Ouzinkie	OUZ2	9/13/93	8:15	Mussels		NMFS
93TISS0232	Ouzinkie	OUZ2	9/13/93	8:20	Mussels		NMFS
93TISS0233	Ouzinkie	OUZ2	9/13/93	8:30	Mussels		ADF&G
93TISS0234	Ouzinkie	OUZ2	9/13/93	8:30	Blank		ADF&G
93TISS0235	Ouzinkie	OUZ3	9/13/93	8:58	Littleneck clams		ADF&G
93TISS0236	Ouzinkie	OUZ3	9/13/93	8:55	Littleneck clams		ADF&G
93TISS0237	Ouzinkie	OUZ3	9/13/93	9:10	Littleneck clams		ADF&G
93TISS0238	Ouzinkie	OUZ3	9/13/93	9:15	Mussels		NMFS
93TISS0239	Ouzinkie	OUZ3	9/13/93	9:15	Mussels		NMFS
93TISS0240	Ouzinkie	OUZ3	9/13/93	9:15	Mussels		NMFS
93TISS0241	Ouzinkie	OUZ3	9/13/93	9:30	Mussels		ADF&G
93TISS0242	Ouzinkie	OUZ3	9/13/93	9:30	Blank		ADF&G
93TISS0243	Port Lions	PTL1	9/14/93	7:50	Butter Clams		ADF&G
93TISS0244	Port Lions	PTL1	9/14/93	7:50	Butter Clams		ADF&G
93TISS0245	Port Lions	PTL1	9/14/93	7:40	Butter Clams		ADF&G
93TISS0246	Port Lions	PTL1	9/14/93	7:55	Mussels		NMFS
93TISS0247	Port Lions	PTL1	9/14/93	7:55	Mussels		NMFS
93TISS0248	Port Lions	PTL1	9/14/93	8:00	Mussels		NMFS
93TISS0249	Port Lions	PTL1	9/14/93	8:00	Mussels		ADF&G
93TISS0250	Port Lions	PTL1	9/14/93	8:05	Blank		NMFS

Id. No	Village	Site	Date	Time	Species	Bile Id. No	Disposition
93TISS0251	Larsen Bay	LAB15	9/15/93	9:00	Butter Clams		ADF&G
93TISS0252	Larsen Bay	LAB15	9/15/93	9:05	Butter Clams		ADF&G
93TISS0253	Larsen Bay	LAB15	9/15/93	9:10	Butter Clams		ADF&G
93TISS0254	Larsen Bay	LAB15	9/15/93	9:15	Littleneck clams		ADF&G
93TISS0255	Larsen Bay	LAB15	9/15/93	9:20	Littleneck clams		ADF&G
93TISS0256	Larsen Bay	LAB15	9/15/93	9:30	Littleneck clams		ADF&G
93TISS0257	Larsen Bay	LAB15	9/15/93	9:35	Mussels		NMFS
93TISS0258	Larsen Bay	LAB15	9/15/93	9:40	Mussels		NMFS
93TISS0259	Larsen Bay	LAB15	9/15/93	10:00	Mussels		NMFS
93TISS0260	Larsen Bay	LAB15	9/15/93	10:00	Mussels		ADF&G
93TISS0261	Larsen Bay	LAB15	9/15/93	10:00	Blank		ADF&G
93TISS0262	Nanwalek	PTG6	9/23/93	12:14	Black Rockfish	93BILE0262	NMFS
93TISS0263	Nanwalek	PTG6	9/23/93	12:16	Black Rockfish	93BILE0263	NMFS
93TISS0264	Nanwalek	PTG6	9/23/93	12:18	Black Rockfish	93BILE0264	NMFS
93TISS0265	Nanwalek	PTG6	9/23/93	12:20	Black Rockfish	93BILE0265	NMFS
93TISS0266	Nanwalek	PTG6	9/23/93	12:22	Black Rockfish	93BILE0266	NMFS
93TISS0267	Nanwalek	PTG6	9/23/93	12:25	Black Rockfish	93BILE0267	NMFS
93TISS0268	Nanwalek	PTG6	9/23/93	12:27	Black Rockfish	93BILE0268	NMFS
93TISS0269	Nanwalek	PTG6	9/23/93	12:30	Black Rockfish	93BILE0269	NMFS
93TISS0272	Chenega	CHE2	9/27/93	14:15	Tiger Rockfish	93BILE0274	NMFS
93TISS0273	Chenega	CHE2	9/27/93	14:50	Yelloweye Rockfish	93BILE0273	NMFS
93TISS0275	Chenega	CHE2	9/27/93	16:35	China Rockfish	93BILE0275	NMFS
93TISS0276	Chenega	CHE2	9/27/93	16:35	China Rockfish		ADF&G
93TISS0277	Chenega	CHE2	9/27/93	17:45	Tiger Rockfish	93BILE0277	NMFS
93TISS0278	Chenega	CHE2	9/27/93	18:05	Yelloweye Rockfish	93BILE0278	NMFS

DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING

Roadway of any Width. Side Slopes 1½ to 1.

In the figure below: opposite 7 under "Cut or Fill" and under .3 read 11.0, the distance out from the side stake at left. Also, opposite 11 under "Cut or Fill" and under .1 read 16.7, the distance out from the side stake at right.



Cut or Fill	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	Cut or Fill
	Distance out from Side or Shoulder Stake										
0	0.0	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	0
1	1.5	1.7	1.8	2.0	2.1	2.3	2.4	2.6	2.7	2.9	1
2	3.0	3.2	3.3	3.5	3.6	3.8	3.9	4.1	4.2	4.4	2
3	4.5	4.7	4.8	5.0	5.1	5.3	5.4	5.6	5.7	5.9	3
4	6.0	6.2	6.3	6.5	6.6	6.8	6.9	7.1	7.2	7.4	4
5	7.5	7.7	7.8	8.0	8.1	8.3	8.4	8.6	8.7	8.9	5
6	9.0	9.2	9.3	9.5	9.6	9.8	9.9	10.1	10.2	10.4	6
7	10.5	10.7	10.8	11.0	11.1	11.3	11.4	11.6	11.7	11.9	7
8	12.0	12.2	12.3	12.5	12.6	12.8	12.9	13.1	13.2	13.4	8
9	13.5	13.7	13.8	14.0	14.1	14.3	14.4	14.6	14.7	14.9	9
10	15.0	15.2	15.3	15.5	15.6	15.8	15.9	16.1	16.2	16.4	10
11	16.5	16.7	16.8	17.0	17.1	17.3	17.4	17.6	17.7	17.9	11
12	18.0	18.2	18.3	18.5	18.6	18.8	18.9	19.1	19.2	19.4	12
13	19.5	19.7	19.8	20.0	20.1	20.3	20.4	20.6	20.7	20.9	13
14	21.0	21.2	21.3	21.5	21.6	21.8	21.9	22.1	22.2	22.4	14
15	22.5	22.7	22.8	23.0	23.1	23.3	23.4	23.6	23.7	23.9	15
16	24.0	24.2	24.3	24.5	24.6	24.8	24.9	25.1	25.2	25.4	16
17	25.5	25.7	25.8	26.0	26.1	26.3	26.4	26.6	26.7	26.9	17
18	27.0	27.2	27.3	27.5	27.6	27.8	27.9	28.1	28.2	28.4	18
19	28.5	28.7	28.8	29.0	29.1	29.3	29.4	29.6	29.7	29.9	19
20	30.0	30.2	30.3	30.5	30.6	30.8	30.9	31.1	31.2	31.4	20
21	31.5	31.7	31.8	32.0	32.1	32.3	32.4	32.6	32.7	32.9	21
22	33.0	33.2	33.3	33.5	33.6	33.8	33.9	34.1	34.2	34.4	22
23	34.5	34.7	34.8	35.0	35.1	35.3	35.4	35.6	35.7	35.9	23
24	36.0	36.2	36.3	36.5	36.6	36.8	36.9	37.1	37.2	37.4	24
25	37.5	37.7	37.8	38.0	38.1	38.3	38.4	38.6	38.7	38.9	25
26	39.0	39.2	39.3	39.5	39.6	39.8	39.9	40.1	40.2	40.4	26
27	40.5	40.7	40.8	41.0	41.1	41.3	41.4	41.6	41.7	41.9	27
28	42.0	42.2	42.3	42.5	42.6	42.8	42.9	43.1	43.2	43.4	28
29	43.5	43.7	43.8	44.0	44.1	44.3	44.4	44.6	44.7	44.9	29
30	45.0	45.2	45.3	45.5	45.6	45.8	45.9	46.1	46.2	46.4	30
31	46.5	46.7	46.8	47.0	47.1	47.3	47.4	47.6	47.7	47.9	31
32	48.0	48.2	48.3	48.5	48.6	48.8	48.9	49.1	49.2	49.4	32
33	49.5	49.7	49.8	50.0	50.1	50.3	50.4	50.6	50.7	50.9	33
34	51.0	51.2	51.3	51.5	51.6	51.8	51.9	52.1	52.2	52.4	34
35	52.5	52.7	52.8	53.0	53.1	53.3	53.4	53.6	53.7	53.9	35
36	54.0	54.2	54.3	54.5	54.6	54.8	54.9	55.1	55.2	55.4	36
37	55.5	55.7	55.8	56.0	56.1	56.3	56.4	56.6	56.7	56.9	37
38	57.0	57.2	57.3	57.5	57.6	57.8	57.9	58.1	58.2	58.4	38
39	58.5	58.7	58.8	59.0	59.1	59.3	59.4	59.6	59.7	59.9	39
40	60.0	60.2	60.3	60.5	60.6	60.8	60.9	61.1	61.2	61.4	40

Name Dave Erikson
Dames & Moore

Address

Phone

Project Subsistence Food Sampling Project 1993

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6/23/93 Subsistence Sampling

Traveled to Pt Graham at 10:00 AM - met with Pat Norman - President of the local council

Sampled Duncan's beach/slough for littlenecks and softshell clams. Habitat was fairly muddy which made it difficult to get enough littlenecks.

The beach is fairly heavily used with seine skiffs tied up along the upper beach. There are some old abandon boats just up the slough.

Fish sampling 6/23/92

off the mouth of the bay 15:00

15:15 Changed location - very few strikes - only one gray cod - throw it back!

15:20 Went into 14 fathoms to try for Rockfish.

15:40 Moved just outside the mouth of the Bay to a new location but we were unsuccessfull at catching anything

1650 Went back into the bay to drift with the tide to see if we can get into any rockfish

Fishermen

Damian Sigler

Dale Melchoff

Pat Norman

1830 Returned to Ed Graham

June 24, 1993

Flew over to Nanwalek at 12.00 and was met at the plane by Bob Krasnikoff and Ephim Monnin.

The easiest way to get to the site was by skiff which was anchored off the airport beach.

I looked over the beach just past the village, northwest of Russian Point. The beach was mostly solid rock or very large boulders. No habitat for clams.

My assistants paid the nearest clam beds were inside Port Graham on the southside of the bay on the east side of Passage Island.

I decided to try to get some steamers on the island but we only found a few small ones, not enough for even one sample. There was plenty sea otter feeding pits on the beach.

1300 - Russia Pt - NANI - collected 11 clams and 4 mussel samples.

1400-1830 - We tried several spots to get Rockfish but we were able to only getting Kelp Greenling.

1850 - First Blackrock fish
100m south of Flat Island
30' depth

Wt 4 lbs 18.25 inches ♂

We fished a while longer but we couldn't seem to get back to where the fish were.

5DE.
6/26 - Second Day of Sampling - Nanwalek
10:30 - 1:00 fished the Flat Island area with no success on Rockfish
Only Kelp greenling
- New Location - Lots of Rock Fish
Weather - clear and calm

#1 12" 1¼ lb.
#2 13.2 1.5 lbs — we got bile and
#3 13.0 1.75 — tissue off of 8
#4 12.25 1.¼ — Rockfish all
#5 ~~12.3~~ (13.0) 1.½ 1315 DC — the same location
6 16.1 ~~1.~~ .925 DC
7 18.5 4.0
8 19.0 3.8

This site is directly between Pt Pogibshi and Dangerous Cape and directly offshore from the main drainage stream which has no name.

This site was named PT66 from the Exxon Studies but there are 2 PT66s - the other ones is up the Bay from Port Graham.

Flew back to Homer at 1900 - Finished first sampling trip to these two villages.

6/29/93 -

Traveled to Anchorage in the morning to catch a 2:30 flight with Jim Air to Chenega.

1300 - called Martin to get on flight

1400 - called Rita to tell her we will be soon to Wyndy Bay and Anderson beach on July 5 at 8:00 Hrs.

- People going will be Pat Norman of Port Graham and Emily — of Nanwalek

1500 - flew to Chenega and met with Larry Evanoff. He had lined up Peter Kompkoff and his son Richard to help with the sampling.

6/30/93

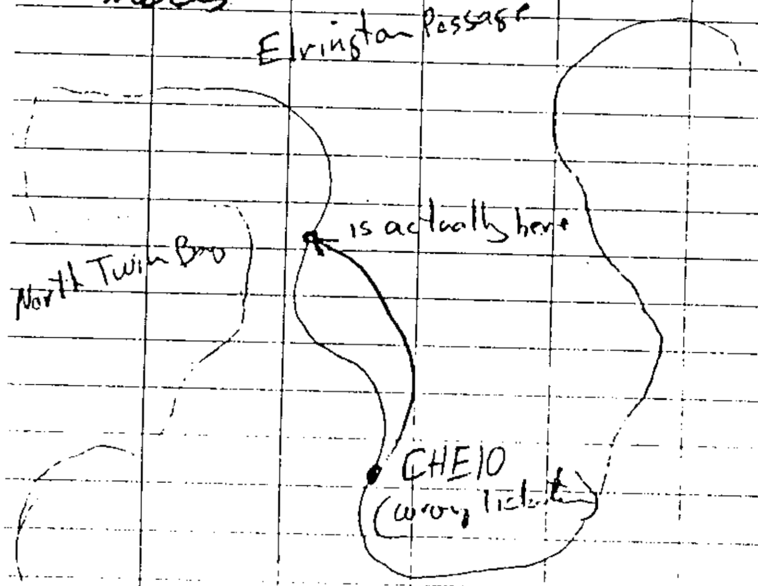
0800 - waited 45 min on the dock for the others to show up.

0845 - left the dock for Fox Farm (CHE10) and it took about 40 min to get there. Low tide was at 0515

96

We looked for the site which was marked on the map but the marked site was in the wrong location. I recall that this was a problem in 1991 when we sampled here so the location must not have been changed in the interim

The actual location is on the ismus between the two promint hills



We collected 4 Butterclam Samples 4 mussel sample (3 with one split) and 2 little neck samples

- Size of the clams and mussels were small.
- No oil observed but we did not go up to the storm berm to see if any was up there

0715 - Head to the fish site off Sawmill Bay (CHE2) weather rainy and light wind.
anchored in 180 ft of water and tried for Black Rockfish

	Species	Length	weight
#1	yelloweye	(small)	≈1 lb. (not measured)
#2	Black Rockfish	18.25	3.6 lb
#3	Black Rockfish	13.25	1.5 lbs
#4	Black Rockfish	14.0	1.9 lbs
#5	Yelloweye Rockfish	23.0	8.0 lbs
#6	Yelloweye Rockfish	17.0	4.1 "
#7	Yelloweye Rockfish	23.0	7.9 "
#8	Yelloweye Rockfish	13.0	1.5 "
#9	Black Rockfish	14.3	1.8 lb

other species caught but not sampled were 2 Tiger Rockfish 1 China Rockfish, 1 gray cod and one Quillback Rockfish

Quit fishing
1200 - Back to Chenega.

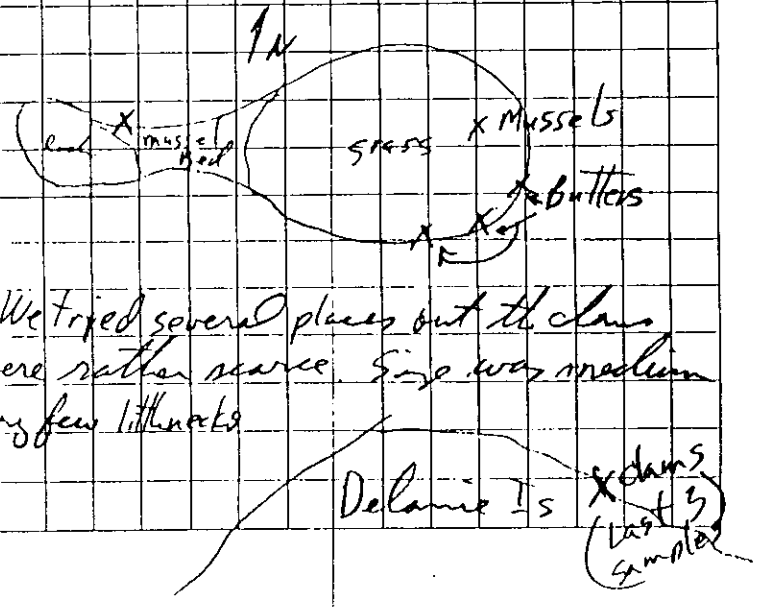
I forgot to get a split rod divided sample 93TIS50051 into two and labled the second half 93TIS50057

9/1/93 Delaware Island

Left Chenega at 04:45 & arrived at Delaware Island at 0620.

We checked the map about clam habitat was very limited. A small inlet off the north side appeared to be the best habitat around this area.

The inlet is also a Arctic Tern colony with over a hundred terns present (young also in the colony)



We Tried several places but the clams were rather scarce. Size was medium Very few littlenecks

97

0740 Left the island and circled Delarof for the clam area

(Collected 3 Butterclam samples and 3 Mussel samples)

after leaving, we decided to look closer at a beach on Delarof on the northwest side.

We landed and took three clam samples from this small beach. about 4-6 inches below the surface at this site, there was a dark brown layer which appeared to be mousse or old oil but there was no sheen or any smell of oil

7/12/92

0630 Left Tatitlek for Reef Island The staff driver was Jerry Totemoff and the assistant was Brian Zacher.

This station will be called TAT 9 located on the south east side of the island and the only gravel beach we could see.

Collected 3 mussel samples plus an additional split sample.

Butter clams were small and scarce but we did find a small pocket of little necks and got three samples. There were also giant clams.

There was no sign of residual oil or mousse. Jerry Totemoff said he though the area was exposed during the spill.

0900 We stopped in Tatitlek on our way out to Delarof Point to get some Rockfish. Brian said he had

to go to Valdez to pick up his brother so he left. Jerry and I went to TAT4 and spent the rest of the day Fishing

- Caught only 2 Quillback Rockfish got tissue & bile off both.

Jerry said that no body he ever knew fished for rockfish in this area. Most people go up into Boulder Bay.

7/3/93

0700 - Took a skiff out to the small island north of Blight Island TAT1.

Digging clams was fairly difficult due to the low density - the largest ones were at the edges of large boulders where the otters can't get them

We managed to get a couple of mussels, littlenecks & butters

0930 TAT4

We tried for Rockfish the rest of the day at Bidarka Point. The weather kicked up in the late afternoon - had to leave.

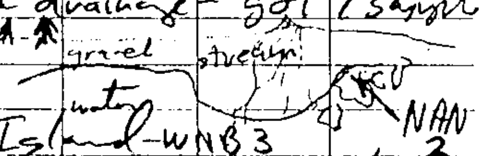
Tried the spot up Boulder Bay where Jerry said most people fish but no luck

1630 - Back in Tatitlek - end of Sampling

7/5/93 Outer Coast of Kenai
0800 - Left Homer on Maritime Helicopters - Pilot Don Fell -

Picked up Pat Norman in Port Graham and Flew to Nanwalek - The woman we were to pick up wasn't there so we had to wait for 45 min. - Emilie Swenning -

NAN 2
0945 - Andersen Beach - outer Coast
Exposed gravel beach - no clam habitat. There were some rocks on the east side of creek drainage - got 4 sampl of Mussels -

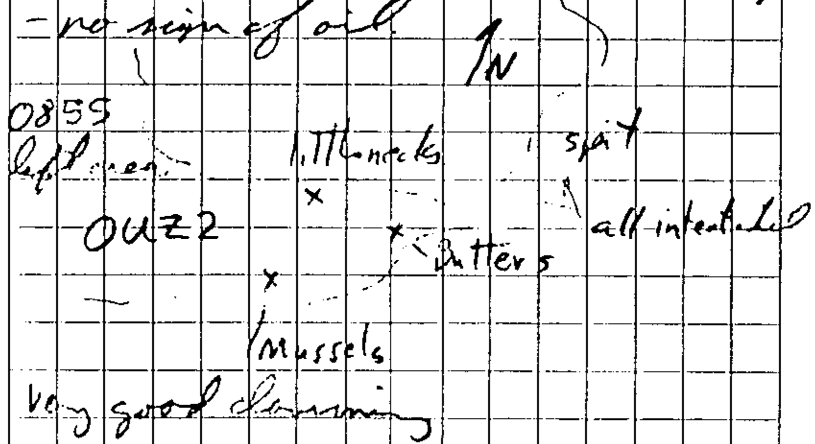


1030 - Windy Bay - Island - WNB 3
Sampled Chitons from the rock face on the east side of Island - usual place. Mussels were taken from the site previously refered to as "Lower east" on other sampling trips.

"TAR and asphalt" evident in Rocks of the upper beach - some was even shining in the hot sun. This was the only place this was seen

7-17-93
Second Half of First Cycle -
Kodiak Villages

Traveled from Homer to Ouzinkie & had to charter to Ouzinkie since I missed the Anch-Kodiak Markair flight to Ouzinkie - used UVAK Air
Andy Christofferson fixed me up in the apartment - No food -
Boat - Nutachia - (Andy's boat)
7-18 - Left Dock at 0700 for Camel Rock - but this site is actually North of Camel Rock
0730 - Sampled spit north of Camel Rock - got all the needed samples - no sign of oil



100

7-19-93 Second day at Ouzinkie
I used the same boat and assistant
for this sampling.
-OUZ3
0800 We left the harbor and went
around the corner to Sourdough
flats. Most of the area is not
good clam habitat. The gravel
beach is too steep and exposed.
Clams are found under the cobbles
on the south end of the beach.
The large cobbles have to be moved
to get at the clams. It took a while
to get all the samples.

No sign of residual oil although it
was hit during the spill.

We collected all the needed samples

0930 went back to Ouzinkie and
packed up the samples

1230 flew to Kodiak and dropped
off the samples at the Fishery Center
- samples from both Ouzinkie sites.

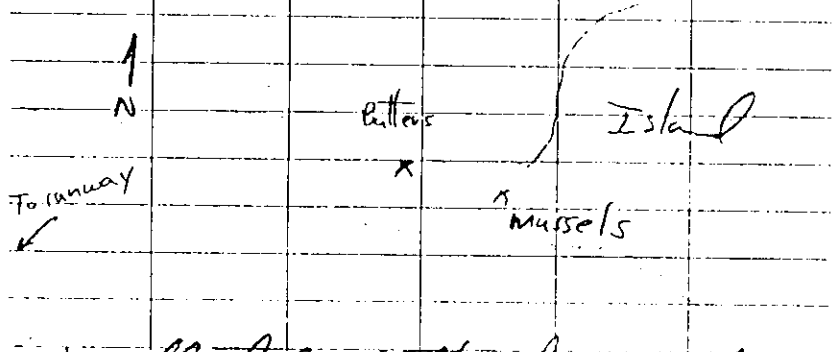
0345 Took the Pen Air flight
to Pt Lions - Susan Vogt [illegible]
met me at the airport and
took me to the Lions Den Lodge.

7-20-93 Port Heiden

0900: Susan Voskofsky picked me up at the Lodge and we went to the site at the end of the runway

Weather was raining and blowing about 10 mph - lots of clams & mussels everywhere -

We sampled in the same spot we did in 1990 - about 100 m from the inlet - on the spit connecting the island with the mainland on the northside



We collected 3 butter clam samples 3 mussels with one split. + a field blank

1030 Went back to the Lodge and put samples in freezer.

1230: flew back to Kodiak to catch the Mark air 400 flight to Larsen Bay.

1700 Larsen Bay.

Roy Jones meet me at the flight & Amook Lodge - Bed & Breakfast

Got the skiff ready in the evening

Roy's daughter - Sandra Jones -

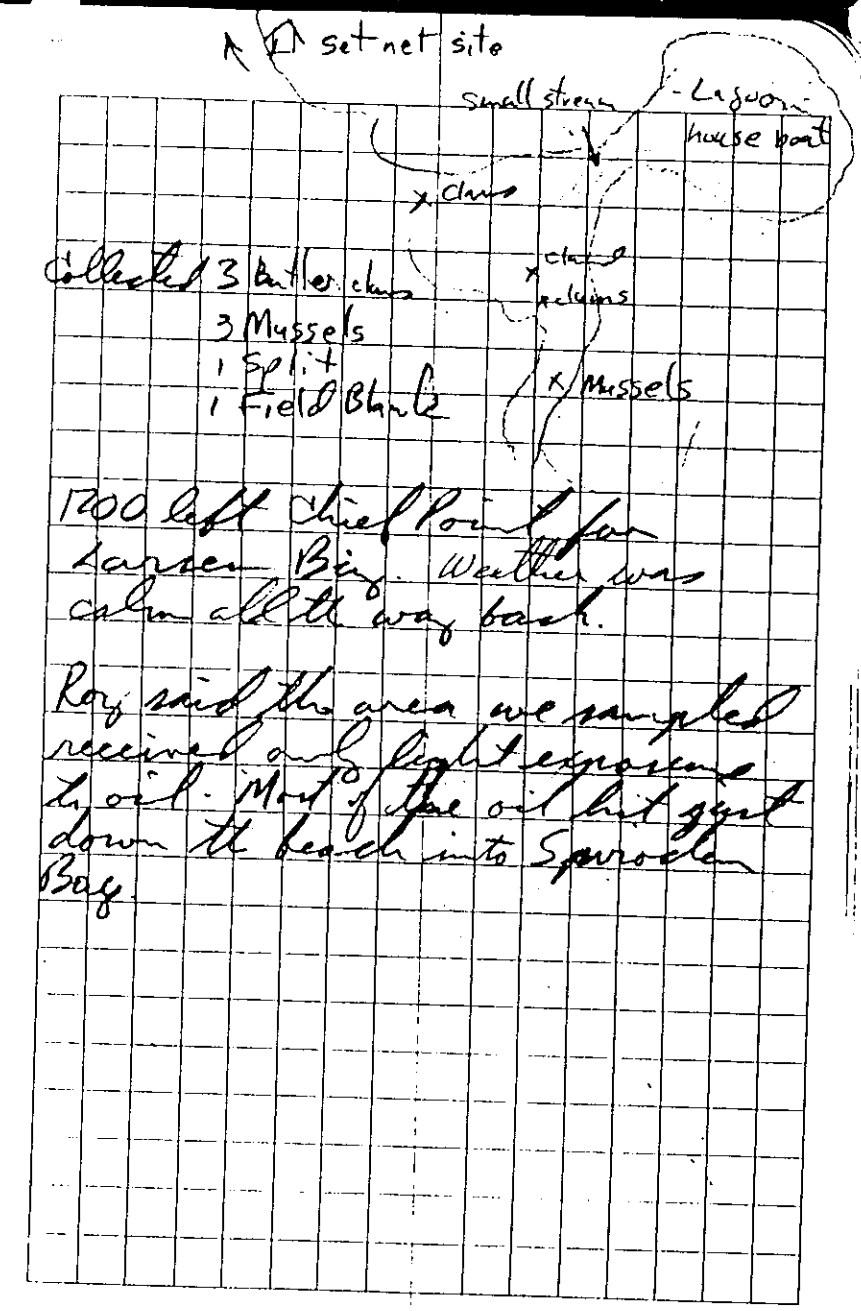
7-21-91

0800 - Called Horace in Anchorage but he wasn't in.

0830 - Talked to Horace about arrangements in Karluk in Akiok.

0930 - Headed from Chief Point (LHB 15) to sample clams & mussels.

1000 - Chief Point - weather clear. The first beach we looked at did not look like a likely spot since it was so exposed. Inside the cove at the outlet to a small lagoon, we found some small butter clams. Most of the clams had died in the last several years. Most live clams were about 2 inches in length. Locals in the area blamed the disappearance on sea otters but very few of the shells of the dead clams were broken.



Collected 3 butter clams
3 Mussels
1 Split
1 Field Blank

1200 left Chief Point for Karluk Bay. Weather was calm all the way back.

Roy said the area we sampled received only slight exposure to oil. Most of the oil hit just down the beach into Sparrevohn Bay.

7-22-73

Flew to Karluk and arrived at 400pm.

Stayed at Mary Reft- her son was there to the one who was going to take me out in the skiff (16' Lund).

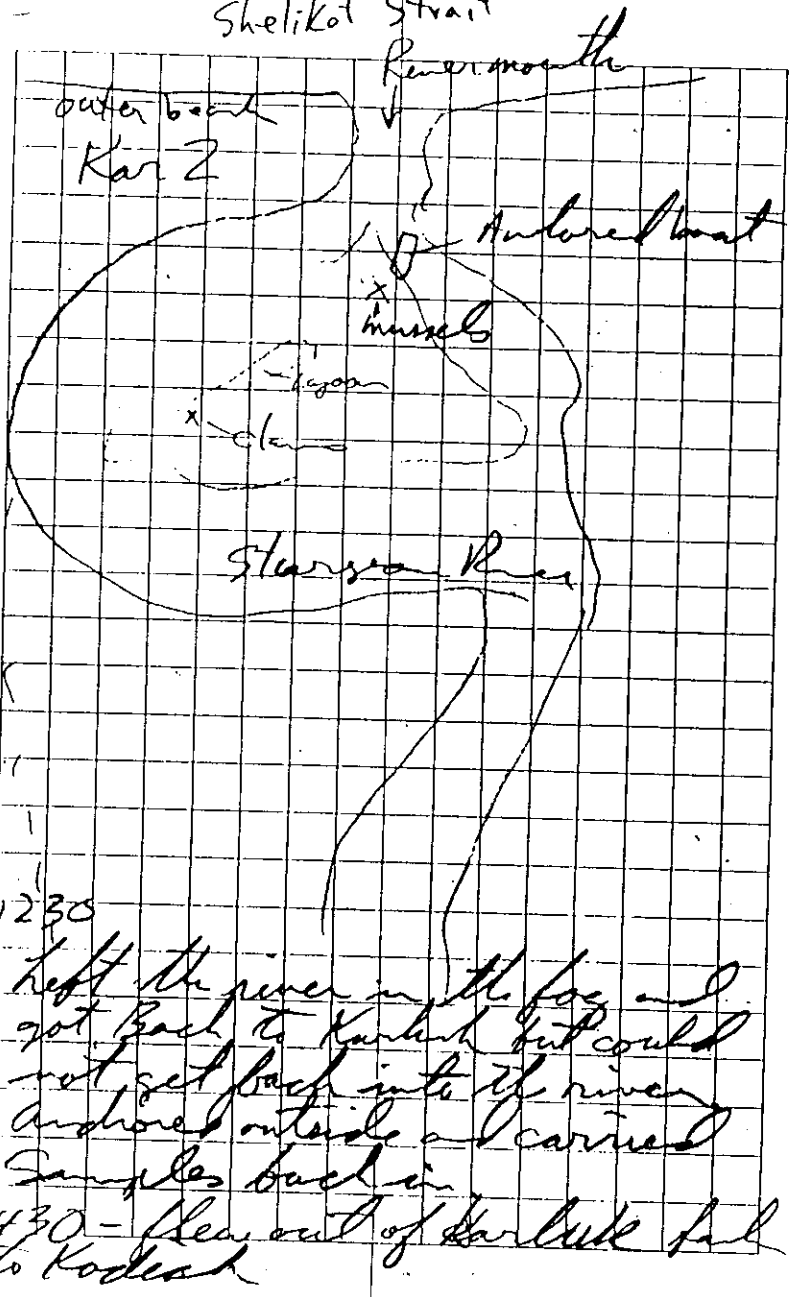
Took the skiff to Sturgeon River in the morning to catch the tide. Weather was rain and fog. Assistant was John Reft

1045 Got into the river with flood much trouble. Went to the high lagoon like channel where we collected the clams, last time to a good site since it is fairly high on the tide line but does not go dry.

Got 3 samples of littlenecks and 3 samples of Butter clams without much trouble

Got 3 mussel samples and one split at the mussel bed near the boat.

Shelikof Strait



1230

Left the river in the fog and got back to Karluk but could not get back into the river anchored outside and carried samples back in

1430 - Flew out of Karluk for to Kodiak

Stayed in Kodiak the night of the 22nd.

7-23-93

0945 - Flew to Akhiok to spot the following day.

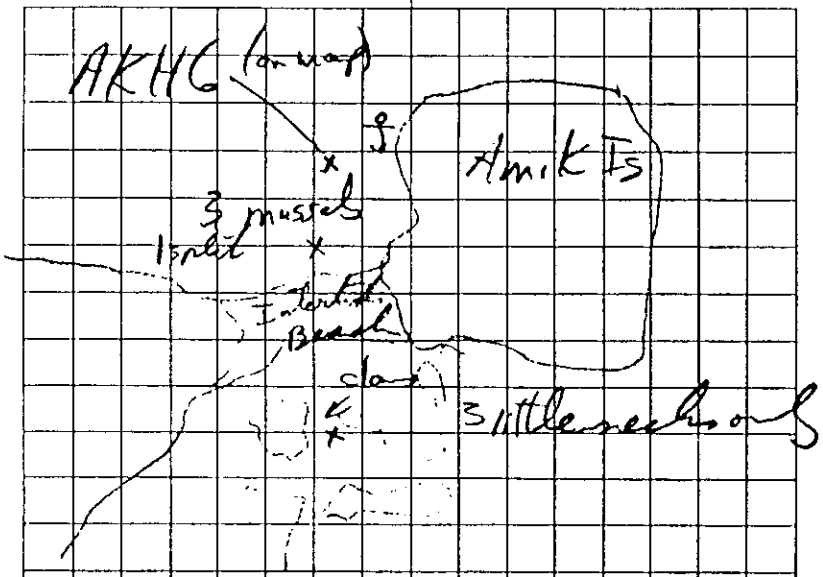
No one there to meet me! I went to city Hall but they said that Mitch Semeonoff was up at fish camp still.

Got a ride up to his camp and talked with him about getting a skiff. He had just hit a rock and put a hole in it so I arranged to get a ride with Ewin Anderson.

7-24-93

1030 Headed for Amook Island but suspect that the site is named Sadlerochit (AKH6). Probably should be AKH8 - Tanner Head for razors.

Weather is too bad to get there today and Edwin said it takes a very low tide to get razors. Stayed AKH6 anyway



Flew out back to Kodiak at 1430 - Very bad flight! Tried to get through the passes over to the east side of island but ceiling got too low - had to sit down in Ouzinkie for 30 min. Crawled back to Kodiak under the fog.

Collected the remainder of the samples in Kodiak at the Fisheries Center. Kat Wynne was in there so I stood outside the door for about 1 hr. until someone came along to let me in. The samples were kept at -70° so they stayed frozen until I got them to the lab in Anchorage.

9/1/93

After several days of bad weather I got a flight over to Port Graham to start the second cycle of sampling. Pat Norman couldn't make it but he fixed me up with a skiff driven by a seiner to do the sampling.

We forgot to plan on low tide - the tide was not as low as it was the last time so we were pressed for time to get all the samples.

PTG-4 - Duncans Slough

0900 - 3 samples of littlenecks
2 of softshell clams (they were hard to find this time)
3 mussel samples (+ one split)

1000 - left the beach for PTG-12 on the rocky point east of Johnson Slought (Johnson Pt.) (59° 22.4' 151° 52.4')

1015 - Collected 3 chiton samples + 1 oil sheen field blank and one split

Since we have a limited number of low tide this month, I decided to sample Nanwalek at the same time as Port Graham. We could not find assistant to help so it used the same people and same boat. - Assistat Neil Hedrick -
Boat - "Terri Lynn" - Skipper Cliff McGhan
1100 - We raced over to Russian Pt by Nanwalek to get samples before the tide got too high
collected -
3 Chiton samples
3 Mussel samples
(1 split)
1 Field blank.

1200 - Took the seiner over to PTG 6 - located between Pt Pogrebka and Dangerous Cape -
Fished for a couple of hours - 3 people fishing but only one black rockfish was caught
took fin samples and took the whole fish for tissue

9-1-93
Went back to Homer to catch a flight to Anchorage so I could get the last flight to Chenega on Timair -
Nobody was expecting me in Chenega - Ball Dropped!!
!! No boat - No assistance
No place to stay!!

Got in contact with John Totemoff - and he said he would take me to Eyak Farm the next day. Boat bum picker named "Shaker"

Finally got a cot in the mess hall for the night.

9/2/93 Fox Farm CHE10

Left Chenega on the Morning and went down to CHE10, at the same location as last time but the tide was not near as low as before - Slow boat trip!

0900 -

The littlenecks were fairly easy to find but the butter clams were scarce at this level of the beach

Littlenecks - 3
Butter - 1
Mussels - 3 + 1 split
Field Blank - 1

1130 left beach and went back to Chenega - boat was having engine trouble. Running rough.

1320 - CHE2 -

Spent the rest of the day trying to catch some fish (rockfish) off the point near the mouth of ~~Snug~~ Crab Bay. No luck - only some Kelp Greenling -

1730 - Back to Chenega -

9-3-93

John Totemoff said it would take at least 3½ hrs to get to Delenia Island from Chenega and with the tide so early we would have to leave in the dark. The boat has no radar and is not running very well so I decided to try and catch fish at CHE2 instead of going up to Delenia Is.

0900 - We first tried to get some rockfish up at Shelter Bay CHE26.

Tried about 10 locations but were not able to get any rockfish - This was the the same results as the last sampling period in July at Shelter Bay.

1300 - Went back and fished at CHE2, just off of Chenega Village.

1500 - I caught our first Rockfish - Blackrock fish - after several passes over a shallow rock pile just west of CHEZ.

1600 - Jim in Charter came early so we had to get back to Chenega to catch the flight to Tatitlek.

1800 - Arrived in Tatitlek
Gary Komphoff was out of town but he had someone meet us and put me up in the Trailer. No word on who was going to take me out in the Morning

9/4/93 -
0800 - No word from Gary Komphoff yet about a boat or assistance
Tracked him down at the office and he arranged for a skiff and an helper. Steve Totemoff was the skiff handler -

- First site was Reef Island
TAT-9 - southeast end.
0900
The tide was not very low and it was coming in when we got there - we had to hussel to get the samples ahead of the tide.

3 littlenecks
3 Mussels (1 one split
1 full Blue

Clams at this site are quite small -

We had engine trouble half way back and drifted for about a half hour.

1025 - TAT-1 - this site is in the narrows north of Bligh Island again the level of the tide did not let us sample the same exact area as before but it was close.

Density of clams was lower at this tide level and we weren't able to get enough Butter clams for a sample.

3 littlenecks (small)
3 Mussels (+ one split)

1130 Went Back to Tatitlek to get fishing gear and headed for Bidarka Pt.

Weather was fairly rough - wind 10 knots from the south and some rain - very hard to hold in one place.

1310 - First Quillback Rockfish
Wt 1.1 Kg - Male
Length 420 mm

took bile sample + tissue
caught total of 4 - one had very little bile

	wt	Length
0219	1.0 Kg	370 mm
0220	1.0 Kg	370 mm
0222	1.1 Kg	390 mm

also caught a small halibut a very large gray cod and some Kelp Greenling, none were sampled

1630 - Wind is picking up so we had to head in. Fairly strong storm is moving in.

09/5/93 - Plane could not get in last night so I had to stay another day.

Fog on the west side of the sound kept the planes grounded until 1500 in the afternoon. I finally got picked up and had a death defying ride back to Anchorage.

9/12/93

I had to leave Homer on Sunday morning to get to Anchorage by late evening. In Anchorage I was met by Roger Johnson and he said he would be taking me out in the same boat we had last time, the "Natasha."

9/13/93

We had to leave just before daylight to get to the site

0805 -

First site OKZ 2 -

Tide was not as low but clams were still easy to get. - good site

3 Butterclams
3 littlenecks
3 Manila (+ one split
1 Blunt

0850 OKZ 3

The second site was being flooded fairly quickly as we arrived.

littlenecks were small but we did manage to get enough for the samples. ~~of little~~
collected
3 littleneck Samples
3 Mussels (+ one split)
1 field Blank.

0940 - Went back to Ouzinkie to catch the plane for Port Lions

Stayed at Lions Den Lodge

112

9/14/93 Port Lions
Sadie Jackofski was not available to do the assistant work so Robert Nelson helped this time. -

0730 PTL-1 Bar between the end of the runway and a small island to the east. - Very good clamming.

Collected 3 Butterclam samples
3 Mussels Samples
(+ one split)
1 field Blank.

Red tide warnings have kept most of the people in the village from clamming all summer. Red tide has been seen in the water numerous times by local residents.

Mid day I caught a flight from Port Lions to Larsen Bay by way of Kodiak - Dropped samples off at the Fishery Center in Kodiak

9/15/93 Larsen Bay

Stayed at Amook Lodge, Roy Jones - same as last time.

Since it's a long run over to Chief Pt. from town, we had to leave quite early in the morn. Weather was good

0900 arrive at Chief Pt.

Sampled the same area as I did in July. To outward of a small lagoon. We also went in side the lagoon to see if the density or size of clams was different that the sample location.

Clams were more abundant inside but a boyscout camp always anchored inside which could be a source contamination.

Collect 3 butter clam samples
3 little neck samples
3 Mussel samples (+ one split)

1015 - Left Chief Pt. and headed back to Larsen Bay - Weather was too windy in Karluk so I stayed at Larsen Bay the rest of the day.

1600 Weather not improving so caught flight to Kodiak

Put the samples in the Freezer at the Fish & Game Center.

9/16/93

Weather in both Karluk and Akhiok is too windy for planes to land. Will have to wait until tomorrow.

Called M. Tech Simeonoff in Akhiok - was not there. Has been in Kodiak for several days.

9/17/93

1630 - Call the city offices and the sick pump boat operator was sick, Evelyn Anderson - Weather is also too rough to get to Rodeman Reach - high seas - wind from east.

1730 - Called Karluk - planes still not getting in -

The weather is also too rough to get to Sturgeon River - have to sail around Karluk Pt.

No more goods to wait for so I decided to bag it!

Retrieved samples from freezer & shipped them back to Anchorage

Returned to Homer

9/1-193

Set up a helicopter trip for month Morning with Maritime Helicopters - Pat Norman and some one from Nanwalek will go with me to Windy Bay on Monday 9/20

Weather has been very windy and we only have 2 more tides this month to get this set

9/20/93

I got as far as the airport and the wind picked up even more and we had to scrape the flight

9/21/93

Tried again on Tuesday but wind still too strong. Wind from the Southwest also low ceiling.

Decided to end this cycle of intertidal sampling - no more good tides.

9/23/93

I decided to take advantage of some good weather to try and get some more rockfish from the Port Graham area.

Call Emil Kvasnikoff to arrange of boat and assistant the previous night

0900 arrived in Nanwalek -
No skiff and no assistant!

Contacted Wally Kvasnikof and he got Demetri Tanape to use Wally's skiff to take me out.

1215 - PTG-6 - Pt Pogibshi to Dangerous Cape

Started catching Rockfish as soon as we got the poles in the water.
caught 8 in 15 minutes
- all Black Rockfish -

1240 Headed Back to Nanwalek
1500 - Flew back to Homer

9/24/93

Talked with Rita about sending Steve Shaner to Chenega to try and catch Delinia Island CHE 25 and get some more rockfish at CHE 2 -

9/27/93

Steve Shaner flew to Chenega in the morning to finish sampling Delenia Island and Rockfish
He went out the first day in the vessel "Strike" - owned by Pete Kompkoff. His assistants were Sean Wilson and Clint Gregorioff.
They fished at CHE 2 - 300 m SW of the mouth of Johnson Cove
- From 1200 to 18:30
a total of 5 rockfish

	L	W
+ Tiger Rockfish	387	839 gm
+ Tiger Rockfish	356	600 gm
+ Yelloweye Rockfish	286 mm	326 gm
+ Yelloweye Rockfish	605 mm	2.2 kg
+ China Rockfish	337	466 gm

Plus one split and one field Blank.

9/28 - Weather is too rough to get to Waterman Island - They spent the rest of the day fishing at CHE-2 but were unable to get any Rockfish. - 0800 to 1800

9/29 - 0835

The sampling crew decided to take some clams & mussels at Johnson Cove in case we wanted to establish a site there. -

3 Samples of L. Littlenecks
3 " " Mussels

+ one field Blank.

APPENDIX 5:

Seal and Duck Collection Documentation

SUBSISTENCE FOODS SAMPLING PROGRAM
Protocols for the Collection and Handling of Seal and Duck Samples
Alaska Department of Fish and Game
Division of Subsistence
September 13, 1993

Chain of Custody

Chain of custody and collection forms (attached) will be used. The beach and water conditions (degree of oiling) will be clearly noted on the collection forms as well as the results of sight and smell tests conducted in the field. These waterproof forms will be placed in the zip lock bag with each individual tissue sample. Be sure that the species identification and sample location are displayed through the ziplock bag.

Field note books will be rite-in the-rain. Any deviation from protocol and the study plan can be documented in the field notes. The location of the sampling site will be determined with the aid of USGS grid maps or NOAA charts. The site locations should be plotted on the map.

Whenever samples are split, a separate chain of custody record will be prepared for each portion and marked to indicate with whom the samples are being split.

Evidence tape must be affixed to the shipping container before the samples leave the custody of the sampling personnel. The seal must be signed and dated before the container is shipped. The original chain of custody record accompanies the shipment; a copy is retained by the sample shipper. If samples are sent by common carrier, copies of all bills of lading or air bills must be retained as part of the permanent documentation.

Entries into the field logbooks or field data sheets are signed or initialed and dated by the person making the entry at the time of entry. Each days entries are closed out with a horizontal line, date and initial. Errors in field logbooks or other records are corrected by drawing a single line through the error, entering the correct information, and signing and dating the correction. Never erase an entry or any part of an entry. Do not remove the pages from the logbook.

Preparation

Aluminum foil will be cooked at 350 degrees Fahrenheit for one hour before it can be used to wrap tissue samples. All other sampling equipment will be washed using detergent and rinsed before and after each sample collection. This includes clam shovels, knives, containers, and gloves. Instruments used for exterior dissection must be cleansed before they can be used for internal dissection.

Collection Blank

At least one field blank and replicate sample should be taken for each collection site. A field blank is a sample container (foil and zip lock bag or bile container) opened in the field, closed and stored as if it contained a sample. Chain of custody forms will accompany blanks, and blanks will be sent to the laboratory.

Collection

The method of collection must not contaminate the samples. Do not collect any subsurface samples through surface slicks. Organisms to be analyzed for petroleum hydrocarbons should be freshly killed. Decomposed organisms should not be collected.

The animals to be sampled will always be handled with latex gloves. Each will be brought on board the boat in a manner so as not to contaminate it with any petroleum products such as fuel, plastics, or fuel-soaked material. The specimen will then be dissected in an appropriately clean container or on aluminum foil.

Ideally, samples should be collected from five seals and twenty ducks.

SEALS: Approximately 20 to 30 grams blubber, with skin attached, will be excised from each seal. Twenty to 30 grams of the liver will also be collected. The dissected tissue samples will then be double-wrapped in aluminum foil and placed in a zip lock bag. A bile sample will be taken from each seal. The bile will be collected by puncturing the gall bladder with a sterile disposable scalpel over a collection vial. Do not fill the vial all the way to the top, because the bile will expand when frozen. Only a few drops of bile are needed for analysis. However, if it is possible to collect more than one vial, do so. It never hurts to have a back up in case one vial breaks or is lost. The gall bladder may puncture and the bile get lost while the seal is being eviscerated. This should be clearly noted on the chain of custody form belonging to the seal from which the bile was lost. The bile samples will then be placed in a plastic bag. Identify the species, age, and sex of the seal as clearly as possible. It is necessary to be very accurate so the species dependent differences in bile metabolites can be ascertained by the laboratory. If you are unsure of the species, write detailed descriptions of the animal in the field note book, including the color, size, shape, etc.

DUCKS: It is important to be aware of the regulations regarding which ducks can be taken legally. We are not getting a special permit for this project, so any ducks killed must be legal for subsistence hunters at the time they are taken. A section of the skin, with attached adipose tissue and muscle, totalling 40 or 50 grams will be taken from each duck. Liver and bile samples will also be taken. The entire liver of each duck should be collected, double wrapped in aluminum foil and placed in a plastic bag. The bile will be collected by puncturing the gall bladder with a sterile disposable scalpel over a collection vial. Do not fill the vial all the way to the top, because the bile will expand when frozen. Only a few drops of bile are needed for analysis. However, if it is possible to collect more than one vial, do so. It never hurts to have a back up in case one vial breaks or is lost. The gall bladder may puncture and the bile get lost while the duck is being eviscerated. This should be clearly noted on the chain of custody form belonging to the duck from which the bile was lost. The bile samples will then be placed in a plastic bag. Identify the species, age and sex of the duck as clearly as possible. It is necessary to be very accurate so the species dependent differences in bile metabolites can be ascertained by the laboratory. If you are unsure of the species, write detailed descriptions of the animal in the field note book, including the color, size, shape, etc.

Each sampling site should be carefully defined and described in field notes and sketch maps.

After they are wrapped and labelled, the samples will be placed in insulated coolers containing ice packs. Keep all samples from the same animal together by placing them in a separate large plastic bag.

Sample Preservation

Samples must be kept cool. They should be frozen as soon after collection as possible, and the freezing process should be rapid. Once frozen, the samples must be kept frozen until extracted or prepared for analysis. Therefore, care must be taken that the samples remain frozen throughout the shipping process.

CORDOVA TIDES
September 1993

Date		HIGH TIDES A.M.	FT.	P.M.	FT.	LOW TIDES A.M.	FT.	P.M.	FT.
1	Wed	2:05	12.7	**2:37**	**12.3**	8:14	-.3	**8:28**	**.7**
2	Thu	2:39	12.6	**3:03**	**12.5**	8:45	-.1	**9:02**	**.5**
3	Fri	3:12	12.2	**3:29**	**12.6**	9:15	.4	**9:36**	**.5**
4	Sat	3:45	11.7	**3:55**	**12.5**	9:45	1.1	**10:12**	**.7**
5	Sun	4:19	11.1	**4:22**	**12.2**	10:16	1.9	**10:49**	**1.1**
6	Mon	4:56	10.3	**4:52**	**11.9**	10:48	2.8	**11:31**	**1.6**
7	Tue	5:40	9.4	**5:27**	**11.4**	11:24	3.8	:	-.-
8	Wed	6:42	8.6	**6:17**	**10.9**	0:19	2.1	**12:06**	**4.6**
9	Thu	8:13	8.2	**7:40**	**10.5**	1:17	2.6	**1:02**	**5.3**
10	Fri	9:38	8.4	**9:06**	**10.7**	2:30	2.7	**2:21**	**5.7**
11	Sat	10:43	9.1	**10:17**	**11.3**	3:53	2.3	**3:55**	**5.2**
12	Sun	11:33	10.1	**11:17**	**12.1**	5:02	1.4	**5:09**	**4.0**
13	Mon	:	-.-	**12:16**	**11.2**	5:53	.3	**6:04**	**2.4**
14	Tue	0:11	13.0	**12:56**	**12.4**	6:36	-.5	**6:50**	**.7**
15	Wed	1:02	13.6	**1:35**	**13.5**	7:15	-1.0	**7:35**	**-.8**
16	Thu	1:50	14.0	**2:12**	**14.3**	7:55	-1.2	**8:18**	**-1.7**
17	Fri	2:38	14.0	**2:50**	**14.9**	8:34	-.9	**9:03**	**-2.2**
18	Sat	3:24	13.6	**3:29**	**15.1**	9:15	-.2	**9:48**	**-2.1**
19	Sun	4:12	12.9	**4:09**	**14.8**	9:57	.8	**10:38**	**-1.5**
20	Mon	5:02	11.9	**4:52**	**14.1**	10:42	2.0	**11:30**	**-.5**
21	Tue	6:01	10.8	**5:43**	**13.0**	11:32	3.3	:	-.-
22	Wed	7:16	9.9	**6:50**	**11.9**	0:27	.5	**12:29**	**4.5**
23	Thu	8:43	9.6	**8:17**	**11.1**	1:32	1.6	**1:39**	**5.3**
24	Fri	10:01	9.8	**9:40**	**10.9**	2:50	2.3	**3:09**	**5.4**
25	Sat	11:02	10.4	**10:48**	**11.1**	4:15	2.3	**4:41**	**4.7**
26	Sun	11:49	11.0	**11:43**	**11.4**	5:19	1.9	**5:42**	**3.5**
27	Mon	:	-.-	**12:27**	**11.5**	6:04	1.5	**6:24**	**2.4**
28	Tue	0:30	11.7	**12:58**	**12.1**	6:40	1.1	**7:00**	**1.4**
29	Wed	1:09	12.0	**1:28**	**12.5**	7:12	.9	**7:33**	**.8**
30	Thu	1:45	12.1	**1:53**	**12.9**	7:42	1.0	**8:04**	**.0**

○ 1 ◑ 9 ● 16 ◐ 22 ○ 30

Light Type A.M. Tides
Bold Type P.M. Tides

- 38 -

CHENEGA BAY 1993

Sept. 15 - 25, 1993

Collection of Seal and Sea Duck tissue samples.

Seal: SKIN/BLUBBER
LIVER
BILE

Sea Duck: Skin/Adipose tissue/Muscle
Liver
Bile

Collector: Vicki Vanek

Skipper/Hunter: John M Totemoff

Boat: Bowpicker "Shaker" 26 foot keel

Note: on Surgical Gloves - were rinsed with clean water to remove cornstarch, air dried on paper towels and repackaged in paper jackets gloves came in originally

Tissue samples handled with hemostats and forceps - handled as little as possible or not at all with gloves

Sept 15 1993

Leave Harbor 10:15 AM Vicki Vanek, Toby Tokmoff, Ed

Travel to and look - North side Evans Island.
Iktua Rocks, Guguak Bay, and unnamed
islands south of Guguak Bay near Evans I. shore.
Tried for 2 seperate seals - missed shots.
Saw 5 others - total disappeard after shooting.
No goldeneye ducks seen.

WEATHER: misty rain, low ceiling, occasional light fog
no wind to speak of

TOTAL FOR DAY: SEAL - 0 DUCK - 0

9-15 VV

Sept 17 1993 Clear. Sunny. 20-30 knot winds

93-CHE-SEAL-1

Non-gravid Adult Female Seal - Harbor Seal
Stomach - contained moderate amount worms - white - tan in color - 2" long
Length (tip nose to tip of tail) - 61.5"
Girth - 40 inches

LOCATION SHOT: off rocky small islands at southern tip of
Mummy Island
~ 60° 15' 24" N
147° 55' 00" W
Marked on Map SEWARD B-3 (US Geo Survey)

TIME SHOT: 2:30 PM

All samples taken, wrapped, and in cooler within 1 hour.
resting on cold packs.
Blubber, Liver, 4 vials Bile

Seal shot in the water, about 30 yds from shore.
No signs of oil on nearby beaches.

93-CHE-SEAL-2

Sub Adult Male - Harbor Seal
possibly born earlier this year.
Appeared to have adult teath already, but not sure.
LENGTH (tip nose to tip of tail) - 36 inches
GIRTH: 27 3/4 inches
Stomach - contained parasites - worms as in SEAL #1
No food

LOCATION SHOT: same area as 93-CHE-SEAL-1 -
off rocky sm. islands at southern tip of
Mummy Island
- 60° 15' 24" N
147° 55' 00" W
Marked on Map SEWARD B-3 (US Geo Survey)
shot within 50-100 yds of where SEAL-1 shot

TIME SHOT: 4:00 PM

All samples, in cooler within 50 min.
Blubber, Liver, 3 vials Bile

Worked on seals on rocks

TOTAL FOR DAY: SEAL - 2 DUCK - 0

9-17 VV

Sept 18 1993

93-CHE-SEAL-3 HARBOR SEAL - Adult Male.

Shot At: 1:30 PM sunk. (shot in water)

Pulled From Water (with Halibut Hook + line) at 3:05 PM.

LOCATION: Unnamed bay on west side Latouche Island.
Bay is just south of Izmaylov Island
59° 59' 25" N
147° 59' 00" W
Marked on US Geo Survey Map Blying Sound D3

GIRTH: 31 1/2 inches

LENGTH (tip nose to tip of tail): 47.5 inches

Blubber, Liver, 2 vials of Bile collected.
All samples in freezer on board boat by 3:50 PM
Worked on seal on deck of boat

No Goldeneye or Black Scoters seen only Harlequins

TOTAL for DAY: SEAL - 1 DUCKS - 0

9-18-93 VV

Sept 20 1993
Travel to south end Evans Island
No seal No ducks seen. Heavy rain, Gusting winds

9-20-93 VV

Sept 21 1993

93-CHE-SEAL-4 HARBOR SEAL - Adult Female

SHOT AT: 1:30 PM

WEATHER: Clear

Towed seal with boat across bay to cut up in Iktul Bay. (Hauled on board ~2:30 pm)

LOCATION SHOT: on Ship Island (near Flemming Island)
Seal on rocks
60° 09' 45" N
148° 00' 20" W
Noted on US Geo Survey Map SEWARD A-3
(One other seal seen on same rocks)

ADULT FEMALE
Non-gravid
Both ovaries had what looked like Follicles (fluid-filled or cysts?)
one on one ovary, two on the other
Vessels to uterus + ovaries also seemed larger
and uterine wall thickened.

LENGTH: 59" GIRTH: 41"

Samples collected: ① Blubber/skin from ventral abdomen
② liver
③ 1 vial Bile (approximately 1 more vial. Full mixed out of gall bladder missing held vial)

Samples put in small portable freezer on board within 15 min of collecting. Samples all collected by about 3:00 PM. Done on deck of boat.

(

93-CHE-SEAL-5 HARBOR SEAL

ADULT MALE

LENGTH (tip nose to tip tail) : 51 inches

GIRTH : 34 1/4 inches

LOCATION: Iktua Bay - Evans Island

~ 60° 07' 07" N

148° 00' 30" W

Noted on US Survey Map SEWARD A-3

SHOT AT : ~ 2:30 PM

BROUGHT ON BOARD: ~ 3:05 PM

Samples collected: ① Blubber/Skin from ventral abdomen

② Liver

③ 7 vials of Bile

As collected, put directly into small Freezer on board

Work done on board big boat on deck.

All Collected in freezer by 4:10 PM.

Seal collected near rocks near mouth of bay.

About 1½ hrs later saw 3 other seals in water in general area (we were anchored here)

Hunter was not on board at time.

9-21 VV

Sept 22 93

TOTAL FOR DAY: SEAL-0 DUCK-0

Areas hunted: Gage Island

and looked at north end Evans Island

passage between Squire I + Knight Island

rocks south of Mummy I (one seal seen)

mouth of Drier Bay (Knight Island) unnamed SW Bay

(2 seals seen)

Squirrel Island

Clam Island

Johnson Bay (Knight Island)

Pleiades Islands (one seal seen)

Seals seen - one missed and others not in

good position to shoot when seen.

No black ducks (Black Scoters) or Goldeneye seen.

Weather: Clear, Wind - 5-15 knots

9-22 VV

Sept 23

TOTAL FOR DAY: SEAL-0 DUCK-0

Weather: Clear, Sunny

Winds picking up in afternoon to 10-15 to 20-25

Areas hunted:

Izmaylov Island

Latouche Passage

West side of Latouche Island

(Montgomery Bay to Sleepy Bay on north side of Latouche Island)

Bettles Island

unnamed spit and islands and protected bays, on south end of Sawmill Bay (spit is east of San Juan Harbor) (bay Chenega town is on) + Johnson Cove on north end of Sawmill Bay

No seals or Goldeneyes or Black Ducks (Black Scoters) Only ducks seen are Harlequins (~32 around Montgomery Bay alone) and Mergansers (10 seen on rocky beach close in Johnson Cove) in addition to others.

9-23 VV

Sept 24 1993

93-CHE-DUCK-1

BARROW'S GOLDENEYE - Male

LOCATION: Iktua Bay - Evan's Island at small cove where mouth of stream comes out on east side of bay

~ 60° 06' 25" N

147° 59' 40" W

Noted on US Geo Survey Map SEWARD A-3

Bird in Flock of about 20 ducks that Flew from near mouth of stream out across the bay when Flushed.

First Goldeneye seen whole trip!

TIME SHOT: 4:30 PM

SAMPLES TAKEN AT: 6:00 PM (Bird kept cold out on deck til able to take samples)

put directly into freezer on board boat

SAMPLES COLLECTED: ① Skin/Adipose Tissue/Meat from ventral side of bird

② Whole Liver

③ Bile - about 1/8 vial full

TOTAL FOR DAY: SEAL-0 DUCK'S - 1

Inventory of seal and duck samples sent to the NOAA/NMFS laboratory on September 28, 1993 for testing as part of Restoration Project Number 93017.

COLLECTION LOCATION	SAMPLE NUMBER	DATE COLLECTED	SPECIES	SEX	TYPE OF SAMPLE
Mummy Island	93-CHE-SEAL-1	9/17/93	HARBOR SEAL	FEMALE	BLUBBER/SKIN
					LIVER
					BILE
Mummy Island	93-CHE-SEAL-2	9/17/93	HARBOR SEAL	MALE	BLUBBER/SKIN
					LIVER
					BILE
LaTouche Island	93-CHE-SEAL-3	9/18/93	HARBOR SEAL	MALE	BLUBBER/SKIN
					LIVER
					BILE
Ship Island	93-CHE-SEAL-4	9/21/93	HARBOR SEAL	FEMALE	BLUBBER/SKIN
					LIVER
					BILE
Iktua Bay-Evans Island	93-CHE-SEAL-5	9/24/93	HARBOR SEAL	MALE	BLUBBER/SKIN
					LIVER
					BILE
Iktua Bay-Evans Island	93-CHE-DUCK-1	9/24/93	BARROWS GOLDENEYE	MALE	ADIPOSE TISSUE/SKIN

In addition, a field blank was taken at each sampling site, these were also sent to the lab.

APPENDIX 6:

NMFS Laboratory Reports on Test Results

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Fisheries Science Center
Environmental Conservation Division
2725 Montlake Boulevard East
Seattle, Washington 98112

August 20, 1993

Rita Miraglia
Alaska Department of Fish & Game
333 Raspberry Road
Anchorage, AK 99518-1599

Dear Ms. Miraglia,

The concentrations of metabolites of aromatic compounds (ACs) in the bile samples from the 17 fish collected in the June/July, 1993 subsistence sampling were quite low, indicating minimal exposure to petroleum-related ACs. Based on our experience to date, including the earlier subsistence studies, one would not expect to find elevated concentrations of ACs in the fish tissue. Thus, we recommend that the fish tisuue samples not be analyzed for ACs. Please advise me or Don Brown of your decision on this matter.

Sincerely yours,

for Sin-Lam Chan, Ph.D.
Deputy Director

cc: Don Brown

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Fisheries Science Center
Environmental Conservation Division
2725 Montlake Boulevard East
Seattle, Washington 98112

August 25, 1993

Rita Miraglia
Alaska Department of Fish & Game
333 Raspberry Road
Anchorage, AK 99518-1599

Dear Ms. Miraglia,

The concentrations of metabolites of aromatic compounds (FACs) in bile, a semiquantitative measure of exposure to aromatic compounds (ACs), were measured in 17 fish collected in June and July, 1993. The concentrations of biliary FACs in these fish were quite low, which indicates minimal exposure to petroleum-related ACs. The concentrations of biliary FACs found in bottomfish sampled from Chenega in 1989 were considerably higher (see attached Table). However, mean concentrations of ACs found in corresponding muscle tissue of bottomfish from Chenega (in 1989) were extremely low, ranging from not detected to only 0.5 ng/g wet weight. Additionally, very low amounts of ACs were found in muscle tissue of fish from Port Graham in 1989, which contained similar levels of biliary FACs as fish sampled in 1993. Further, based on our analytical results from earlier subsistence studies, we would not expect to find elevated concentrations of ACs in the fish tissue. Thus, we recommend that the tissue samples from fish collected in the summer of 1993 not be analyzed for ACs by GC/MS. Please advise me or Don Brown of your decision on this matter.

Sincerely yours,

for Sin-Lam Chan, Ph.D.
Deputy Director

cc: Don Brown
Tom Hom

Summary of the concentrations (mean ± SD) of metabolites of ACs (FACs) in bile and aromatic compounds in muscle tissue of bottomfish sampled in 1989 and 1993. Numbers in parentheses indicate the number of samples analyzed.

Site	1989		1993
	Biliary FACs (ng phenanthrene equiv./mg bile protein)	ACs in muscle (ng/g wet weight)	Biliary FACs (ng phenanthrene equiv./mg bile protein)
Chenega	6,100 ± 6,200 (12)	0.13 ± 0.22 (14)	1,700 ± 2000 (9)
Concentration Range	360 – 22,000	0 – 0.5	90 – 6,700
Port Graham	1,100 ± 730 (2)	0.10 ± 0.14 (2)	500 ± 160 (8)
Concentration Range	550 – 1600	0 – 0.2	250 – 770

Data collected and compiled by the Environmental Conservation Division/NMFS/NOAA, Seattle, WA.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Northwest Fisheries Center
Environmental Conservation Division
2725 Montlake Blvd., East
Seattle, WA 98112

September 30, 1993

Dr. James Fall
Regional Program Manager
Division of Subsistence
Alaska Department of Fish & Game (ADF&G)
333 Raspberry Rd.
Anchorage, AK 99518-1599

Dear Jim:

The concentrations of aromatic compounds (ACs) in all 51 samples of shellfish collected at Chenega Bay (mussels), Karluk (mussels), Larsen Bay (mussels), Ouzinkie (butter clams, mussels), Port Graham (chitons, littleneck clams, mussels), Port Lions (mussels), Tatitlek (littleneck clams, mussels) and Windy Bay (mussels) during the summer of 1993 as part of the ADF&G/NOAA subsistence study were very low, similar to values generally found for samples from reference areas. Table 1 contains the sampling information. The sampling sites were CHE10, CHE25, KAR2, LAB15, NAN1, NAN2, OUZ2, OUZ3, PTG4, PTG12, PTL1, TAT1, TAT9, and WNB3.

Edible portions of the samples have been analyzed for the ACs listed in Tables 3 and 4. The concentrations of the ACs (ng/g or ppb based on wet weight) in shellfish are summarized in Table 2. The ACs are divided into subclasses of (a) low molecular weight ACs (LACs) and (b) high molecular weight ACs (HACs), as defined in the explanatory notes for Tables 2-4. Table 3 contains the detailed analytical results for all the individual ACs that comprise LACs and HACs. It is important to note that the concentrations of ACs in these mollusc samples did not differ substantially from those found in mollusc samples from reference areas from previous samplings or from the method blanks. As is common, the method blanks show trace levels (low ppb) of unavoidable ACs. Quality assurance information appears in Table 4.

You should have received the bile FAC summary data, which was sent on August 25, 1993. These data also showed little evidence of fish exposure to ACs.

If you have any questions, please feel free to call Sin-Lam Chan, Don Brown or me at (206) 860-3330.

Sincerely yours,

Usha Varanasi, Ph.D.
Director

Attachment

cc: F/NWC2 - S.L. Chan
F/NWC2 - D. Brown

Aromatic Contaminants for ADFG Subsistence Summer 1993 Explanatory Notes for Tables 1 through 4.

Abbreviations used:

ACs - the aromatic contaminants listed in Tables 3 - 4.

LACs - low molecular weight ACs, the sum of 2 and 3-ring ACs, as listed in Tables 3 - 4 from naphthalene through the C3-dibenzothiophenes.

HACs - high molecular weight ACs, the sum of 4 through 6-ring ACs, as listed in Tables 3 - 4 from fluoranthene through benzo[ghi]perylene.

RSD - relative standard deviation is the standard deviation divided by the mean and expressed as a percent.

A hyphen (-) indicates that the analyte was not detected above the limit of detection which ranged from 0.1 to 0.5 ng/g (ppb) wet weight.

Results were determined by GC/MS - selected ion monitoring.

Naphthalene-d8 was the internal standard for naphthalene through C4-naphthalenes. Acenaphthene-d10 was the internal standard for acenaphthylene through C1-fluoranthenes/pyrenes. Benzo[a]pyrene-d12 was the internal standard for benz[a]anthracene through benzo[ghi]perylene.

Concentrations less than 10 are rounded to one significant figure; concentrations greater than or equal to 10 are rounded to two significant figures.

Percent recoveries for the internal standards (surrogates) averaged 90%, RSD =10%, n = 219. Percent recoveries of the surrogates include quality assurance samples.

Table 1. Species Sampling Log for samples included in this report - 1993 Subsistence part I. (Total Samples: 51)					
		CHITONS	BUTTER CLAMS	LITTLENECK CLAMS	MUSSELS
Village					
Sampling site	Code				
Chenega Bay	CHE10				3
Chenega Bay	CHE25				3
Karluk	KAR2				3
Larsen Bay	LAB15				3
Nanwalek	NAN1				3
Nanwalek	NAN2				3
Ouzinkie	OUZ2		3		3
Ouzinkie	OUZ3				3
Port Graham	PTG4			3	3
Port Graham	PTG12	3			
Port Lions	PTL1				3
Tatitlek	TAT1				3
Tatitlek	TAT9			3	3
Windy Bay	WNB3				3
TOTAL:		3	3	6	39

Table 2: Edible flesh. Sums of ACs listed in Tables 3-4 (LAC/HAC) in edible flesh, ng/g (ppb) wet weight. Brackets indicate triplicate analyses of one sample.

Village:	Chenega Bay		Karluk	Larsen Bay	Nanwalek		Ouzinkie		Port Graham		Port Lions	Tatitlek		Windy Bay
Site:	CHE10	CHE25	KAR2	LAB15	NAN1	NAN2	OUZ2	OUZ3	PTG4	PTG12	PTL1	TAT1	TAT9	WNB3
Chitons										5 / 0.4 6 / 0.5 6 / 1				
Clams							3 / 0.1							
butter							9 / 2 5 / 2							
littleneck									8 / 6 8 / 6 5 / 3				6 / 0.4 3 / 0.3 4 / 0.4	
Mussels	[2 / 0.5] [4 / 0.3] [4 / 0.2] 3 / 0.7 4 / 0.7	4 / 0.2 4 / - 4 / 0.4	3 / - 4 / 1 12 / 3	4 / 0.4 4 / 0.5 4 / 0.5	3 / 0.5 3 / 0.3 3 / 0.4	4 / 0.5 4 / 0.4 4 / -	3 / - 2 / - 4 / 1	3 / 1 4 / 2 5 / 2	5 / 5 [6 / 4] [4 / 3] [4 / 3] 5 / 5		4 / 2 5 / 1 4 / 1	5 / 3 4 / 0.5 3 / 0.5	4 / 0.4 4 / 0.3 4 / -	5 / 1 4 / 0.8 3 / 0.8

Table 3-1: Chitons. Concentrations, ng/g (ppb) wet weight, of aromatic contaminants (ACs) in edible flesh.

ACs	Village:	<- Port Graham ->		
	Site:	PTG12	PTG12	PTG12
	ID no.:	93TISS0013	93TISS0014	93TISS0015
	Date collected:	6/23/93	6/23/93	6/23/93
	Collector:	D&M	D&M	D&M
	Lab no.:	60-3162	60-3163	60-3164
naphthalene		2	2	2
C1-naphthalenes		2	2	2
C2-naphthalenes		0.2	0.5	0.4
C3-naphthalenes		-	0.4	0.3
C4-naphthalenes		-	-	-
acenaphthylene		-	-	-
acenaphthene		-	-	-
fluorene		0.1	0.1	-
C1-fluorenes		-	-	-
C2-fluorenes		-	-	-
C3-fluorenes		-	0.1	-
phenanthrene		0.2	0.3	0.3
C1-phenanthrenes/anthracenes		0.2	0.3	0.4
C2-phenanthrenes/anthracenes		-	0.1	0.1
C3-phenanthrenes/anthracenes		-	-	-
C4-phenanthrenes/anthracenes		-	-	-
dibenzothiophene		-	-	-
C1-dibenzothiophenes		-	-	-
C2-dibenzothiophenes		-	-	-
C3-dibenzothiophenes		-	-	-
Sum of LACs		**5**	**6**	**6**
fluoranthene		-	0.1	0.2
pyrene		0.1	0.1	0.2
C1-fluoranthenes/pyrenes		-	-	-
benz[a]anthracene		-	-	-
chrysene		-	-	-
C1-chrysenes/benz[a]anthracenes		-	-	-
C2-chrysenes/benz[a]anthracenes		-	-	-
C3-chrysenes/benz[a]anthracenes		-	-	-
C4-chrysenes/benz[a]anthracenes		-	-	-
benzo[b]fluoranthene		-	-	-
benzo[k]fluoranthene		-	-	-
benzo[a]pyrene		-	-	0.1
indeno[1,2,3-cd]pyrene		0.2	0.1	0.3
dibenz[a,h]anthracene		-	-	-
benzo[ghi]perylene		0.1	0.2	0.2
Sum of HACs		**0.4**	**0.5**	**1**
sample weight, grams:		5.07	5.07	5.01

Table 3-2: Butter clams. Concentrations, ng/g (ppb) wet weight, of aromatic contaminants (ACs) in edible flesh.

ACs	Village:	<- Ouzinkie ->		
	Site:	OUZ2	OUZ2	OUZ2
	ID no.:	93TISS0106	93TISS0107	93TISS0108
	Date collected:	7/18/93	7/18/93	7/18/93
	Collector:	D&M	D&M	D&M
	Lab no.:	60-3154	60-3160	60-3161
naphthalene		1	2	1
C1-naphthalenes		1	2	1
C2-naphthalenes		0.3	0.4	0.4
C3-naphthalenes		0.1	0.5	0.5
C4-naphthalenes		-	-	-
acenaphthylene		-	-	-
acenaphthene		-	-	-
fluorene		0.1	0.2	0.2
C1-fluorenes		-	0.2	-
C2-fluorenes		-	-	-
C3-fluorenes		-	-	-
phenanthrene		0.4	0.9	0.5
C1-phenanthrenes/anthracenes		-	0.9	0.5
C2-phenanthrenes/anthracenes		-	0.7	0.5
C3-phenanthrenes/anthracenes		-	0.3	0.2
C4-phenanthrenes/anthracenes		-	-	-
dibenzothiophene		-	0.1	-
C1-dibenzothiophenes		-	0.2	0.1
C2-dibenzothiophenes		-	0.3	0.2
C3-dibenzothiophenes		-	0.2	0.2
Sum of LACs		**3**	**9**	**5**
fluoranthene		0.1	1	0.2
pyrene		-	0.9	0.2
C1-fluoranthenes/pyrenes		-	0.3	-
benz[a]anthracene		-	-	-
chrysene		-	0.1	0.2
C1-chrysenes/benz[a]anthracenes		-	-	-
C2-chrysenes/benz[a]anthracenes		-	-	-
C3-chrysenes/benz[a]anthracenes		-	-	-
C4-chrysenes/benz[a]anthracenes		-	-	-
benzo[b]fluoranthene		-	-	0.2
benzo[k]fluoranthene		-	-	0.2
benzo[a]pyrene		-	-	0.2
indeno[1,2,3-cd]pyrene		-	-	0.3
dibenz[a,h]anthracene		-	-	-
benzo[ghi]perylene		-	-	0.3
Sum of HACs		**0.1**	**2**	**2**
sample weight, grams:		5.05	5.06	5.10

Table 3-3: Littleneck Clams. Concentrations, ng/g (ppb) wet weight, of aromatic contaminants (ACs) in edible flesh.

ACs	Village:	<- Port Graham ->			<- Tatitlek ->		
	Site:	PTG4	PTG4	PTG4	TAT9	TAT9	TAT9
	ID no.:	93TISS0004	93TISS0009	93TISS0011	93TISS0073	93TISS0074	93TISS0075
	Date collected:	6/23/93	6/23/93	6/23/93	7/02/93	7/02/93	7/02/93
	Collector:	D&M	D&M	D&M	D&M	D&M	D&M
	Lab no.:	60-3165	60-3167	60-3168	60-3169	60-3175	60-3150
naphthalene		1	1	1	2	2	2
C1-naphthalenes		2	2	1	2	1	1
C2-naphthalenes		0.6	0.4	0.4	0.2	0.1	0.2
C3-naphthalenes		0.5	0.6	0.5	0.5	-	-
C4-naphthalenes		-	-	-	-	-	-
acenaphthylene		-	-	-	-	-	-
acenaphthene		0.1	0.2	0.1	-	-	-
fluorene		0.3	0.3	0.2	0.1	-	0.1
C1-fluorenes		0.1	0.2	-	-	-	-
C2-fluorenes		-	-	-	-	-	-
C3-fluorenes		-	-	-	-	-	-
phenanthrene		1	1	0.8	0.3	0.3	0.3
C1-phenanthrenes/anthracenes		1	1	0.8	0.4	-	-
C2-phenanthrenes/anthracenes		0.5	0.5	0.3	-	-	-
C3-phenanthrenes/anthracenes		0.1	-	-	-	-	-
C4-phenanthrenes/anthracenes		-	-	-	-	-	-
dibenzothiophene		0.1	0.1	-	-	-	-
C1-dibenzothiophenes		0.1	0.1	-	-	-	-
C2-dibenzothiophenes		0.2	0.1	-	-	-	-
C3-dibenzothiophenes		-	-	-	-	-	-
Sum of LACs		**8**	**8**	**5**	**6**	**3**	**4**
fluoranthene		2	3	1	0.1	0.1	-
pyrene		1	1	0.7	0.1	-	-
C1-fluoranthenes/pyrenes		0.5	0.4	0.3	-	-	-
benz[a]anthracene		0.3	0.3	0.2	-	-	-
chrysene		0.4	0.4	0.3	-	-	-
C1-chrysenes/benz[a]anthracenes		-	-	-	-	-	-
C2-chrysenes/benz[a]anthracenes		-	-	-	-	-	-
C3-chrysenes/benz[a]anthracenes		-	-	-	-	-	-
C4-chrysenes/benz[a]anthracenes		-	0.1	-	-	-	-
benzo[b]fluoranthene		0.2	0.1	0.1	-	-	-
benzo[k]fluoranthene		0.2	0.2	-	-	-	-
benzo[a]pyrene		0.2	0.2	-	-	0.1	-
indeno[1,2,3-cd]pyrene		0.4	0.2	0.2	0.1	-	0.2
dibenz[a,h]anthracene		-	-	-	-	-	-
benzo[ghi]perylene		0.3	0.2	0.2	0.1	0.1	0.2
Sum of HACs		**6**	**6**	**3**	**0.4**	**0.3**	**0.4**
sample weight, grams:		5.09	5.05	5.02	5.04	5.05	5.06

Table 3-4: Mussels. Concentrations, ng/g (ppb) wet weight, of aromatic contaminants (ACs) in edible flesh.

ACs	Village:	<- Chenega Bay ->							
	Site:	CHE10	CHE10	CHE10	CHE10	CHE10	CHE25	CHE25	CHE25
	ID no.:	93TISS0041	93TISS0041	93TISS0041	93TISS0042	93TISS0043	93TISS0061	93TISS0062	93TISS0063
	Date collected:	6/30/93	6/01/93	6/01/93	6/30/93	6/30/93	7/01/93	7/01/93	7/01/93
	Collector:	D&M	D&M	D&M	D&M	D&M	D&M	D&M	D&M
		<------triplicates------>							
	Lab no.:	60-3100	60-3178	60-3179	60-3101	60-3102	60-3103	60-3104	60-3105
naphthalene		1	2	2	2	2	2	2	2
C1-naphthalenes		1	1	1	1	1	1	1	1
C2-naphthalenes		0.1	0.2	0.2	-	0.2	0.3	0.3	0.3
C3-naphthalenes		-	-	-	-	-	-	-	-
C4-naphthalenes		-	-	-	-	-	-	-	-
acenaphthylene		-	-	-	-	-	-	-	-
acenaphthene		-	-	-	-	-	-	0.1	-
fluorene		-	0.1	0.1	0.1	0.1	0.1	0.1	-
C1-fluorenes		-	-	-	-	-	-	-	-
C2-fluorenes		-	-	-	-	-	-	-	-
C3-fluorenes		-	-	-	-	-	-	-	-
phenanthrene		0.2	0.3	0.3	0.3	0.3	0.4	0.3	0.4
C1-phenanthrenes/anthracenes		-	-	0.1	-	0.1	0.2	0.1	0.2
C2-phenanthrenes/anthracenes		-	-	-	-	-	-	-	-
C3-phenanthrenes/anthracenes		-	-	-	-	-	-	-	-
C4-phenanthrenes/anthracenes		-	-	-	-	-	-	-	-
dibenzothiophene		-	-	-	-	-	-	-	-
C1-dibenzothiophenes		-	-	-	-	-	-	-	-
C2-dibenzothiophenes		-	-	-	-	-	-	-	-
C3-dibenzothiophenes		-	-	-	-	-	-	-	-
Sum of LACs		**2**	**4**	**4**	**3**	**4**	**4**	**4**	**4**
fluoranthene		-	0.1	0.1	-	0.1	0.1	-	0.2
pyrene		-	0.1	-	-	0.1	-	-	0.2
C1-fluoranthenes/pyrenes		-	-	-	-	-	-	-	-
benz[a]anthracene		-	-	-	-	-	-	-	-
chrysene		-	-	-	-	-	-	-	-
C1-chrysenes/benz[a]anthracenes		-	-	-	-	-	-	-	-
C2-chrysenes/benz[a]anthracenes		-	-	-	-	-	-	-	-
C3-chrysenes/benz[a]anthracenes		-	-	-	-	-	-	-	-
C4-chrysenes/benz[a]anthracenes		-	-	-	-	-	-	-	-
benzo[b]fluoranthene		0.1	-	-	0.2	-	-	-	-
benzo[k]fluoranthene		-	-	-	-	-	-	-	-
benzo[a]pyrene		0.1	-	-	0.1	0.1	-	-	-
indeno[1,2,3-cd]pyrene		0.1	0.1	-	0.2	0.2	-	-	-
dibenz[a,h]anthracene		-	-	-	-	-	-	-	-
benzo[ghi]perylene		0.2	-	0.1	0.2	0.2	0.1	-	-
Sum of HACs		**0.5**	**0.3**	**0.2**	**0.7**	**0.7**	**0.2**	**-**	**0.4**
sample weight, grams:		5.11	5.05	5.08	4.91	4.92	5.09	5.06	5.02

Table 3-5: Mussels. Concentrations, ng/g (ppb) wet weight, of aromatic contaminants (ACs) in edible flesh.

ACs	Village:	<- Karluk ->			<- Larsen Bay ->		
	Site:	KAR2	KAR2	KAR2	LAB15	LAB15	LAB15
	ID no.:	93TISS0150	93TISS0151	93TISS0152	93TISS0139	93TISS0140	93TISS0141
	Date collected:	7/22/93	7/22/93	7/22/93	7/21/93	7/21/93	7/21/93
	Collector:	D&M	D&M	D&M	D&M	D&M	D&M
	Lab no.:	60-3106	60-3107	60-3108	60-3109	60-3115	60-3116
naphthalene		1	2	3	2	1	1
C1-naphthalenes		1	1	2	1	1	1
C2-naphthalenes		0.2	0.2	1	0.2	0.4	0.5
C3-naphthalenes		-	-	1	-	0.3	0.3
C4-naphthalenes		-	-	-	-	-	-
acenaphthylene		-	-	-	-	-	-
acenaphthene		-	-	0.2	-	-	-
fluorene		0.1	0.1	0.3	-	0.1	0.1
C1-fluorenes		-	-	-	-	-	-
C2-fluorenes		-	-	-	-	-	-
C3-fluorenes		-	-	-	-	-	-
phenanthrene		0.2	0.3	0.6	0.3	0.4	0.4
C1-phenanthrenes/anthracenes		-	-	0.5	0.2	0.3	0.3
C2-phenanthrenes/anthracenes		-	-	1	-	0.2	0.1
C3-phenanthrenes/anthracenes		-	-	1	-	-	-
C4-phenanthrenes/anthracenes		-	-	-	-	-	-
dibenzothiophene		-	-	-	-	-	-
C1-dibenzothiophenes		-	-	0.1	-	-	-
C2-dibenzothiophenes		-	-	0.6	-	0.1	-
C3-dibenzothiophenes		-	-	0.9	-	-	-
Sum of LACs		**3**	**4**	**12**	**4**	**4**	**4**
fluoranthene		-	0.1	0.3	-	0.2	0.2
pyrene		-	-	0.9	-	0.1	-
C1-fluoranthenes/pyrenes		-	-	1	-	-	-
benz[a]anthracene		-	-	-	-	-	-
chrysene		-	-	0.1	-	-	-
C1-chrysenes/benz[a]anthracenes		-	-	-	-	-	-
C2-chrysenes/benz[a]anthracenes		-	-	-	-	-	-
C3-chrysenes/benz[a]anthracenes		-	-	-	-	-	-
C4-chrysenes/benz[a]anthracenes		-	-	-	-	-	-
benzo[b]fluoranthene		-	0.2	0.1	0.1	-	0.1
benzo[k]fluoranthene		-	-	-	-	-	-
benzo[a]pyrene		-	0.2	-	0.1	-	-
indeno[1,2,3-cd]pyrene		-	0.3	0.1	0.1	0.1	0.1
dibenz[a,h]anthracene		-	-	-	-	-	-
benzo[ghi]perylene		-	0.4	0.2	0.1	0.1	0.1
Sum of HACs		**-**	**1**	**3**	**0.4**	**0.5**	**0.5**
sample weight, grams:		4.98	5.02	5.02	5.09	5.08	5.00

Table 3-6: Mussels. Concentrations, ng/g (ppb) wet weight, of aromatic contaminants (ACs) in edible flesh.

ACs	Village:	<- Nanwalek ->					
	Site:	NAN1	NAN1	NAN1	NAN2	NAN2	NAN2
	ID no.:	93TISS0020	93TISS0021	93TISS0022	93TISS0090	93TISS0091	93TISS0092
	Date collected:	6/24/93	6/24/93	6/24/93	7/05/93	7/05/93	7/05/93
	Collector:	D&M	D&M	D&M	D&M	D&M	D&M
	Lab no.:	60-3117	60-3118	60-3119	60-3120	60-3121	60-3122
naphthalene		1	1	1	2	2	2
C1-naphthalenes		1	1	1	1	1	1
C2-naphthalenes		0.1	0.3	0.2	0.2	0.3	0.2
C3-naphthalenes		-	-	-	-	-	-
C4-naphthalenes		-	-	-	-	-	-
acenaphthylene		-	-	-	-	-	-
acenaphthene		-	-	-	-	-	-
fluorene		0.1	0.1	0.1	0.1	0.1	0.1
C1-fluorenes		-	-	-	-	-	-
C2-fluorenes		-	-	-	-	-	-
C3-fluorenes		-	-	-	-	-	-
phenanthrene		0.3	0.3	0.3	0.3	0.4	0.3
C1-phenanthrenes/anthracenes		-	0.1	-	-	0.2	-
C2-phenanthrenes/anthracenes		-	-	-	-	-	-
C3-phenanthrenes/anthracenes		-	-	-	-	-	-
C4-phenanthrenes/anthracenes		-	-	-	-	-	-
dibenzothiophene		-	-	-	-	-	-
C1-dibenzothiophenes		-	-	-	-	-	-
C2-dibenzothiophenes		-	-	-	-	-	-
C3-dibenzothiophenes		-	-	-	-	-	-
Sum of LACs		**3**	**3**	**3**	**4**	**4**	**4**
fluoranthene		0.2	0.1	0.1	0.1	0.1	-
pyrene		-	-	-	-	-	-
C1-fluoranthenes/pyrenes		-	-	-	-	-	-
benz[a]anthracene		-	-	-	-	-	-
chrysene		-	-	-	-	-	-
C1-chrysenes/benz[a]anthracenes		-	-	-	-	-	-
C2-chrysenes/benz[a]anthracenes		-	-	-	-	-	-
C3-chrysenes/benz[a]anthracenes		-	-	-	-	-	-
C4-chrysenes/benz[a]anthracenes		-	-	-	-	-	-
benzo[b]fluoranthene		-	-	0.1	-	-	-
benzo[k]fluoranthene		-	-	-	-	-	-
benzo[a]pyrene		-	-	-	0.1	-	-
indeno[1,2,3-cd]pyrene		0.1	0.1	0.1	0.2	0.1	-
dibenz[a,h]anthracene		-	-	-	-	-	-
benzo[ghi]perylene		0.2	0.1	0.1	0.1	0.2	-
Sum of HACs		**0.5**	**0.3**	**0.4**	**0.5**	**0.4**	**-**
sample weight, grams:		5.04	5.00	5.02	5.01	5.02	5.04

Table 3-7: Mussels. Concentrations, ng/g (ppb) wet weight, of aromatic contaminants (ACs) in edible flesh.

ACs	Village:	<- Ouzinkie ->					
	Site:	OUZ2	OUZ2	OUZ2	OUZ3	OUZ3	OUZ3
	ID no.:	93TISS0112	93TISS0113	93TISS0114	93TISS0123	93TISS0124	93TISS0125
	Date collected:	7/18/93	7/18/93	7/18/93	7/19/93	7/19/93	7/19/93
	Collector:	D&M	D&M	D&M	D&M	D&M	D&M
	Lab no.:	60-3123	60-3124	60-3130	60-3131	60-3132	60-3133
naphthalene		1	1	2	1	2	2
C1-naphthalenes		1	1	1	1	1	1
C2-naphthalenes		0.3	0.1	0.4	0.2	0.2	0.3
C3-naphthalenes		-	-	-	-	0.1	-
C4-naphthalenes		-	-	-	-	-	-
acenaphthylene		-	-	-	-	-	-
acenaphthene		-	-	0.1	0.1	-	-
fluorene		0.1	0.1	0.2	0.2	0.2	0.2
C1-fluorenes		-	-	-	-	-	-
C2-fluorenes		-	-	-	-	-	-
C3-fluorenes		-	-	-	-	-	-
phenanthrene		0.3	0.2	0.5	0.6	0.6	0.7
C1-phenanthrenes/anthracenes		-	-	-	0.2	0.3	0.3
C2-phenanthrenes/anthracenes		-	-	-	-	-	0.3
C3-phenanthrenes/anthracenes		-	-	-	-	-	0.1
C4-phenanthrenes/anthracenes		-	-	-	-	-	-
dibenzothiophene		-	-	-	-	-	-
C1-dibenzothiophenes		-	-	-	-	-	-
C2-dibenzothiophenes		-	-	-	-	-	-
C3-dibenzothiophenes		-	-	-	-	-	-
Sum of LACs		**3**	**2**	**4**	**3**	**4**	**5**
fluoranthene		-	-	0.2	0.3	0.5	0.4
pyrene		-	-	0.4	0.2	0.3	0.2
C1-fluoranthenes/pyrenes		-	-	-	-	-	0.2
benz[a]anthracene		-	-	-	-	0.1	0.2
chrysene		-	-	-	0.1	0.2	0.2
C1-chrysenes/benz[a]anthracenes		-	-	-	-	-	-
C2-chrysenes/benz[a]anthracenes		-	-	-	-	-	-
C3-chrysenes/benz[a]anthracenes		-	-	-	-	-	-
C4-chrysenes/benz[a]anthracenes		-	-	-	-	-	-
benzo[b]fluoranthene		-	-	-	-	0.1	-
benzo[k]fluoranthene		-	-	-	-	-	-
benzo[a]pyrene		-	-	-	-	0.1	-
indeno[1,2,3-cd]pyrene		-	-	0.1	0.1	0.2	0.1
dibenz[a,h]anthracene		-	-	-	-	-	-
benzo[ghi]perylene		-	-	0.6	0.4	0.4	0.3
Sum of HACs		**-**	**-**	**1**	**1**	**2**	**2**
sample weight, grams:		5.00	5.04	5.18	5.10	5.05	5.18

Table 3-8: Mussels. Concentrations, ng/g (ppb) wet weight, of aromatic contaminants (ACs) in edible flesh.

ACs	Village:	<- Port Graham ->					<- Port Lions ->		
	Site:	PTG4	PTG4	PTG4	PTG4	PTG4	PTL1	PTL1	PTL1
	ID no.:	93TISS0007	93TISS0008	93TISS0008	93TISS0008	93TISS0010	93TISS0131	93TISS0132	93TISS0133
	Date collected:	6/23/93	6/23/93	6/23/93	6/23/93	6/23/93	7/20/93	7/20/93	7/20/93
	Collector:	D&M	D&M	D&M	D&M	D&M	D&M	D&M	D&M
				<------triplicates------>					
	Lab no.:	60-3134	60-3166	60-3176	60-3177	60-3135	60-3136	60-3137	60-3138
naphthalene		2	2	2	2	2	2	2	2
C1-naphthalenes		1	1	1	1	1	1	1	1
C2-naphthalenes		0.3	0.3	0.3	0.3	0.2	0.2	0.3	0.2
C3-naphthalenes		-	0.2	-	-	-	-	-	-
C4-naphthalenes		-	-	-	-	-	-	-	-
acenaphthylene		-	-	-	-	-	-	-	-
acenaphthene		-	-	-	-	-	-	0.1	-
fluorene		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
C1-fluorenes		-	-	-	-	-	-	-	-
C2-fluorenes		-	-	-	-	-	-	-	-
C3-fluorenes		-	-	-	-	-	-	-	-
phenanthrene		1	0.9	0.7	0.7	0.8	0.6	0.8	0.7
C1-phenanthrenes/anthracenes		0.3	0.6	0.2	0.2	0.3	-	0.2	0.1
C2-phenanthrenes/anthracenes		0.2	0.3	-	-	0.3	-	-	-
C3-phenanthrenes/anthracenes		-	0.1	-	-	-	-	-	-
C4-phenanthrenes/anthracenes		-	-	-	-	-	-	-	-
dibenzothiophene		-	0.1	-	-	-	-	-	-
C1-dibenzothiophenes		-	-	-	-	-	-	-	-
C2-dibenzothiophenes		-	-	-	-	-	-	-	-
C3-dibenzothiophenes		-	-	-	-	-	-	-	-
Sum of LACs		**5**	**6**	**4**	**4**	**5**	**4**	**5**	**4**
fluoranthene		1	0.8	0.6	0.7	1	0.3	0.3	0.3
pyrene		0.9	0.5	0.3	0.4	0.7	0.2	0.2	0.2
C1-fluoranthenes/pyrenes		0.4	0.1	0.1	0.2	0.2	-	-	-
benz[a]anthracene		0.3	0.3	0.2	0.2	0.2	-	-	-
chrysene		0.5	0.5	0.3	0.3	0.4	0.1	-	-
C1-chrysenes/benz[a]anthracenes		-	-	-	-	-	-	-	-
C2-chrysenes/benz[a]anthracenes		-	-	-	-	-	-	-	-
C3-chrysenes/benz[a]anthracenes		-	-	-	-	-	-	-	-
C4-chrysenes/benz[a]anthracenes		-	-	0.1	-	-	-	-	-
benzo[b]fluoranthene		0.4	0.5	0.2	0.3	0.4	0.2	0.1	0.1
benzo[k]fluoranthene		0.4	0.4	-	0.1	0.4	0.2	-	0.1
benzo[a]pyrene		0.4	0.3	0.1	0.2	0.3	0.1	-	0.1
indeno[1,2,3-cd]pyrene		0.3	0.4	0.3	0.3	0.4	0.2	0.2	0.2
dibenz[a,h]anthracene		-	-	-	-	-	-	-	-
benzo[ghi]perylene		0.7	0.4	0.3	0.3	0.6	0.5	0.3	0.4
Sum of HACs		**5**	**4**	**3**	**3**	**5**	**2**	**1**	**1**
sample weight, grams:		5.09	5.04	5.05	5.05	5.10	5.01	5.08	5.06

Table 3-9: Mussels. Concentrations, ng/g (ppb) wet weight, of aromatic contaminants (ACs) in edible flesh.

ACs	Village:	<- Tatitlek ->						<- Windy Bay ->		
	Site:	TAT1	TAT1	TAT1	TAT9	TAT9	TAT9	WNB3	WNB3	WNB3
	ID no.:	93TISS0085	93TISS0086	93TISS0087	93TISS0068	93TISS0069	93TISS0070	93TISS0096	93TISS0097	93TISS0098
	Date collected:	7/03/93	7/03/93	7/03/93	7/02/93	7/02/93	7/02/93	7/05/93	7/05/93	7/05/93
	Collector:	D&M	D&M	D&M	D&M	D&M	D&M	D&M	D&M	D&M
	Lab no.:	60-3139	60-3145	60-3146	60-3147	60-3148	60-3149	60-3151	60-3152	60-3153
naphthalene		2	2	1	2	2	2	2	2	1
C1-naphthalenes		1	1	1	1	1	1	1	1	1
C2-naphthalenes		0.2	0.3	0.3	0.3	0.2	0.3	0.2	-	0.1
C3-naphthalenes		-	-	-	-	-	-	-	-	-
C4-naphthalenes		-	-	-	-	-	-	-	-	-
acenaphthylene		-	-	-	-	-	-	-	-	-
acenaphthene		-	-	-	-	-	-	0.1	-	-
fluorene		0.1	0.1	0.1	0.1	-	0.1	0.2	-	0.1
C1-fluorenes		-	-	-	-	-	-	-	-	-
C2-fluorenes		-	-	-	-	-	-	-	-	-
C3-fluorenes		-	-	0.1	-	-	-	-	-	-
phenanthrene		0.5	0.4	0.3	0.3	0.3	0.3	0.6	0.5	0.5
C1-phenanthrenes/anthracenes		0.4	0.2	0.1	-	-	-	0.1	-	-
C2-phenanthrenes/anthracenes		0.3	0.1	-	-	-	-	-	-	-
C3-phenanthrenes/anthracenes		0.2	-	-	-	-	-	0.2	0.1	-
C4-phenanthrenes/anthracenes		-	-	-	-	-	-	-	-	-
dibenzothiophene		-	-	-	-	-	-	-	-	-
C1-dibenzothiophenes		-	-	-	-	-	-	-	-	-
C2-dibenzothiophenes		-	-	-	-	-	-	0.2	-	-
C3-dibenzothiophenes		-	-	-	-	-	-	0.2	-	-
Sum of LACs		**5**	**4**	**3**	**4**	**4**	**4**	**5**	**4**	**3**
fluoranthene		0.3	0.2	0.1	-	-	-	0.3	0.2	0.3
pyrene		0.3	-	-	-	-	-	0.1	0.1	0.1
C1-fluoranthenes/pyrenes		0.9	-	-	-	-	-	-	-	-
benz[a]anthracene		0.2	-	-	-	-	-	-	-	-
chrysene		0.3	-	-	-	-	-	0.1	0.1	0.1
C1-chrysenes/benz[a]anthracenes		0.4	-	-	-	-	-	-	-	-
C2-chrysenes/benz[a]anthracenes		-	-	-	-	-	-	-	-	-
C3-chrysenes/benz[a]anthracenes		-	-	-	-	-	-	-	-	-
C4-chrysenes/benz[a]anthracenes		-	-	-	0.2	0.1	-	0.1	0.1	-
benzo[b]fluoranthene		0.1	0.1	0.1	-	-	-	0.1	0.1	0.1
benzo[k]fluoranthene		-	-	-	-	-	-	-	-	-
benzo[a]pyrene		0.1	-	-	-	-	-	-	-	-
indeno[1,2,3-cd]pyrene		0.1	0.1	0.1	0.1	0.1	-	0.2	0.1	0.1
dibenz[a,h]anthracene		-	-	-	-	-	-	-	-	-
benzo[ghi]perylene		0.3	0.1	0.2	0.1	0.1	-	0.2	0.1	0.1
Sum of HACs		**3**	**0.5**	**0.5**	**0.4**	**0.3**	**-**	**1**	**0.8**	**0.8**
sample weight, grams:		5.04	5.04	5.06	5.06	5.01	5.04	5.03	5.03	5.05

Table 4-1: Method blanks. Concentrations, ng/g (ppb) wet weight, of aromatic contaminants (ACs) in method blanks.

ACs	Lab no.:	60-3111	60-3126	60-3141	60-3156	60-3171	60-3182
naphthalene		2	1	1	1	1	1
C1-naphthalenes		1	1	1	1	2	1
C2-naphthalenes		0.1	0.1	-	0.2	0.3	-
C3-naphthalenes		-	-	-	-	0.2	-
C4-naphthalenes		-	-	-	-	-	-
acenaphthylene		-	-	-	-	-	-
acenaphthene		-	-	-	-	-	-
fluorene		0.1	-	-	-	0.1	-
C1-fluorenes		-	-	-	-	-	-
C2-fluorenes		-	-	-	-	-	-
C3-fluorenes		-	-	-	-	-	-
phenanthrene		0.2	0.1	0.2	0.1	0.2	0.1
C1-phenanthrenes/anthracenes		-	-	-	-	-	-
C2-phenanthrenes/anthracenes		-	-	-	-	-	-
C3-phenanthrenes/anthracenes		-	-	-	-	-	-
C4-phenanthrenes/anthracenes		-	-	-	-	-	-
dibenzothiophene		-	-	-	-	-	-
C1-dibenzothiophenes		-	-	-	-	-	-
C2-dibenzothiophenes		-	-	-	-	-	-
C3-dibenzothiophenes		-	-	-	-	-	-
Sum of LACs		**3**	**2**	**2**	**2**	**4**	**2**
fluoranthene		-	-	-	-	-	-
pyrene		-	-	-	-	-	-
C1-fluoranthenes/pyrenes		-	-	-	-	-	-
benz[a]anthracene		-	-	-	-	-	-
chrysene		-	-	-	-	-	-
C1-chrysenes/benz[a]anthracenes		-	-	-	-	-	-
C2-chrysenes/benz[a]anthracenes		-	-	-	-	-	-
C3-chrysenes/benz[a]anthracenes		-	-	-	-	-	-
C4-chrysenes/benz[a]anthracenes		-	-	-	-	-	-
benzo[b]fluoranthene		0.1	-	-	-	-	-
benzo[k]fluoranthene		-	-	-	-	-	-
benzo[a]pyrene		0.2	-	-	-	-	-
indeno[1,2,3-cd]pyrene		0.1	-	-	0.1	0.1	-
dibenz[a,h]anthracene		-	-	-	-	-	-
benzo[ghi]perylene		0.1	-	-	-	0.1	-
Sum of HACs		**0.5**	**-**	**-**	**0.1**	**0.2**	**-**

Table 4-2: NIST Control Material (Mytilus edulis). Concentrations, ng/g (ppb) wet weight, of aromatic contaminants (ACs) in NIST Tissue SRM 1974.

ACs	Lab no.:	60-3110	60-3125	60-3140	60-3155	60-3170	60-3181	Previously Analyzed (n=14) mean	RSD
naphthalene		3	3	3	3	3	3	6	61
C1-naphthalenes		3	3	3	3	4	3	3	28
C2-naphthalenes		3	3	3	3	3	3	4	14
C3-naphthalenes		6	7	6	7	8	5	8	14
C4-naphthalenes		18	17	13	20	17	16	18	24
acenaphthylene		0.3	0.3	0.3	0.3	0.3	0.3	1	60
acenaphthene		0.7	0.7	0.7	0.8	0.8	0.8	0.9	14
fluorene		0.8	0.9	0.9	1	0.9	1	1	36
C1-fluorenes		3	3	3	3	3	3	4	18
C2-fluorenes		14	12	10	15	12	12	20	24
C3-fluorenes		9	6	7	11	7	8	21	50
phenanthrene		4	4	4	4	4	4	5	37
C1-phenanthrenes/anthracenes		7	8	7	8	8	7	7	17
C2-phenanthrenes/anthracenes		28	33	29	34	32	31	29	17
C3-phenanthrenes/anthracenes		34	34	29	41	31	30	38	17
C4-phenanthrenes/anthracenes		4	3	2	6	3	3	9	48
dibenzothiophene		0.6	0.6	0.6	0.6	0.6	0.5	0.9	46
C1-dibenzothiophenes		3	4	4	2	4	4	4	43
C2-dibenzothiophenes		24	28	24	26	25	25	27	37
C3-dibenzothiophenes		27	31	26	32	26	27	31	36
Sum of LACs		**190**	**200**	**180**	**220**	**190**	**190**	**220**	**35**
fluoranthene		46	42	44	49	39	44	42	12
pyrene		42	40	41	40	39	41	40	14
C1-fluoranthenes/pyrenes		22	22	21	26	20	20	25	13
benz[a]anthracene		4	4	4	4	4	4	6	24
chrysene		14	14	14	14	14	14	17	12
C1-chrysenes/benz[a]anthracenes		4	5	5	5	5	4	8 (n=5)	21
C2-chrysenes/benz[a]anthracenes		2	2	2	2	3	1	4 (n=2)	36
C3-chrysenes/benz[a]anthracenes		-	0.1	0.1	0.3	0.2	0.1	1	62
C4-chrysenes/benz[a]anthracenes		-	-	-	-	0.2	-	0.3	47
benzo[b]fluoranthene		6	5	5	5	5	6	7	21
benzo[k]fluoranthene		3	3	4	3	4	2	5	21
benzo[a]pyrene		1	2	2	1	2	2	2	32
indeno[1,2,3-cd]pyrene		1	1	1	1	2	1	2	25
dibenz[a,h]anthracene		0.2	0.3	0.2	0.2	0.3	0.2	0.5	28
benzo[ghi]perylene		2	2	2	2	2	2	3	33
Sum of HACs		**150**	**140**	**150**	**150**	**140**	**140**	**160**	**17**
sample weight, grams:		2.94	3.00	2.99	3.05	3.05	3.04	-	-

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Northwest Fisheries Center
Environmental Conservation Division
2725 Montlake Blvd., East
Seattle, WA 98112

January 6, 1994

Dr. James Fall
Regional Program Manager
Division of Subsistence
Alaska Department of Fish & Game (ADF&G)
333 Raspberry Rd.
Anchorage, AK 99518-1599

Dear Dr. Fall:

The samples collected during the fall of 1993 as part of the ADF&G/NOAA subsistence study (Table 1) have been analyzed. The concentrations of metabolites of FACs in the bile samples from the five fish collected in September 1993 subsistence sampling (Table 2) were low, indicating minimal exposure to petroleum-related ACs. The small number of bile samples taken from several species, and the lack of reference samples preclude any rigorous treatment of the data. Based on our experience to date, including the earlier subsistence studies, one would not expect to find elevated concentrations of ACs in fish tissue, and as this is applicable to the summer 1993 fish samples, the tissue samples were therefore not analyzed for ACs. The concentrations of FACs in the bile from five harbor seals were also low (Table 3). Since there was only one bile sample from a duck, little can be said about exposure.

The concentrations of the ACs (ng/g or ppb based on wet weight) in tissues of shellfish and Harbor seals are summarized in Table 4. The aromatic compounds (ACs) are divided into subclasses of (a) low molecular weight ACs (LACs) and (b) high molecular weight ACs (HACs), as defined in the explanatory notes for Tables 4-7. Tables 5 and 6 contain the detailed analytical results for all the individual ACs that comprise LACs and HACs. It is important to note that the concentrations of ACs in these mollusc and Harbor seal samples were very low and did not differ substantially from those found in samples from reference areas from previous samplings or from the method blanks. As is common, the method blanks show trace levels (low ppb) of unavoidable ACs. Quality assurance information appears in Table 7.

If you have any questions, please feel free to call Sin-Lam Chan, Don Brown or me at (206) 860-3330.

Sincerely yours,

S. L. Chan

Usha Varanasi, Ph.D.
Director

Attachment

cc: F/NWC2 - S.L. Chan
F/NWC2 - D. Brown

Aromatic Contaminants for ADFG Subsistence Summer 1993 Explanatory Notes for Tables 1 through 7.

Abbreviations used:

ACs - the aromatic contaminants listed in Tables 3 and 4.

LACs - low molecular weight ACs, the sum of 2 and 3-ring ACs, as listed in Tables 3 and 4 from naphthalene through the C3-dibenzothiophenes.

HACs - high molecular weight ACs, the sum of 4 through 6-ring ACs, as listed in Tables 3 and 4 from fluoranthene through benzo[ghi]perylene.

RSD - relative standard deviation is the standard deviation divided by the mean and expressed as a percent.

A hyphen (-) indicates that the analyte was not detected above the limit of detection which ranged from 0.1 to 0.5 ng/g (ppb) wet weight.

Results were determined by GC/MS - selected ion monitoring.

Naphthalene-d8 was the internal standard for naphthalene through C4-naphthalenes. Acenaphthene-d10 was the internal standard for acenaphthylene through C1-fluoranthenes/pyrenes. Unless otherwise noted, benzo[a]pyrene-d12 was the internal standard for benz[a]anthracene through benzo[ghi]perylene.

Concentrations less than 10 ng/g are rounded to one significant figure; concentrations greater than or equal to 10 ng/g are rounded to two significant figures.

Percent recoveries for the internal standards (surrogates) averaged 86%, RSD =15%, n = 216. Percent recoveries of the surrogates include quality assurance samples.

Specific Notes

a Levels of the analyte were indistinguishable from those of blank analyses.

Table 1. Species Sampling Log for samples included in this report - 1993 Subsistence part II. (Total Samples: 50)

Village	Station Code	CHITONS	BUTTER CLAMS	LITTLENECK CLAMS	HARBOR SEALS	MUSSELS	YELLOWEYE ROCKFISH	TIGER ROCKFISH	CHINA ROCKFISH	BARROW'S GOLDENEYE DUCK
Chenega Bay	CHE2						2	2	1	
Chenega Bay	CHE10					3				
Iktua Bay, Evans Island					1					1
Larsen Bay	LAB15					4				
LaTouche Island					1					
Mummy Island					2					
Nanwalek	NAN1					3				
Ouzinkie	OUZ2		3			2				
Ouzinkie	OUZ3					3				
Port Graham	PTG4			3		3				
Port Graham	PTG12	3								
Port Lions	PTL1					3				
Ship Island					1					
Tatitlek	TAT1					3				
Tatitlek	TAT9			3		3				
TOTAL:		3	3	6	5	27	2	2	1	1

Table 2: Concentrations of metabolites of fluorescent aromatic compounds (FACs, NPH for naphthalene, PHN for phenanthrene) in fish bile from samples from Chenega (CHE2) collected in September, 1993.

Field/Bile Sample no.	Species	FACs NPH ng/g bile	FACs PHN ng/g bile	Protein mg/ml
93BILE0273	Yelloweye Rockfish	7,100	130	1
93BILE0274	Tiger Rockfish	1,800	180	1.8
93BILE0275	China Rockfish	6,600	870	2.3
93BILE0277	Tiger Rockfish	10,000	1,100	2.1
93BILE0278	Yelloweye Rockfish	4,800	290	0.9

Table 3: Concentrations of metabolites of fluorescent aromatic compounds (FACs, NPH for naphthalene, PHN for phenanthrene) in duck and harbor seal bile samples collected in September, 1993.

Field/Bile Sample no.	Site	Species	FACs NPH ng/g bile	FACs PHN ng/g bile	Protein mg/ml
93-CHE-DUCK-1	Iktua Bay, Evans Island	Barrow's Goldeneye	64,000	9,100	51
93-CHE-SEAL-1	Mummy Island	Harbor Seal	14,000	1,500	10
93-CHE-SEAL-2	Mummy Island	Harbor Seal	3,300	490	10
93-CHE-SEAL-3	LaTouche Island	Harbor Seal	5,600	230	23
93-CHE-SEAL-4	Ship Island	Harbor Seal	25,000	3,200	35
93-CHE-SEAL-5	Iktua Bay, Evans Island	Harbor Seal	16,000	1,900	15

Table 4-1: Edible flesh. Sums of ACs listed in Tables 3-4 (LAC/HAC) in edible flesh, ng/g (μ_{PE}) wet weight. Brackets indicate replicate analyses of one sample.

Village:	Chenega Bay	Iktua Bay, Evans Island	Larsen Bay	LaTouche Island	Mummy Island	Nanwalek	Ouzinkie		Port Graham	
Site:	CHE10		LAB15			NAN1	OUZ2	OUZ3	PTG4	PTG12
Chitons										2 / 0.9
										3 / 0.9
										2 / 1
Clams										
butter							3 / 1			
							2 / 0.9			
							3 / 1			
littleneck									5 / 9	
									3 / 3	
									4 / 3	
Harbor Seals										
blubber		2 / 2		5 / 3	2 / 5					
					2 / 6					
liver		3 / 1		3 / 1	3 / 1					
					2 / 0.7					
Mussels	3 / 2		3 / 0.9			3 / 0.9	1 / 1	2 / 2	3 / 2	
	4 / 0.9		3 / 0.9			3 / 0.7	9 / 12	[11 / 5]	4 / 3	
	4 / 1		1 / 0.7			3 / 0.9		[5 / 4]	3 / 3	
			2 / 0.7					[3 / 2]		
								[3 / 2]		

Table 4-2: Edible flesh. Sums of ACs listed in Tables 3-4 (LAC/HAC) in edible flesh, ng/g (ppb), wet weight. Brackets indicate replicate analyses of one sample.

Village:	Port Lions	Ship Island	Tatitlek	
Site:	PTL1		TAT1	TAT9
Chitons				
Clams				
butter				
littleneck				3 / 1
				1 / 1
				3 / 0.5
Harbor Seals				
blubber		4 / 3		
liver		3 / 0.9		
Mussels	2 / 1		[2 / 1	2 / 0.8
	2 / 1		1 / 0.7]	1 / 0.6
	3 / 0.9		[4 / 1]	1 / -
			4 / 1	
			2 / 1	

Table 5-1: Harbor Seal Blubber. Concentrations, ng/g (ppb) wet weight, of aromatic contaminants (ACs) in edible flesh.

ACs	Village:	Iktua Bay, Evans Island	LaTouche Island	<- Mummy Island ->		Ship Island
	ID no.:	93CHESEAL5	93CHESEAL3	93CHESEAL1	93CHESEAL2	93CHESEAL4
	Date collected:	9/24/93	9/18/93	9/17/93	9/17/93	9/21/93
	Collector:	ADF&G	ADF&G	ADF&G	ADF&G	ADF&G
	Lab no.:	60-3194	60-3190	60-3186	60-3188	60-3192
naphthalene		a	a	a	a	a
C1-naphthalenes		a	a	a	a	a
C2-naphthalenes		-	1	-	-	-
C3-naphthalenes		-	2	-	-	2
C4-naphthalenes		-	-	-	-	-
acenaphthylene		-	-	-	-	-
acenaphthene		-	-	-	-	-
fluorene		-	-	-	-	-
C1-fluorenes		-	-	-	-	-
C2-fluorenes		-	-	-	-	-
C3-fluorenes		-	-	-	-	-
phenanthrene		2	2	2	2	2
C1-phenanthrenes/anthracenes		-	-	-	-	-
C2-phenanthrenes/anthracenes		-	-	-	-	-
C3-phenanthrenes/anthracenes		-	-	-	-	-
C4-phenanthrenes/anthracenes		-	-	-	-	-
dibenzothiophene		-	-	-	-	-
C1-dibenzothiophenes		-	-	-	-	-
C2-dibenzothiophenes		-	-	-	-	-
C3-dibenzothiophenes		-	-	-	-	-
Sum of LACs		**2**	**5**	**2**	**2**	**4**
fluoranthene		0.6	0.7	0.8	0.7	0.6
pyrene		0.6	0.7	0.8	0.8	0.6
C1-fluoranthenes/pyrenes		-	-	-	-	-
benz[a]anthracene		-	-	-	-	-
chrysene		-	-	-	-	-
C1-chrysenes/benz[a]anthracenes		-	-	-	-	-
C2-chrysenes/benz[a]anthracenes		-	-	-	-	-
C3-chrysenes/benz[a]anthracenes		-	-	-	-	-
C4-chrysenes/benz[a]anthracenes		-	-	-	-	-
benzo[b]fluoranthene		-	-	0.5	0.7	-
benzo[k]fluoranthene		-	-	0.7	0.7	-
benzo[a]pyrene		-	0.3	0.6	0.9	0.4
indeno[1,2,3-cd]pyrene		0.4	0.6	0.7	0.8	0.6
dibenz[a,h]anthracene		-	-	-	-	-
benzo[ghi]perylene		0.5	0.6	0.9	0.9	0.8
Sum of HACs		**2**	**3**	**5**	**6**	**3**
sample weight, grams:		1.19	1.06	0.98	0.99	1.18

Table 5-2: Harbor Seal Liver. Concentrations, ng/g (ppb) wet weight, of aromatic contaminants (ACs) in edible flesh.

ACs	Village:	Iktua Bay, Evans Island	LaTouche Island	<- Mummy Island ->		Ship Island
	ID no.:	93CHESEAL5	93CHESEAL3	93CHESEAL1	93CHESEAL2	93CHESEAL4
	Date collected:	9/24/93	9/18/93	9/17/93	9/17/93	9/21/93
	Collector:	ADF&G	ADF&G	ADF&G	ADF&G	ADF&G
	Lab no.:	60-3195	60-3191	60-3187	60-3189	60-3193
naphthalene		a	a	a	a	a
C1-naphthalenes		2	2	2	2	2
C2-naphthalenes		-	-	-	-	-
C3-naphthalenes		-	-	-	-	-
C4-naphthalenes		-	-	-	-	-
acenaphthylene		-	-	-	-	-
acenaphthene		-	-	-	-	-
fluorene		-	-	-	-	-
C1-fluorenes		-	-	-	-	-
C2-fluorenes		-	-	-	-	-
C3-fluorenes		-	-	-	-	-
phenanthrene		0.7	0.6	0.6	0.5	0.6
C1-phenanthrenes/anthracenes		-	0.7	-	-	-
C2-phenanthrenes/anthracenes		-	-	-	-	-
C3-phenanthrenes/anthracenes		-	-	-	-	-
C4-phenanthrenes/anthracenes		-	-	-	-	-
dibenzothiophene		-	-	-	-	-
C1-dibenzothiophenes		-	-	-	-	-
C2-dibenzothiophenes		-	-	-	-	-
C3-dibenzothiophenes		-	-	-	-	-
Sum of LACs		**3**	**3**	**3**	**2**	**3**
fluoranthene		0.3	0.2	0.3	-	0.3
pyrene		0.3	0.3	0.3	-	0.2
C1-fluoranthenes/pyrenes		-	-	-	-	-
benz[a]anthracene		-	-	-	-	-
chrysene		-	-	-	-	-
C1-chrysenes/benz[a]anthracenes		-	-	-	-	-
C2-chrysenes/benz[a]anthracenes		-	-	-	-	-
C3-chrysenes/benz[a]anthracenes		-	-	-	-	-
C4-chrysenes/benz[a]anthracenes		-	-	-	-	-
benzo[b]fluoranthene		-	-	-	-	-
benzo[k]fluoranthene		-	-	-	-	-
benzo[a]pyrene		-	0.2	0.1	0.1	-
indeno[1,2,3-cd]pyrene		0.4	0.3	0.2	0.3	0.2
dibenz[a,h]anthracene		-	-	-	-	-
benzo[ghi]perylene		0.2	0.3	0.2	0.3	0.2
Sum of HACs		**1**	**1**	**1**	**0.7**	**0.9**
sample weight, grams:		3.16	3.19	3.00	3.10	3.03

Table 6-1: Chitons. Concentrations, ng/g (ppb) wet weight, of aromatic contaminants (ACs) in edible flesh.

ACs	Village:	<- Port Graham ->		
	Site:	PTG12	PTG12	PTG12
	ID no.:	93TISS0178	93TISS0179	93TISS0180
	Date collected:	9/01/93	9/01/93	9/01/93
	Collector:	D&M	D&M	D&M
	Lab no.:	60-3207	60-3208	60-3209
naphthalene		a	a	a
C1-naphthalenes		0.8	0.9	0.8
C2-naphthalenes		0.4	0.5	0.4
C3-naphthalenes		-	-	-
C4-naphthalenes		-	-	-
acenaphthylene		-	-	-
acenaphthene		-	-	-
fluorene		0.1	0.1	0.1
C1-fluorenes		-	0.2	0.2
C2-fluorenes		-	-	-
C3-fluorenes		-	-	-
phenanthrene		0.3	0.4	0.4
C1-phenanthrenes/anthracenes		0.3	0.4	0.4
C2-phenanthrenes/anthracenes		-	0.1	0.1
C3-phenanthrenes/anthracenes		-	-	-
C4-phenanthrenes/anthracenes		-	-	-
dibenzothiophene		-	-	-
C1-dibenzothiophenes		-	-	0.1
C2-dibenzothiophenes		-	-	-
C3-dibenzothiophenes		-	-	-
Sum of LACs		**2**	**3**	**2**
fluoranthene		0.2	0.2	0.2
pyrene		0.2	0.2	0.2
C1-fluoranthenes/pyrenes		-	-	-
benz[a]anthracene		-	-	-
chrysene		-	-	-
C1-chrysenes/benz[a]anthracenes		-	-	-
C2-chrysenes/benz[a]anthracenes		-	-	-
C3-chrysenes/benz[a]anthracenes		-	-	-
C4-chrysenes/benz[a]anthracenes		-	-	-
benzo[b]fluoranthene		0.1	0.1	0.1
benzo[k]fluoranthene		-	-	-
benzo[a]pyrene		-	0.1	-
indeno[1,2,3-cd]pyrene		0.2	0.2	0.3
dibenz[a,h]anthracene		-	-	-
benzo[ghi]perylene		0.2	0.1	0.2
Sum of HACs		**0.9**	**0.9**	**1**
sample weight, grams:		5.00	5.01	5.01

Table 6-2: Butter Clams. Concentrations, ng/g (ppb) wet weight, of aromatic contaminants (ACs) in edible flesh.

ACs	Village:	<- Ouzinkie ->		
	Site:	OUZ2	OUZ2	OUZ2
	ID no.:	93TISS0227	93TISS0228	93TISS0229
	Date collected:	9/13/93	9/13/93	9/13/93
	Collector:	D&M	D&M	D&M
	Lab no.:	60-3204	60-3205	60-3206
naphthalene		a	a	a
C1-naphthalenes		0.6	0.7	0.6
C2-naphthalenes		0.3	0.3	0.3
C3-naphthalenes		0.3	0.1	0.4
C4-naphthalenes		-	-	-
acenaphthylene		-	-	-
acenaphthene		-	-	-
fluorene		0.1	0.1	0.2
C1-fluorenes		0.1	-	0.3
C2-fluorenes		-	-	-
C3-fluorenes		-	-	-
phenanthrene		0.5	0.5	0.6
C1-phenanthrenes/anthracenes		0.4	0.4	0.5
C2-phenanthrenes/anthracenes		0.4	0.1	0.2
C3-phenanthrenes/anthracenes		-	-	-
C4-phenanthrenes/anthracenes		-	-	-
dibenzothiophene		-	-	-
C1-dibenzothiophenes		-	0.1	0.1
C2-dibenzothiophenes		0.1	-	0.1
C3-dibenzothiophenes		-	-	-
Sum of LACs		**3**	**2**	**3**
fluoranthene		0.3	0.3	0.3
pyrene		0.2	0.1	0.2
C1-fluoranthenes/pyrenes		-	-	-
benz[a]anthracene		-	-	-
chrysene		-	-	-
C1-chrysenes/benz[a]anthracenes		-	-	-
C2-chrysenes/benz[a]anthracenes		-	-	-
C3-chrysenes/benz[a]anthracenes		-	-	-
C4-chrysenes/benz[a]anthracenes		-	-	-
benzo[b]fluoranthene		0.1	-	0.1
benzo[k]fluoranthene		-	-	-
benzo[a]pyrene		0.1	-	0.1
indeno[1,2,3-cd]pyrene		0.3	0.2	0.3
dibenz[a,h]anthracene		-	-	-
benzo[ghi]perylene		0.4	0.3	0.3
Sum of HACs		**1**	**0.9**	**1**
sample weight, grams:		5.02	5.02	5.01

Table 6-3: Littleneck Clams. Concentrations, ng/g (ppb) wet weight, of aromatic contaminants (ACs) in edible flesh.

ACs	Village:	<- Port Graham ->			<- Tatitlek ->		
	Site:	PTG4	PTG4	PTG4	TAT9	TAT9	TAT9
	ID no.:	93TISS0169	93TISS0170	93TISS0171	93TISS0202	93TISS0203	93TISS0204
	Date collected:	9/01/93	9/01/93	9/01/93	9/04/93	9/04/93	9/04/93
	Collector:	D&M	D&M	D&M	D&M	D&M	D&M
	Lab no.:	60-3210	60-3211	60-3212	60-3213	60-3219	60-3220
naphthalene		a	a	a	a	a	a
C1-naphthalenes		0.6	0.7	0.7	0.9	0.8	1
C2-naphthalenes		0.4	0.4	0.3	0.4	0.1	0.4
C3-naphthalenes		-	0.2	-	0.1	-	-
C4-naphthalenes		-	-	-	-	-	-
acenaphthylene		-	-	-	-	-	-
acenaphthene		-	-	0.1	-	-	-
fluorene		0.2	0.1	0.2	0.1	-	0.2
C1-fluorenes		0.1	-	0.3	0.1	-	-
C2-fluorenes		-	-	-	-	-	-
C3-fluorenes		-	-	-	-	-	-
phenanthrene		1	0.7	0.7	0.4	0.3	0.5
C1-phenanthrenes/anthracenes		1	0.6	0.7	0.4	0.2	0.3
C2-phenanthrenes/anthracenes		1	0.5	0.4	0.2	-	0.2
C3-phenanthrenes/anthracenes		0.3	-	-	0.1	-	-
C4-phenanthrenes/anthracenes		-	-	-	-	-	-
dibenzothiophene		-	-	-	-	-	-
C1-dibenzothiophenes		0.2	0.1	0.1	0.2	-	-
C2-dibenzothiophenes		0.2	-	-	-	-	0.1
C3-dibenzothiophenes		-	-	-	-	-	-
Sum of LACs		**5**	**3**	**4**	**3**	**1**	**3**
fluoranthene		2	1	1	0.2	0.1	0.2
pyrene		2	0.6	0.7	0.1	0.1	0.1
C1-fluoranthenes/pyrenes		1	0.3	0.3	-	-	-
benz[a]anthracene		0.4	0.1	0.1	-	-	-
chrysene		0.6	0.2	0.2	-	-	-
C1-chrysenes/benz[a]anthracenes		0.4	-	-	-	-	-
C2-chrysenes/benz[a]anthracenes		-	-	-	-	-	-
C3-chrysenes/benz[a]anthracenes		-	-	-	-	-	-
C4-chrysenes/benz[a]anthracenes		-	-	-	-	-	-
benzo[b]fluoranthene		0.2	-	0.1	-	0.1	-
benzo[k]fluoranthene		0.3	-	-	-	-	-
benzo[a]pyrene		0.4	-	-	-	0.1	-
indeno[1,2,3-cd]pyrene		0.7	0.4	0.4	0.4	0.3	0.1
dibenz[a,h]anthracene		-	-	-	-	-	-
benzo[ghi]perylene		0.6	0.3	0.3	0.4	0.3	0.1
Sum of HACs		**9**	**3**	**3**	**1**	**1**	**0.5**
sample weight, grams:		5.06	5.02	5.06	5.08	5.01	5.02

Table 6-4: Mussels. Concentrations, ng/g (ppb) wet weight, of aromatic contaminants (ACs) in edible flesh.

ACs	Village:	<- Chenega Bay ->			<- Larsen Bay ->				<- Nanwalek ->		
	Site:	CHE10	CHE10	CHE10	LAB15	LAB15	LAB15	LAB15	NAN1	NAN1	NAN1
	ID no.:	93TISS0195	93TISS0196	93TISS0197	93TISS0232	93TISS0257	93TISS0258	93TISS0259	93TISS0183	93TISS0184	93TISS0185
	Date collected:	9/02/93	9/02/93	9/02/93	9/15/93	9/15/93	9/15/93	9/15/93	9/01/93	9/01/93	9/01/93
	Collector:	D&M	D&M	D&M	D&M	D&M	D&M	D&M	D&M	D&M	D&M
	Lab no.:	60-3227	60-3228	60-3234	60-3257	60-3254	60-3255*	60-3256	60-3224	60-3225	60-3226
naphthalene		a	a	a	a	a	a	a	a	a	a
C1-naphthalenes		1	1	0.7	0.9	0.8	0.7	1	1	1	1
C2-naphthalenes		0.1	0.3	0.3	0.4	0.4	0.2	0.4	0.4	0.5	0.4
C3-naphthalenes		-	0.2	0.2	-	-	-	-	-	-	0.1
C4-naphthalenes		-	-	-	-	-	-	-	-	-	-
acenaphthylene		-	-	-	-	-	-	-	-	-	-
acenaphthene		-	-	-	-	-	-	-	-	-	-
fluorene		-	0.2	-	0.2	-	-	-	0.2	0.2	0.2
C1-fluorenes		-	-	-	-	-	-	-	-	-	-
C2-fluorenes		-	-	-	-	-	-	-	-	-	-
C3-fluorenes		-	-	-	-	-	-	-	-	-	-
phenanthrene		0.5	0.6	0.6	0.5	0.4	0.3	0.4	0.5	0.5	0.5
C1-phenanthrenes/anthracenes		0.4	0.5	0.5	0.3	0.3	0.1	0.2	0.4	0.3	0.3
C2-phenanthrenes/anthracenes		0.3	0.5	0.4	0.3	0.3	-	-	0.4	0.1	0.2
C3-phenanthrenes/anthracenes		0.2	0.1	0.1	-	0.1	-	-	0.1	-	-
C4-phenanthrenes/anthracenes		-	-	-	-	-	-	-	-	-	-
dibenzothiophene		0.1	0.1	-	-	0.1	-	-	-	-	-
C1-dibenzothiophenes		-	0.2	0.1	-	-	-	-	-	-	-
C2-dibenzothiophenes		0.3	0.3	0.5	-	0.2	-	-	-	-	0.1
C3-dibenzothiophenes		0.1	0.2	0.2	-	0.1	-	-	-	-	-
Sum of LACs		**3**	**4**	**4**	**3**	**3**	**1**	**2**	**3**	**3**	**3**
fluoranthene		0.2	0.2	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2
pyrene		0.2	0.2	0.2	0.1	0.2	0.1	0.2	0.2	0.1	0.2
C1-fluoranthenes/pyrenes		-	-	-	-	-	-	-	-	-	-
benz[a]anthracene		-	-	-	-	-	-	-	-	-	-
chrysene		0.1	0.1	0.1	-	0.1	-	-	0.1	-	0.1
C1-chrysenes/benz[a]anthracenes		-	-	-	-	-	-	-	-	-	-
C2-chrysenes/benz[a]anthracenes		0.2	-	0.1	-	-	-	-	-	-	-
C3-chrysenes/benz[a]anthracenes		-	-	-	-	-	-	-	-	-	-
C4-chrysenes/benz[a]anthracenes		-	-	-	-	-	-	-	-	-	-
benzo[b]fluoranthene		0.3	-	0.1	0.1	-	0.1	-	-	-	-
benzo[k]fluoranthene		-	-	-	-	-	-	-	-	-	-
benzo[a]pyrene		0.2	-	-	-	-	-	-	-	-	-
indeno[1,2,3-cd]pyrene		0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.2
dibenz[a,h]anthracene		-	-	-	-	-	-	-	-	-	-
benzo[ghi]perylene		0.4	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2
Sum of HACs		**2**	**0.9**	**1**	**0.9**	**0.9**	**0.7**	**0.7**	**0.9**	**0.7**	**0.9**
sample weight, grams:		5.06	4.99	5.11	5.07	5.00	5.04	5.07	5.11	5.06	5.06

* Acenaphthene-d10 was the internal standard for benz[a]anthracene through benzo[ghi]perylene for this sample.

Table 6-5: Mussels. Concentrations, ng/g (ppb) wet weight, of aromatic contaminants (ACs) in edible flesh.

ACs	Village:	<- Ouzinkie ->							<- Port Graham ->		
	Site:	OUZ2	OUZ2	OUZ3	OUZ3	OUZ3	OUZ3	OUZ3	PTG4	PTG4	PTG4
	ID no.:	93TISS0230	93TISS0231	93TISS0238	93TISS0239	93TISS0239	93TISS0240	93TISS0240	93TISS0174	93TISS0175	93TISS0176
	Date collected:	9/13/93	9/13/93	9/13/93	9/13/93	9/13/93	9/13/93	9/13/93	9/01/93	9/01/93	9/01/93
	Collector:	D&M	D&M	D&M	D&M	D&M	D&M	D&M	D&M	D&M	D&M
					<----duplicates---->		<----duplicates---->				
	Lab no.:	60-3241	60-3242	60-3243	60-3249	60-3264	60-3250	60-3258*	60-3221	60-3222	60-3223
naphthalene		a	a	a	a	a	a	a	a	a	a
C1-naphthalenes		0.6	0.7	0.7	1	1	0.9	0.9	1	1	1
C2-naphthalenes		-	-	-	0.4	0.7	0.4	0.1	0.3	0.4	0.3
C3-naphthalenes		-	-	-	0.1	0.3	-	-	-	0.2	-
C4-naphthalenes		-	-	-	-	-	-	-	-	-	-
acenaphthylene		-	-	-	-	0.2	0.1	-	-	0.1	-
acenaphthene		-	-	-	-	-	-	-	-	-	-
fluorene		-	0.2	-	0.2	0.3	0.1	0.2	0.2	0.2	0.2
C1-fluorenes		-	-	-	-	0.5	-	-	-	-	-
C2-fluorenes		-	-	-	-	0.7	-	-	-	-	-
C3-fluorenes		-	-	-	-	0.4	-	-	-	-	-
phenanthrene		0.5	0.5	0.7	1	1	0.7	0.8	0.7	0.8	0.7
C1-phenanthrenes/anthracenes		0.1	0.6	0.1	0.5	1	0.3	0.4	0.4	0.4	0.4
C2-phenanthrenes/anthracenes		0.1	2	0.1	0.6	1	0.4	0.3	0.1	0.4	0.2
C3-phenanthrenes/anthracenes		-	2	-	0.4	1	-	-	-	0.1	0.1
C4-phenanthrenes/anthracenes		-	-	-	-	0.2	-	-	-	-	-
dibenzothiophene		-	-	-	-	0.2	-	-	-	-	-
C1-dibenzothiophenes		-	0.2	-	0.2	0.3	-	-	-	-	-
C2-dibenzothiophenes		-	1	-	0.5	0.8	0.2	0.2	-	0.1	-
C3-dibenzothiophenes		-	2	-	0.5	1	0.1	0.1	-	-	-
Sum of LACs		**1**	**9**	**2**	**5**	**11**	**3**	**3**	**3**	**4**	**3**
fluoranthene		0.3	3	0.5	0.8	1	0.4	0.4	0.5	0.7	0.6
pyrene		0.2	3	0.3	0.4	0.7	0.2	0.2	0.3	0.5	0.4
C1-fluoranthenes/pyrenes		-	2	0.1	0.2	0.5	0.1	0.1	-	0.3	0.3
benz[a]anthracene		-	0.3	0.2	0.3	0.5	0.2	0.1	0.2	0.2	0.2
chrysene		-	1	0.3	0.4	0.6	0.3	0.3	0.3	0.4	0.4
C1-chrysenes/benz[a]anthracenes		-	0.4	-	-	-	-	-	-	-	-
C2-chrysenes/benz[a]anthracenes		-	-	-	-	-	-	-	-	-	-
C3-chrysenes/benz[a]anthracenes		-	-	-	-	-	-	-	-	-	-
C4-chrysenes/benz[a]anthracenes		-	-	-	-	-	-	-	-	-	-
benzo[b]fluoranthene		0.2	0.6	0.2	0.3	0.3	0.2	0.3	0.3	0.4	0.3
benzo[k]fluoranthene		-	0.4	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.3
benzo[a]pyrene		0.1	0.2	0.1	0.2	0.1	0.1	-	0.1	0.2	0.2
indeno[1,2,3-cd]pyrene		0.2	0.3	0.3	0.3	0.3	0.2	0.3	0.2	0.2	0.3
dibenz[a,h]anthracene		-	-	-	-	-	-	-	-	-	-
benzo[ghi]perylene		0.2	0.4	0.2	0.4	0.2	0.3	0.4	0.3	0.2	0.3
Sum of HACs		**1**	**12**	**2**	**4**	**5**	**2**	**2**	**2**	**3**	**3**
sample weight, grams:		5.09	4.94	5.02	5.05	5.17	5.02	5.15	5.00	5.06	5.00

* Acenaphthene-d10 was the internal standard for benz[a]anthracene through benzo[ghi]perylene for this sample.

Table 6-6: Mussels. Concentrations, ng/g (ppb) wet weight, of aromatic contaminants (ACs) in edible flesh.

ACs	Village:	<- Port Lions ->		
	Site:	PTL1	PTL1	PTL1
	ID no.:	93TISS0246	93TISS0247	93TISS0248
	Date collected:	9/14/93	9/14/93	9/14/93
	Collector:	D&M	D&M	D&M
	Lab no.:	60-3251*	60-3276	60-3253*
naphthalene		a	a	a
C1-naphthalenes		0.8	0.6	0.8
C2-naphthalenes		0.2	0.3	0.4
C3-naphthalenes		0.1	-	0.1
C4-naphthalenes		-	-	-
acenaphthylene		-	-	-
acenaphthene		-	-	-
fluorene		0.1	0.1	0.2
C1-fluorenes		-	-	-
C2-fluorenes		-	-	-
C3-fluorenes		-	-	-
phenanthrene		0.4	0.6	0.6
C1-phenanthrenes/anthracenes		0.1	0.2	0.3
C2-phenanthrenes/anthracenes		-	0.2	0.1
C3-phenanthrenes/anthracenes		-	-	-
C4-phenanthrenes/anthracenes		-	-	-
dibenzothiophene		-	-	0.4
C1-dibenzothiophenes		-	-	-
C2-dibenzothiophenes		-	-	-
C3-dibenzothiophenes		-	-	-
Sum of LACs		**2**	**2**	**3**
fluoranthene		0.2	0.3	0.3
pyrene		0.1	0.2	0.2
C1-fluoranthenes/pyrenes		-	-	-
benz[a]anthracene		-	-	-
chrysene		0.1	0.1	0.1
C1-chrysenes/benz[a]anthracenes		-	-	-
C2-chrysenes/benz[a]anthracenes		-	-	-
C3-chrysenes/benz[a]anthracenes		-	-	-
C4-chrysenes/benz[a]anthracenes		-	-	-
benzo[b]fluoranthene		0.1	0.1	0.2
benzo[k]fluoranthene		0.1	-	0.1
benzo[a]pyrene		-	-	-
indeno[1,2,3-cd]pyrene		0.2	0.4	0.2
dibenz[a,h]anthracene		-	-	-
benzo[ghi]perylene		0.2	0.3	0.2
Sum of HACs		**1**	**1**	**1**
sample weight, grams:		5.03	5.01	5.03

* Acenaphthene-d10 was the internal standard for benz[a]anthracene through benzo[ghi]perylene for this sample.

Table 6-7: Mussels. Concentrations, ng/g (ppb) wet weight, of aromatic contaminants (ACs) in edible flesh.

ACs	Village:	<- Tatitlek ->							
	Site:	TAT1	TAT1	TAT1	TAT1	TAT1	TAT9	TAT9	TAT9
	ID no.:	93TISS0212	93TISS0212	93TISS0212	93TISS0213	93TISS0214	93TISS0205	93TISS0206	93TISS0207
	Date collected:	9/04/93	9/14/93	9/14/93	9/04/93	9/04/93	9/01/93	9/04/93	9/04/93
	Collector:	D&M	D&M	D&M	D&M	D&M	D&M	D&M	D&M
			<-----triplicates----->						
	Lab no.:	60-3238	60-3265	60-3266	60-3239	60-3240	60-3235	60-3236	60-3237
naphthalene		a	a	a	a	a	a	a	a
C1-naphthalenes		0.8	0.7	1	2	0.7	0.9	0.7	0.6
C2-naphthalenes		-	0.4	0.5	0.4	-	0.1	-	-
C3-naphthalenes		-	-	0.1	-	-	-	-	-
C4-naphthalenes		-	-	-	-	-	-	-	-
acenaphthylene		-	-	0.1	-	-	-	-	-
acenaphthene		-	-	-	-	-	-	-	-
fluorene		-	-	0.1	0.2	-	-	-	-
C1-fluorenes		-	-	0.3	-	-	-	-	-
C2-fluorenes		-	-	0.1	-	-	-	-	-
C3-fluorenes		-	-	-	-	-	-	-	-
phenanthrene		0.4	0.6	0.6	0.6	0.5	0.5	0.4	0.4
C1-phenanthrenes/anthracenes		-	0.4	0.5	0.4	0.2	0.3	-	-
C2-phenanthrenes/anthracenes		-	0.1	0.2	-	0.1	0.1	-	-
C3-phenanthrenes/anthracenes		-	-	-	-	-	-	-	-
C4-phenanthrenes/anthracenes		-	-	-	-	-	-	-	-
dibenzothiophene		-	-	-	-	-	-	-	-
C1-dibenzothiophenes		-	-	-	-	-	-	-	-
C2-dibenzothiophenes		-	-	-	-	-	0.1	-	-
C3-dibenzothiophenes		-	-	-	-	-	-	-	-
Sum of LACs		**1**	**2**	**4**	**4**	**2**	**2**	**1**	**1**
fluoranthene		0.2	0.2	0.3	0.3	0.3	0.2	0.1	-
pyrene		0.2	0.2	0.2	0.2	0.2	0.2	0.1	-
C1-fluoranthenes/pyrenes		-	-	-	-	-	-	-	-
benz[a]anthracene		-	-	-	-	-	-	-	-
chrysene		-	0.1	-	-	-	-	-	-
C1-chrysenes/benz[a]anthracenes		-	-	-	-	-	-	-	-
C2-chrysenes/benz[a]anthracenes		-	-	-	-	-	-	-	-
C3-chrysenes/benz[a]anthracenes		-	-	-	-	-	-	-	-
C4-chrysenes/benz[a]anthracenes		-	-	-	-	-	-	-	-
benzo[b]fluoranthene		-	0.1	0.1	-	0.2	-	-	-
benzo[k]fluoranthene		-	0.1	-	-	-	-	-	-
benzo[a]pyrene		-	-	-	-	0.1	-	-	-
indeno[1,2,3-cd]pyrene		0.2	0.4	0.4	0.3	0.2	0.2	0.2	-
dibenz[a,h]anthracene		-	-	-	-	-	-	-	-
benzo[ghi]perylene		0.1	0.3	0.3	0.2	0.2	0.2	0.2	-
Sum of HACs		**0.7**	**1**	**1**	**1**	**1**	**0.8**	**0.6**	**-**
sample weight, grams:		5.11	5.02	5.20	4.94	5.04	5.00	5.11	5.08

Table 7-1. Method blanks. Concentrations, ng/g (ppb) wet weight, of aromatic contaminants (ACs) in method blanks.

ACs	Lab no.:	60-3197	60-3215	60-3230	60-3245	60-3260	60-3270	60-3278	Method Blanks Analyzed (n=7) mean	RSD
naphthalene		7	2	2	2	2	4	1	3	68
C1-naphthalenes		3	0.5	0.6	0.6	0.6	1	0.5	1	91
C2-naphthalenes		-	0.2	-	0.1	-	0.5	0.1	0.2 (n=5)	84
C3-naphthalenes		-	-	-	-	-	-	-	-	-
C4-naphthalenes		-	-	-	-	-	-	-	-	-
acenaphthylene		-	-	-	-	-	-	-	-	-
acenaphthene		-	-	-	-	-	-	-	-	-
fluorene		-	-	-	-	-	0.1	-	0.1 (n=1)	-
C1-fluorenes		-	-	-	-	-	-	-	-	-
C2-fluorenes		-	-	-	-	-	-	-	-	-
C3-fluorenes		-	-	-	-	-	-	-	-	-
phenanthrene		0.8	0.2	0.2	0.5	0.2	0.4	0.2	0.4	57
C1-phenanthrenes/anthracenes		-	-	-	0.5	-	-	-	0.5 (n=1)	65
C2-phenanthrenes/anthracenes		-	-	-	0.4	-	-	-	0.4 (n=1)	58
C3-phenanthrenes/anthracenes		-	-	-	-	-	-	-	-	-
C4-phenanthrenes/anthracenes		-	-	-	-	-	-	-	-	-
dibenzothiophene		-	-	-	-	-	-	-	-	-
C1-dibenzothiophenes		-	-	-	-	-	-	-	-	-
C2-dibenzothiophenes		-	-	-	0.1	-	-	-	0.1 (n=1)	-
C3-dibenzothiophenes		-	-	-	-	-	-	-	-	-
Sum of LACs		**11**	**3**	**3**	**4**	**3**	**6**	**2**	**5**	**62**
fluoranthene		0.3	-	-	0.7	-	0.2	-	0.4 (n=3)	66
pyrene		-	-	-	0.6	-	0.2	-	0.4 (n=2)	71
C1-fluoranthenes/pyrenes		-	-	-	-	-	-	-	-	-
benz[a]anthracene		-	-	-	-	-	-	-	-	-
chrysene		-	-	-	0.1	-	-	-	0.1 (n=1)	440
C1-chrysenes/benz[a]anthracenes		-	-	-	-	-	-	-	-	-
C2-chrysenes/benz[a]anthracenes		-	-	-	-	-	-	-	-	-
C3-chrysenes/benz[a]anthracenes		-	-	-	-	-	-	-	-	-
C4-chrysenes/benz[a]anthracenes		-	-	-	-	-	-	-	-	-
benzo[b]fluoranthene		-	-	-	-	2	0.1	-	1 (n=2)	130
benzo[k]fluoranthene		-	-	-	-	-	-	-	-	-
benzo[a]pyrene		-	-	0.1	-	-	0.1	-	0.1 (n=2)	-
indeno[1,2,3-cd]pyrene		-	-	0.1	-	2	0.2	-	0.8 (n=3)	140
dibenz[a,h]anthracene		-	-	-	-	-	-	-	-	-
benzo[ghi]perylene		0.3	-	0.1	-	3	0.2	0.1	0.7 (n=5)	170
Sum of HACs		**0.6**	**-**	**0.3**	**1**	**7**	**1**	**0.1**	**2 (n=6)**	**160**

Table 7-2: NIST Control Material (Mytilus edulis). Concentrations, ng/g (ppb) wet weight, of aromatic contaminants (ACs) in NIST Mussel V tissue.

ACs	Lab no.:	60-3196	60-3214*	60-3229	60-3244	60-3259	60-3269	60-3277*	Mussel V tissue Analyzed (n=7) mean	RSD
naphthalene		a	a	a	a	a	a	a	-	-
C1-naphthalenes		3	2	2	2	2	3	1	2	35
C2-naphthalenes		0.6	1	0.9	0.6	1	2	0.9	1	47
C3-naphthalenes		-	2	2	0.6	2	3	2	2 (n=6)	38
C4-naphthalenes		2	6	3	0.8	3	8	3	4	62
acenaphthylene		0.8	0.5	0.3	-	0.3	0.7	0.2	0.5 (n=6)	48
acenaphthene		-	0.4	0.3	-	0.2	0.4	0.2	0.3 (n=5)	33
fluorene		-	0.5	0.5	0.5	0.4	0.6	0.4	0.5 (n=6)	16
C1-fluorenes		1	2	1	2	1	4	0.8	2	57
C2-fluorenes		4	11	3	4	4	11	3	6	61
C3-fluorenes		8	22	3	9	3	9	0.3	8	89
phenanthrene		2	2	2	2	2	3	2	2	19
C1-phenanthrenes/anthracenes		4	4	4	4	3	5	3	4	17
C2-phenanthrenes/anthracenes		15	16	14	13	13	17	11	14	15
C3-phenanthrenes/anthracenes		25	25	22	20	20	30	16	23	20
C4-phenanthrenes/anthracenes		16	8	5	11	4	19	2	9	71
dibenzothiophene		-	0.3	0.3	0.5	0.3	0.3	0.2	0.3 (n=6)	31
C1-dibenzothiophenes		1	2	1	1	1	2	1	1	49
C2-dibenzothiophenes		10	11	9	9	10	13	9	10	15
C3-dibenzothiophenes		17	21	18	17	18	23	16	19	13
Sum of LACs		**110**	**140**	**91**	**97**	**88**	**150**	**72**	**110**	**26**
fluoranthene		21	24	22	20	21	30	23	23	15
pyrene		19	22	20	18	19	27	19	21	15
C1-fluoranthenes/pyrenes		17	20	17	15	15	26	15	18	22
benz[a]anthracene		3	3	3	3	3	5	2	3	30
chrysene		9	11	9	9	8	13	10	10	17
C1-chrysenes/benz[a]anthracenes		5	6	5	4	4	7	4	5	23
C2-chrysenes/benz[a]anthracenes		2	4	3	1	3	4	2	3	37
C3-chrysenes/benz[a]anthracenes		0.3	1	0.5	0.2	0.6	0.2	-	0.5 (n=6)	66
C4-chrysenes/benz[a]anthracenes		-	0.3	-	-	-	0.4	-	0.4 (n=2)	20
benzo[b]fluoranthene		4	7	4	5	4	7	5	5	27
benzo[k]fluoranthene		2	3	4	2	3	4	3	3	27
benzo[a]pyrene		2	0.9	1	1	1	2	0.4	1	60
indeno[1,2,3-cd]pyrene		2	3	2	1	2	0.5	1	2	43
dibenz[a,h]anthracene		0.3	0.4	0.3	-	0.3	3	0.3	0.8 (n=6)	140
benzo[ghi]perylene		3	4	3	2	3	3	3	3	19
Sum of HACs		**90**	**110**	**94**	**81**	**87**	**130**	**88**	**97**	**18**
sample weight, grams:		2.64	3.04	3.04	3.08	3.02	3.19	3.05	-	-

* Acenaphthene-d10 was the internal standard for benz[a]anthracene through benzo[ghi]perylene for this sample.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Fisheries Science Center
Environmental Conservation Division
2725 Montlake Boulevard East
Seattle, Washington 98112

January 26, 1994

Rita Miraglia
Division of Subsistence
Alaska Department of Fish & Game
333 Raspberry Rd.
Anchorage, AK 99518-1599

Dear Rita,

Ten additional fish bile samples from September 1993 subsistence sampling have been analyzed, and the tables have been revised accordingly. Table 2-1 contains previously reported Chenega Bay fish bile FAC data. Tables 2-2 and 2-3 show the bile FAC data for the additional fish samples from Port Graham and Tatitlek. The concentrations of metabolites of FACs in the bile samples from the 15 fish collected in September 1993 subsistence sampling (Table 2) were low to moderate, indicating minimal exposure to petroleum-related ACs. The small number of bile samples taken from several species, and the lack of reference samples preclude any rigorous treatment of the data. Based on our experience to date, including the earlier subsistence studies, one would not expect to find elevated concentrations of ACs in fish tissue, and as this is applicable to the summer 1993 fish samples, the tissue samples were therefore not analyzed for ACs.

If you have any questions, please feel free to call Don Brown or me at (206) 860-3330.

Sincerely,

Sin-Lam Chan, Ph.D.
Deputy Director

Enclosure

cc: Don Brown

Table 2-1: Concentrations of metabolites of fluorescent aromatic compounds (FACs, NPH for naphthalene, PHN for phenanthrene) in fish bile from samples from Chenega (CHE2) collected in September, 1993.

Field/Bile Sample no.	Species	FACs NPH ng/g bile	FACs PHN ng/g bile	Protein mg/ml
93BILE0273	Yelloweye Rockfish	7,100	130	1
93BILE0274	Tiger Rockfish	1,800	180	1.8
93BILE0275	China Rockfish	6,600	870	2.3
93BILE0277	Tiger Rockfish	10,000	1,100	2.1
93BILE0278	Yelloweye Rockfish	4,800	290	0.9

Table 2-2: Concentrations of metabolites of fluorescent aromatic compounds (FACs, NPH for naphthalene, PHN for phenanthrene) in fish bile from samples from Port Graham (PTG6) collected in September, 1993.

Field/Bile Sample no.	Species	FACs NPH ng/g bile	FACs PHN ng/g bile	Protein mg/ml
93BILE0263	Black Rockfish	*	*	*
93BILE0264	Black Rockfish	8,100	1,100	2.2
93BILE0265	Black Rockfish	4,900	1,300	1.2
93BILE0266	Black Rockfish	5,000	770	1.0
93BILE0267	Black Rockfish	1,300	280	1.2
93BILE0268	Black Rockfish	1,400	350	0.7
93BILE0269	Black Rockfish	21,000	1,900	10

* Quantity of bile insufficient for analysis.

Table 2-3: Concentrations of metabolites of fluorescent aromatic compounds (FACs, NPH for naphthalene, PHN for phenanthrene) in fish bile from samples from Tatitlek (TAT4) collected in September, 1993.

Field/Bile Sample no.	Species	FACs NPH ng/g bile	FACs PHN ng/g bile	Protein mg/ml
93BILE0218	Quillback Rockfish	35,000	2,500	13
93BILE0219	Quillback Rockfish	11,000	1,800	3.6
93BILE0220	Quillback Rockfish	18,000	2,900	2.0
93BILE0222	Quillback Rockfish	2,900	720	2.0

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Fisheries Science Center
Environmental Conservation Division
2725 Montlake Boulevard East
Seattle, Washington 98112

March 3, 1994

FYI. Jody + Craig have copies. I have the original. S

Dr. James Fall
Regional Program Manager
Division of Subsistence
Alaska Department of Fish & Game (ADF&G)
333 Raspberry Rd.
Anchorage, AK 99518-1599

Dear Dr. Fall:

The samples collected during the summer and fall of 1993 as part of the ADF&G/NOAA subsistence study (Tables 1 and 2) have been analyzed and the data were reported in previous letters. This is a summary report of previously submitted data.

The concentrations of the aromatic compounds (ACs) in tissues of shellfish are summarized in Tables 3 and 4. The ACs are divided into subclasses of (a) low molecular weight ACs (LACs) and (b) high molecular weight ACs (HACs). It is important to note that the summed concentrations of ACs in the mollusk samples were very low and did not differ substantially from those found in samples from reference areas from previous samplings or from the method blanks. As is common, the method blanks show trace levels (low ppb) of ACs.

Bile samples from fish, marine mammals, and one duck were analyzed for metabolites of aromatic hydrocarbons (FACs) to assess their exposure to petroleum (Tables 5-6). Most fish had low concentrations of FACs in bile, but some fish collected in June/July (Table 5) may have been exposed to petroleum as indicated by elevated concentrations of FACs. However, only a small number of bile samples were collected and these were divided among several species of fish. This, as well as the lack of reference samples, precludes a rigorous treatment of the bile data for fish. Based on our experience to date, including the earlier subsistence studies, one would not expect to find elevated concentrations of ACs in fish tissue. Therefore, the fish tissue samples were not analyzed for ACs.

The concentrations of FACs in the bile from five harbor seals were also low (Table 6). However, because the data base for ACs in blubber and liver samples is very limited and more information was desired, blubber and liver samples from the harbor seals were analyzed for ACs that would be indicative of petroleum. The concentrations of ACs in the harbor seal samples were very low (less than 10 ng/g, Table 3), typical of species that metabolize ACs efficiently. Because there was only one bile sample from a duck, little can be said about exposure.

In conclusion, the samples collected during the summer and fall of 1993 as part of the ADF&G/NOAA subsistence study contained levels of ACs that were similar to those in samples from reference areas from previous samplings, except for elevated concentrations of FACs in bile of some of the fish collected during June/July.

If you have any questions, please feel free to call Peggy Krahn, Don Brown or me at (206) 860-3330.

Sincerely,

Sin-Lam Chan, Ph.D.
Acting Director

Attachment

cc: P. Krahn
D. Brown

Table 1. Spec. Sampling Log for samples collected during the 1993 Subsistence summer sampling. tal Samples: 68)

Village Sampling site	Station Code	MUSSELS	BUTTER CLAMS	LITTLENECK CLAMS	CHITONS	BLACK ROCKFISH	YELLOWEYE ROCKFISH
Chenega Bay	CHE2					3	6
Chenega Bay	CHE10	3					
Chenega Bay	CHE25	3					
Karluk	KAR2	3					
Larsen Bay	LAB15	3					
Nanwalek	NAN1	3					
Nanwalek	NAN2	3					
Ouzinkie	OUZ2	3	3				
Ouzinkie	OUZ3	3					
Port Graham	PTG4	3		3			
Port Graham	PTG6					6	
Port Graham	PTG12				3		
Port Lions	PTL1	3					
Tatitlek	TAT1	3					
Tatitlek	TAT9	3		3			
Windy Bay	WNB3	3					
TOTAL:		39	3	6	3	11	6

Table 2. Specie. .ampling Log for samples collected during the 1993 Subsistence fall sampling. (Tota. .nples: 61)

Village Sampling site	Station Code	MUSSELS	BUTTER CLAMS	LITTLENECK CLAMS	CHITONS	BLACK ROCKFISH	CHINA ROCKFISH	QUILLBACK ROCKFISH	TIGER ROCKFISH	YELLOWEYE ROCKFISH	HARBOR SEALS	BARROW'S GOLDENEYE DUCK
Chenega Bay	CHE2						1		2	2		
Chenega Bay	CHE10	3										
Iktua Bay, Evans Island											1	1
Larsen Bay	LAB15	4										
LaTouche Island											1	
Mummy Island											2	
Nanwalek	NAN1	3										
Ouzinkie	OUZ2	2	3									
Ouzinkie	OUZ3	3										
Port Graham	PTG4	3		3								
Port Graham	PTG6					7						
Port Graham	PTG12				3							
Port Lions	PTL1	3										
Ship Island											1	
Tatitlek	TAT1	3										
Tatitlek	TAT4							4				
Tatitlek	TAT9	3		3								
TOTAL:		27	3	6	3	7	1	4	2	2	5	1

Table 3: Edible flesh. Sums of concentrations of two and three ring aromatic compounds (LACs) and four-six ring aromatic compounds (HACs), ng/g (ppb) wet weight, in samples collected in June/July, 1993. Brackets indicate triplicate analyses of one sample. A dash (-) indicates the analytes were not detected.

Village:	Chenega Bay		Karluk	Larsen Bay	Nanwalek		Ouzinkie		Port Graham		Port Lions	Tatitlek		Windy Bay
Site:	CHE10	CHE25	KAR2	LAB15	NAN1	NAN2	OUZ2	OUZ3	PTG4	PTG12	PTL1	TAT1	TAT9	WNB3
Chitons										5 / 0.4				
										6 / 0.5				
										6 / 1				
Clams							3 / 0.1							
butter							9 / 2							
							5 / 2							
littleneck									8 / 6				6 / 0.4	
									8 / 6				3 / 0.3	
									5 / 3				4 / 0.4	
Mussels	[2 / 0.5	4 / 0.2	3 / -	4 / 0.4	3 / 0.5	4 / 0.5	3 / -	3 / 1	5 / 5		4 / 2	5 / 3	4 / 0.4	5 / 1
	4 / 0.3	4 / -	4 / 1	4 / 0.5	3 / 0.3	4 / 0.4	2 / -	4 / 2	[6 / 4		5 / 1	4 / 0.5	4 / 0.3	4 / 0.8
	4 / 0.2]	4 / 0.4	12 / 3	4 / 0.5	3 / 0.4	4 / -	4 / 1	5 / 2	4 / 3		4 / 1	3 / 0.5	4 / -	3 / 0.8
	3 / 0.7								4 / 3]					
	4 / 0.7								5 / 5					

Table 4-1: Edible flesh. Sums of concentrations of two and three ring aromatic compounds (LACs) and four-six ring aromatic compounds (HACs), ng/g (ppb) wet weight, in samples collected in September, 1993. Brackets indicate replicate analyses of one sample.

Village:	Chenega Bay	Iktua Bay, Evans Island	Larsen Bay	LaTouche Island	Mummy Island	Nanwalek	Ouzinkie		Port Graham		
Site:	CHE10		LAB15			NAN1	OUZ2	OUZ3	PTG4	PTG6	PTG12
Chitons										2 / 0.9	
										3 / 0.9	
										2 / 1	
Clams							3 / 1				
butter							2 / 0.9				
							3 / 1				
littleneck									5 / 9		
									3 / 3		
									4 / 3		
Harbor Seals											
blubber		2 / 2		5 / 3	2 / 5						
					2 / 6						
liver		3 / 1		3 / 1	3 / 1						
					2 / 0.7						
Mussels	3 / 2		3 / 0.9			3 / 0.9	1 / 1	2 / 2	3 / 2		
	4 / 0.9		3 / 0.9			3 / 0.7	9 / 12	[11 / 5]	4 / 3		
	4 / 1		1 / 0.7			3 / 0.9		[5 / 4]	3 / 3		
			2 / 0.7					[3 / 2]			
								[3 / 2]			

Table 4-2: Edible flesh. Sums of concentrations of two and three ring aromatic compounds (LACs) and four-six ring aromatic compounds (HACs), ng/g (ppb) wet weight, in samples collected in September, 1993. Brackets indicate triplicate analyses of one sample. A dash (-) indicates the analytes were not detected.

Village:	Port Lions	Ship Island	Tatitlek	
Site:	PTL1		TAT1	TAT9
Chitons				
Clams				
butter				
littleneck				3 / 1
				1 / 1
				3 / 0.5
Harbor Seals				
blubber		4 / 3		
liver		3 / 0.9		
Mussels	2 / 1		[2 / 1	2 / 0.8
	2 / 1		1 / 0.7]	1 / 0.6
	3 / 0.9		[4 / 1]	1 / -
			4 / 1	
			2 / 1	

Table 5: Concentrations of metabolites of fluorescent aromatic compounds (FACs, PHN for phenanthrene) and protein in bile from fish collected in June/July, 1993.

Field/Bile Sample no.	Site	Station	Species	PHN FACs ng/g bile	Protein mg/ml
93BILE0048	Chenega	CHE2	Black Rockfish	22,000	1.1
93BILE0049	Chenega	CHE2	Black Rockfish	4,800	0.90
93BILE0050	Chenega	CHE2	Black Rockfish	3,800	1.2
93BILE0047	Chenega	CHE2	Yelloweye Rockfish	6,200	1.3
93BILE0051	Chenega	CHE2	Yelloweye Rockfish	11,000	1.2
93BILE0052	Chenega	CHE2	Yelloweye Rockfish	3,300	2.3
93BILE0053	Chenega	CHE2	Yelloweye Rockfish	5,900	1.2
93BILE0054	Chenega	CHE2	Yelloweye Rockfish	8,100	1.0
93BILE0055	Chenega	CHE2	Yelloweye Rockfish	6,500	1.4
93BILE0025	Port Graham	PTG6	Black Rockfish	4,900	1.3
93BILE0026	Port Graham	PTG6	Black Rockfish	5,100	1.8
93BILE0027	Port Graham	PTG6	Black Rockfish	7,400	1.7
93BILE0028	Port Graham	PTG6	Black Rockfish	1,900	1.7
93BILE0029	Port Graham	PTG6	Black Rockfish	6,300	1.4
93BILE0030	Port Graham	PTG6	Black Rockfish	4,500	1.0
93BILE0031	Port Graham	PTG6	Black Rockfish	6,800	1.3
93BILE0032	Port Graham	PTG6	Black Rockfish	6,600	1.1

Table 6: Concentrations of metabolites of fluorescent aromatic compounds (FACs, PHN for phenanthrene) and protein in bile of fish, duck, and marine mammals collected in September, 1993.

Field/Bile Sample no.	Site	Station	Species	PHN FACs ng/g bile	Protein mg/ml
93BILE0218	Tatitlek	TAT4	Quillback Rockfish	2,500	13
93BILE0219	Tatitlek	TAT4	Quillback Rockfish	1,800	3.6
93BILE0220	Tatitlek	TAT4	Quillback Rockfish	2,900	2.0
93BILE0222	Tatitlek	TAT4	Quillback Rockfish	720	2.0
93BILE0264	Port Graham	PTG6	Black Rockfish	1,100	2.2
93BILE0265	Port Graham	PTG6	Black Rockfish	1,300	1.2
93BILE0266	Port Graham	PTG6	Black Rockfish	770	1.0
93BILE0267	Port Graham	PTG6	Black Rockfish	290	1.2
93BILE0268	Port Graham	PTG6	Black Rockfish	350	0.70
93BILE0269	Port Graham	PTG6	Black Rockfish	1,900	10
93BILE0273	Chenega	CHE2	Yelloweye Rockfish	130	1.0
93BILE0274	Chenega	CHE2	Tiger Rockfish	180	1.8
93BILE0275	Chenega	CHE2	China Rockfish	870	2.3
93BILE0277	Chenega	CHE2	Tiger Rockfish	1,100	2.1
93BILE0278	Chenega	CHE2	Yelloweye Rockfish	290	0.90
93-CHE-DUCK-1	Evan Is.		Barrow's Goldeneye	9,100	51
93-CHE-SEAL-1	Mummy Is.		Harbor Seal	1,500	10
93-CHE-SEAL-2	Mummy Is.		Harbor Seal	490	10
93-CHE-SEAL-3	LaTouche Is.		Harbor Seal	230	23
93-CHE-SEAL-4	Ship Is.		Harbor Seal	3,200	35
93-CHE-SEAL-5	Evan Is.		Harbor Seal	1,900	15

APPENDIX 7:

Report on the OSHTF Meeting and Tour of NMFS Laboratory

MEMORANDUM
STATE OF ALASKA
DEPARTMENT OF FISH AND GAME
DIVISION OF SUBSISTENCE

TO: Carl Rosier
Commissioner
Juneau

DATE: August 30, 1993

THRU: Frank Rue
Director
Division of Habitat and Restoration
Juneau

THRU: James A. Fall
Regional Program Manager
Division of Subsistence
Anchorage

FROM: Rita A. Miraglia
Oil Spill Coordinator
Division of Subsistence
Anchorage

Dean W. Hughes
Assistant Program Manager
Division of Habitat and Restoration
Anchorage

RE: Restoration Project 93017, visit to NMFS lab in Seattle, trip report

Summary: As part of the Subsistence Food Safety Testing Project (restoration project number 93017), Department of Fish and Game personnel, Rita Miraglia and Dean Hughes accompanied a group of representatives of communities impacted by the Exxon Valdez *Oil Spill to Seattle to visit the lab where tests of subsistence resources are being conducted. Bad weather on Kodiak Island prevented five of the community representatives from making the trip. In general, the visit to the lab went well. The five community representatives who did make the trip indicated that they thought the tour of the lab was a good idea. During a question and answer period with the lab staff after the tour, a number of the community representatives made comments to the effect that they were coming away with a better sense of how the tests are done. Some also said that they now had more trust that there is a sincere attempt on the part of the lab to get accurate test results.*

On August 24th and 25th 1993, representatives began travelling from their home communities to Anchorage to participate in a meeting of the Oil Spill Health Task Force (OSHTF). The OSHTF meeting took place on August 25th at the Alaska Native Medical Center, room 120, and began at 1:30 PM. A copy of the attendance sheet for that meeting is attached. Of the ten community representatives who were expected, only five managed to make it to the Anchorage meeting. The rest were delayed by bad weather on Kodiak Island. One representative did make it in from Kodiak Island, Sven Haakanson, Sr. from Old Harbor. He avoided the bad weather by coming to Anchorage a day early. The other community representatives who were present were Larry Evanoff

from Chenega Bay, Roy Totemoff from Tatitlek, Robert McMullen from Port Graham and Ephim Moonin from Nanwalek (formerly English Bay). In addition to the community representatives we had invited two Alaska Department of Fish and Game employees to attend the meeting at our expense; Evelyn Brown from Cordova, and Ted Meyers from Juneau. We also provided airfare for Bruce Wright and Jeff Short who work for the National Oceanic and Atmospheric Administration at the Auk Bay lab from Juneau to Anchorage.

A copy of the meeting agenda is attached. Rita Miraglia presented information on the collection of subsistence food samples for hydrocarbon testing. The samples are being collected under a cooperative agreement between the Alaska Department of Fish and Game, and the Pacific Rim Villages Coalition (PRVC). PRVC has subcontracted with Dames and Moore to provide a biologist to participate in all the sampling trips. In each community PRVC has hired local people to serve as field assistant/administrators. Another function of the Dames and Moore biologist is to provide training for these people. Where needed, skiff drivers have also been hired locally. The goal is to involve local people as much as possible in all stages of the project. One round of sample collection was completed in June and July of this year. Those samples have already been sent to the NMFS lab in Seattle for testing. Another round of sample collection is scheduled to take place in September.

Four of the five community representatives made statements about the situation in their communities with regard to the oil spill. Roy Totemoff brought a written statement from Gary Kompkoff, President of the Tatitlek Village Council, which he asked Rita Miraglia to read aloud. A copy of this statement is attached.

Larry Evanoff from Chenega Bay, said that he agreed with Gary Kompkoff's statement. He added that seals are scarce in his area, and that no one from Chenega Bay even tries to harvest clams from near their community, because they are afraid to. The beaches around Chenega Bay continue to ooze oil.

Ephim Moonin from Nanwalek said that a lot of people from his community still don't trust the safety of the seafood. Tar balls are still found on the shores of the lower Kenai Peninsula.

Sven Haakanson from Old Harbor said that many people in his community still don't eat clams because they are afraid to eat them. He said that last summer four people got sick from eating clams. It seemed that the issue here was paralytic shellfish poisoning (PSP), rather than the oil spill, but that people do not make that distinction. Judy Meidinger, representing Exxon at the meeting, pointed out that the Alaska Department of Environmental Conservation tests commercial beaches for PSP, but will not test subsistence beaches.

The next topic of discussion was viral hemorrhagic septicemia (VHS) in herring in Prince William Sound. Only one third of the expected number of herring returned to Prince William Sound in the spring of 1993. Many of the herring that did return had lesions. Residents of Tatitlek reported that there was very little spawning observed. Residents of Chenega Bay and Tatitlek use both the herring, and the herring ro' on kelp for food. Evelyn Brown, a biologist with the Division of Habitat and Restoration in Cordova gave a brief chronology of the problem including description of actions taken in the field. Ted Meyers, a pathologist with the Alaska Department of Fish and Game, Division of Commercial Fisheries Management and Development discussed steps taken in the lab to determine the cause of the problem. According to Meyers, VHS was the only pathogen identified in the herring. A diagnosis of VHS is consistent with the symptoms

observed in the herring. Meyers said that it is likely that VHS has always been present in the herring population, but that something has stressed the fish and weakened their resistance to the virus. One possible source of stress is exposure to crude oil spilled by the *Exxon Valdez*. Meyers emphasized that the virus is not a threat to human health, although he acknowledged that the lesions are not very appetizing. According to Meyers, fish viruses do not transmit to humans. Lab tests have shown that salmon are not easily infected with VHS, but rainbow trout are susceptible.

Instead of an overview of damage assessment findings, discussion focused on a single paper delivered at the Atlanta conference: Fingerprinting Hydrocarbons in the Biological Resources of the *Exxon Valdez* Spill Area by Bence and Burns. We were interested in this paper in particular because it purports discredit data from the studies undertaken by the OSHTF, and it received wide attention in the press. Jeff Short, from the NOAA lab in Auk Bay explained that while the paper contains a few valid points, in general, it represents a misuse of raw data collected as part of discovery for the legal cases pending against Exxon.

Several times during the course of the meeting, the community representatives were asked what could be done to "convince" them that their subsistence foods were safe to eat. Larry Evanoff of Chenega Bay said, "Get the oil off the beaches". The advice of the OSHTF has been and continues to be that shellfish from beaches where oil is observed on the surface or subsurface should not be consumed. It was also pointed out that as long as people continue to see abnormalities, such as those observed in the herring, they will be wary of consuming local wild foods. Additionally, there continues to be a scarcity of some resources.

Subsistence users in Prince William Sound, especially residents of Chenega Bay have found it necessary to travel long distances to harvest foods to replace resources which are either unavailable or deemed unsafe to eat in their pre-spill harvest areas. These trips are being paid for by individual harvesters, at a time when few jobs are available in their communities, and those who rely on commercial fishing for their income are hurting with the failure of the herring and pink salmon runs this year. At the OSHTF meeting, funding for such harvesting trips and support for an exchange of resources between communities were again identified as an urgent needs in the Prince William Sound communities. The *Exxon Valdez* Trustee Council declined to fund such activities in 1993, because it was the opinion of lawyers working for the U.S. Department of the Interior that it would constitute economic restoration, and would not be a legal use of the settlement dollars. It is estimated that $50,000 a year would suffice to fill these needs.

The meeting adjourned at 4:15 PM. Per diem checks were distributed to the community representatives at that time. There was some confusion over the arrangements for their lodging while in Anchorage. Originally, the plan was to give the community representatives a meal allowance for their time in Anchorage, and have the hotel bill the state for their lodging. This was changed at the last minute, and the representatives were given full per diem for their time in Anchorage. Unfortunately, the information sheets that were given to the representatives indicated that they would not need to pay for their hotel rooms in Anchorage. When the representatives tried to check in to their rooms and were told they had to pay for the rooms, they tried to contact Rita Miraglia at ADF&G in Anchorage sometime after 5 PM. Rita had already gone home for the evening. Carol Roten received the call, and unable to find anyone in Subsistence Division in Anchorage, called McKie Campbell in Juneau. McKie Campbell contacted Rita Miraglia at home, and she called the travel agent who made the arrangements, and Sheila Westfall, Administrative Assistant with the Division of Habitat and Restoration in Anchorage. Sheila ended up coming back in to straighten out the problems. To further

complicate things, five of the community representatives from Kodiak were still weathered in there. Since we had planned to have people sharing hotel rooms in both Anchorage and Seattle, we now had individuals staying in double rooms, which their per diem would not cover. It was necessary to have half the cost for those rooms billed to the state. Sheila wrote up a memo describing the situation, and the action she proposed to take, and McKie Campbell approved it.

We departed Anchorage at 6 AM on August 26, via a Continental Air scheduled flight. At this point we still hoped that the remaining Kodiak contingent might be able to catch up with us in Seattle. We arrived in Seattle at 10:26 AM. Our hotel sent a van to pick us up. We reached the hotel at approximately 12 noon. We checked in to our rooms, and did a little sight seeing and shopping. One of the community representatives had never been outside of Alaska before.

By the morning of the 27th it was evident that the rest of the Kodiak contingent would not be able to catch up with us in time to attend the tour of the lab; four of them spent at least one night in a hotel in Kodiak City, because they were equally unable to proceed to Anchorage or to return home.

The tour of the lab took place on August 27, 1993. The lab sent two vans to pick us up at the hotel at 7:45 AM. One of the people sent to pick us up was Tom Merculieff, originally from Saint George, Alaska, he is a technician at the lab, and has been involved in the subsistence food testing for the last two years. We arrived at the lab at approximately 8 AM. We were greeted by Dr. Usha Varanasi, director of the lab. We moved to a conference room where Dr. Varansi introduced us to her staff, and there followed brief talks on the history of the lab, bile metabolite screening, the analysis of flesh samples for the presence of hydrocarbons, fingerprinting of oil and the meaning of one part per billion. A list of the participants of this meeting is attached. This brief instructive program was followed by a question and answer period. The community representatives had quite a few questions, many of them very insightful. There was some confusion about the function of the lab, and it had to be explained that the lab does not make any determinations about the safety of foods for human consumption. That role had been undertaken in the response to the *Exxon Valdez* Oil Spill by the OSHTF, the U.S. Food and Drug Administration, and the Expert Toxicological Committee.

Next we were given a tour of the lab itself. We were not able to follow a single batch of samples through the testing process, because it takes about one week for each batch of samples to be run through all the steps. However, we did get to see actual samples go through the various steps. The lab staff did a very good job of explaining the process. Dr. Sin-Lam Chan, assistant director of the lab and Catherine Sloan lab supervisor accompanied us throughout the tour to answer any questions that came up. After the tour, we returned to the conference room for another question and answer section.

During this second meeting, a lot of very pointed questions were raised. The community representatives wanted to know where the funding for the lab came from, and whether they had ever received any money from Exxon. The answer to this last question was "no". Other questions included "Did any of your staff ever work for Exxon in the past?" (no), and "Who signs off on your expertise?" (the lab publishes its procedures in professional journals, and other scientists attempt to replicate these procedures to determine whether the procedures and results are valid).

We left the lab at approximately 12 noon, and returned to the hotel. Dean and Rita helped the community representatives fill out their travel authorization forms. The

community representatives then did some more sight seeing and shopping that afternoon.

We met in the hotel lobby at 8 AM on the 28th of August, checked out of our rooms, and boarded the van to the airport. We departed Seattle at 9:45 AM via a Morris air scheduled flight. Our arrival was delayed by heavy winds in the Anchorage area, we landed at roughly 1 PM. The community representatives caught their connecting flights home.

cc: McKie Campbell
Robert Bosworth
Jerome Montague
Joe Sullivan
Una Swain
Jody Seitz
Ron Stanek
Craig Mishler
Lisa Tomrdle

Sign in

Oil Spill Meeting
5/25/93

Name	Representing
Tom Mylswander	IHS
LARRY EVANOFF	CHENEGA BAY
Bruce Wright	NOAA
Jeff Short	NOAA
Robert McMullen	Port Graham
JODY SEITZ	ADF&G
Evelyn Brown	ADF&G
Sven Haakanson Sr	OLD HARBOR
Tasha Chmielewski →	Chugachmiut/Chugach Regional Resources Commission.
Ray Totemoff	Tatitlek
Ephim Moonin	Nanwalek
RITA MIRAGLIA	SUBSISTENCE DN, ADF&G
STEVE WIENER	IHS
MONTE TAYLOR	EXXON CONSULTANT
Judy Meidinger	Exxon consultant
CHRIS SWENSON	ADF&G
Una Swain	ADF&G
Ted Meyers	ADF&G

STATE OF ALASKA

WALTER J. HICKEL, GOVERNOR

DEPARTMENT OF FISH AND GAME

333 RASPBERRY ROAD
ANCHORAGE, ALASKA 99518-1599
PHONE: (907) 344-0541

August 16, 1993

Members of the Oil Spill Health Task Force:

This is to let you know that the Oil Spill Health Task Force will hold a meeting on Wednesday, August 25, 1993.

Agenda Items include:

1. Report on June/July sample collections

2. Updates from community representatives

3. Discussion of human health concerns arising from viral hemorrhagic septicemia in herring in Prince William Sound

4. Discussion of damage assesment papers presented in Anchorage and Atlanta

The meeting will begin at 1:30 p.m. in the Alaska Native Medical Center, room 120.

If you have any questions about the meeting, feel free to contact me at (907) 267-2358.

Sincerely,

Rita A. Miraglia
Oil Spill Coordinator
Division of Subsistence

TATITLEK VILLAGE IRA COUNCIL
P.O. Box 171
Tatitlek, AK 99677

Ph. (907) 325-2311
FAX (907) 325-2298

August 24, 1993

EXXON VALDEZ OIL SPILL HEALTH TASK FORCE

The impacts of the Exxon Valdez Oil Spill on subsistence and other resources in Prince William Sound continue to become more prominent with each passing season. Subsistence resources that were available for generations are no longer available to us. Commercial harvests of salmon and herring, which are staple subsistence resources, are also very important to the economies of each of the communities in Prince William Sound. The harvests of these resources have declined dramatically since 1989. Recent protests by the commercial fishing fleet against the oil industry in Valdez show the degree of concern that residents of Prince William Sound have about the impacts of the oil spill on the resources that provide their livlihoods. The Native Community, as a whole, has been trying to relate the severity of the problem to the various organizations and agencies in the State, with no apparent success. While scientific studies have shown that at least seventy-five percent (75%) of the oil spilled by the Exxon Valdez has remained in Prince William Sound, the Exxon Valdez Oil Spill Trustee Council has refused to recognize this fact. It is very disturbing to a resident of Prince William Sound to learn that millions and millions of "restoration" dollars have been spent on projects such as timber purchases and sea life centers when the real restoration of the oil spill impacted areas remains ignored.

Residents of the Native Village of Tatitlek were concerned with the safety of consuming <u>any</u> of the subsistence resources in 1989; it has been more than four years since the oil was spilled and the residents are still concerned and their concerns are growing with each failed commercial or subsistence fishing season. Prior to the oil spill, our people never had to worry about their resources, for generations we have been able to harvest whatever we wanted without worrying about the safety of consuming anything. The total failures of the herring

and salmon seasons this year have made residents of Prince William Sound wonder what the true impact of the oil spill has been on the Sound. The herring are an integral part of the food chain, almost all of the subsistence resources that we rely on depend largely on herring for their sustenence. When the herring returned to the Sound with sores and lesions on them, we became extremely concerned about the safety of harvesting any and contacted the Alaska Department of Fish & Game and the Department of Environmental Conservation about their condition; we were told that while both agencies were not sure what was affecting the herring, they were safe for human consumption. This made absolutely no sense at all to us. Suppose there were meats in the American Super Markets that had sores and lesions on them, do you think that either agency would have told the consumers that the meats were safe, even before they had determined what was affecting the meats? We very seriously doubt that. Why is this so?

A very pretty picture has been painted of Prince William Sound by people and organizations that really want you to believe that the Sound has returned to it's pre-oil spill condition. IT IS NOT SO, the Sound was very seriously injured by the eleven million gallons on crude oil that was dumped into it and it is going to take many, many years for it to heal itself, which it apparently is going to have to do, because we are learning that the restoration that should have been funded with settlement monies just isn't happening. And it will not happen until the individuals who are in a position to help the Sound recover (EVOS Trustee Council) recognize the fact that the Sound was seriously injured and at least make an attempt to provide for some "restoration".

Thank you.

Attendance at Meeting at
Environmental Conservation Division
National Marine Fisheries Service Laboratory
Seattle, Washington
8-27-93

Rita Miraglia	Alaska Department of Fish & Game
Usha Varanasi, Ph.D.	Environmental Conservation Division National Marine Fisheries Service, NOAA Seattle, WA 98112
Sin-Lam Chan, Ph.D.	Environmental Conservation Division National Marine Fisheries Service, NOAA Seattle, WA 98112
Karen Tilbury, Chemist	Environmental Conservation Division National Marine Fisheries Service, NOAA Seattle, WA 98112
Tom Hom, Research Chemist	Environmental Conservation Division National Marine Fisheries Service, NOAA Seattle, WA 98112
Roy Totemoff	Village of Tatitlek
Larry Evanoff	Chenega Bay, AK
Catherine Sloan	Environmental Conservation Division National Marine Fisheries Service, NOAA Seattle, WA 98112
Sven Haakanson, Sr.	Box 35, Old Harbor, AK 99643
Ephim H. Moonin	Nanwalek, AK
Jennie Bolton, Chemist	Environmental Conservation Division Environmental Chemistry National Marine Fisheries Service, NOAA Seattle, WA 98112
Doug Burrows	Environmental Conservation Division Environmental Chemistry National Marine Fisheries Service, NOAA Seattle, WA 98112
Don Brown	Environmental Conservation Division Environmental Chemistry National Marine Fisheries Service, NOAA Seattle, WA 98112
Robert McMullen	Port Graham, AK
Dean Hughes	Alaska Department Fish and Game

APPENDIX 8:

Informational Flyer and Newsletters

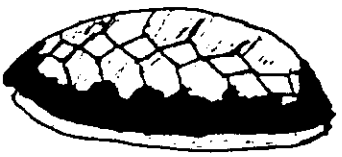
EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL FUNDS SUBSISTENCE RESTORATION PROJECT

The Alaska Department of Fish and Game, Division of Subsistence, working in cooperation with the U.S. Bureau of Indian Affairs, and the National Oceanic and Atmospheric Administration has received funds from the *Exxon Valdez* Oil Spill Trustee Council to continue its efforts to document and attempt to restore the subsistence uses of fish and wildlife damaged by the *Exxon Valdez* oil spill.

Staff of the Division of Subsistence will be visiting the communities of Chenega Bay, Tatitlek, Cordova, Valdez, Port Graham, Nanwalek, Ouzinkie, Larsen Bay, Kodiak City, Chignik Lake, Chignik, Chignik Bay, Chignik Lagoon, Perryville and Ivanof Bay in the next few months to talk to community residents about any remaining concerns that exist regarding the safety of subsistence foods in areas impacted by the *Exxon Valdez* oil spill. Where needed, community meetings will be held to map the specific harvest areas and resources of continued concern to subsistence users.

In community meetings, newsletters, and a video, the Oil Spill Health Task Force has informed people that all the fish, deer, ducks, seals and sea lions tested as part of the subsistence program were found to be safe to eat, but that people should not use clams and other shellfish from beaches where they could see oil on the surface or subsurface. In the subsistence study, about 1,000 samples of fish and shellfish, 28 samples of deer, 19 samples of ducks, and 144 samples of marine mammals were tested. Levels of hydrocarbons in the edible flesh were very low, or non-detectable, even with very sensitive equipment. This is because fish, birds, marine mammals, and land mammals are all able to get rid of limited amounts of contamination in their bile. While this process may cause added stress and potential harm to the organism, it prevents the hydrocarbons from building up and contaminating the meat. Some seals in the subsistence study did show elevated levels of hydrocarbons in their blubber, but these samples came from seals that were heavily coated with oil. Even these levels were below those that were considered to be a health risk by the federal Food and Drug Administration and the Oil Spill Health Task Force.

However, some of the invertebrates tested, including clams and mussels, were different, because they do not have the ability to get rid of hydrocarbons quickly. They accumulate these toxins and retain them for a long period of time. Therefore the Oil Spill Health Task Force has advised people not to harvest shellfish from those beaches where oil is still present. The task force has also advised that if something smells bad or tastes bad, it should not be eaten.



The Division of Subsistence has some limited funds available for additional collection and testing of subsistence food samples, where a significant concern exists. In these areas of special concern, two rounds of sample collection will be conducted, in June and September 1993. The samples will be tested at the Northwest Fisheries Center Laboratory in Seattle. Community representatives will be brought to Seattle to tour the lab, and see how the tests are done. The test results will be interpreted by the Oil Spill Health Task Force, and reported to the communities in a Subsistence Division newsletter.

If you want additional information about the upcoming restoration project, or the previous study conducted by the Division of Subsistence and the Oil Spill Health Task Force, contact Rita Miraglia at (907) 267-2358.

April 1993

Alaska Department of Fish and Game, Division of Subsistence
333 Raspberry Road, Anchorage, Alaska 99518

Subsistence Restoration Project

November 1993 Report

1993 Subsistence Food Testing Project

The Alaska Department of Fish and Game, Division of Subsistence, working with the National Oceanic and Atmospheric Administration, and the U.S. Bureau of Indian Affairs, has received funds from the *Exxon Valdez* Oil Spill Trustees Council to continue its efforts to restore the subsistence uses of fish and wildlife damaged by the *Exxon Valdez* oil spill.

Since 1990, the Oil Spill Health Task Force has advised that all the fish, deer, ducks, seals and sea lions tested as part of the subsistence program were found to be safe to eat, but people should not use shellfish from beaches where oil is still present. Between 1989 and 1991, about 1,000 samples of fish and shellfish, 28 samples of deer, 19 samples of ducks, and 144 samples of marine mammals were tested. With the exception of shellfish and the blubber of heavily oiled seals, levels of hydrocarbons in the edible flesh were very low, many non-detectable. This is because fish, birds, marine mammals, and land mammals are all able to rid themselves of limited amounts of contamination in their bile. While this process may cause added stress and potential harm to the organism, it prevents the hydrocarbons from building up and contaminating the meat. However, shellfish are different, because they do not have the ability to get rid of hydrocarbons quickly. They accumulate these toxins and retain them for a long period of time.

To find out if there were remaining concerns regarding the safety of subsistence foods in areas impacted by the spill, staff of the Division of Subsistence contacted community leaders in Seward, Ouzinkie, Larsen Bay, Port Lions, Akhiok, Old Harbor, Karluk, Chignik Lake, Chignik Bay, Chignik Lagoon, Perryville and Ivanof Bay and community meetings were held in Chenega Bay, Tatitlek, Port Graham, and Nanwalek.

As a result of the community meetings and discussions, it was decided to test subsistence food samples from the use areas of Chenega Bay, Tatitlek, Port Graham, Nanwalek, Ouzinkie, Larsen Bay, Akhiok, Karluk, and Port Lions. The collection of samples was coordinated by the Pacific Rim Villages Coalition, which is a joint undertaking by the village corporations of Chenega Bay, Tatitlek, Port Graham and Nanwalek and the Chugach Alaska Corporation, and is endorsed by the village councils of the Chugach region. The Pacific Rim Villages Coalition hired a biologist, Dave Erikson, to train local assistants in the collection process.

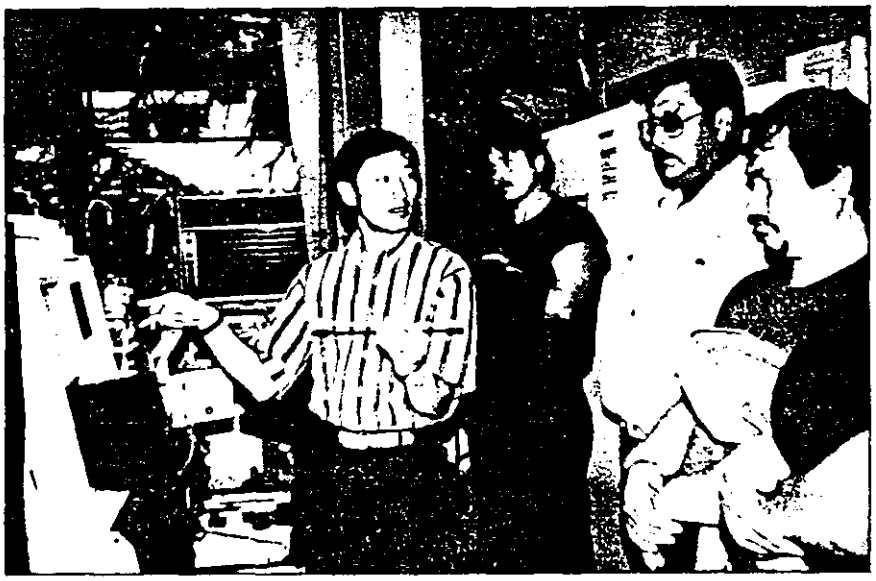
Dr. Catherine Sloan points out samples of subsistence foods waiting to be tested to Larry Evanoff, Robert McMullen, Rita Miraglia, Roy Totemoff and Ephim Moonin.

One round of sample collection was completed in June and July of this year. Those samples have been tested at the NMFS lab in Seattle. According to Dr. Usha Varanasi, Director of the Environmental Division of the Northwest Fisheries Center, "The concentrations of aromatic compounds in all 51 samples of shellfish collected at Chenega Bay, Karluk, Larsen Bay, Ouzinkie, Port Graham, Port Lions, Tatitlek, and Windy Bay during the summer of 1993 were very low, similar to values generally found in samples for reference areas."

The reference samples were collected in areas not oiled by the spill, near Angoon and Yakutat. The very low levels of hydrocarbons found in these samples are considered to be the levels likely to have been present in fish and shellfish in the spill area before the spill.

Samples were also taken of rockfish from the harvest areas of Chenega Bay, Port Graham and Nanwalek. The bile from these fish was analyzed for metabolites of oil at the NMFS lab. According to Dr. Sin-Lam Chan, Deputy Director of the Environmental Conservation Division, "The concentrates of biliary metabolites of aromatic compounds were quite low, which indicates minimal exposure to petroleum-related aromatic compounds." We know from past studies that fish with such low levels of hydrocarbon metabolites in their bile have very little, if any contamination in their edible flesh.

continued on page three



Tom Hom explains bile metabolite screening to Robert McMullen, Larry Evanoff and Ephim Moonin.

Community Representatives Tour NMFS Lab

As part of the subsistence restoration project, representatives of communities impacted by the *Exxon Valdez* oil spill visited the NMFS lab in Seattle, where the samples of subsistence foods are tested for hydrocarbon contamination. Of the ten community representatives invited, five were prevented from going by bad weather on Kodiak Island. Sven Haakanson, Sr. from Old Harbor, avoided the bad weather by coming to Anchorage a day earlier. Larry Evanoff from Chenega Bay, Roy Totemoff from Tatitlek, Robert McMullen from Port Graham, and Ephim Moonin from Nanwalek participated in the tour, along with Alaska Department of Fish and Game employees, Rita Miraglia and Dean Hughes.

The tour took place on August 27. One of the people sent by the lab to pick the group up at their hotel in Seattle was Tom Merculief, an Aleut originally from Saint George, Alaska. Tom is a technician at the NMFS lab, and has been involved in the subsistence food testing for the last two years.

At the lab, the group was greeted by Dr. Usha Varanasi, Director of the Environmental Conservation Division. Dr. Varanasi introduced her staff, and gave a brief presentation on the history of the lab. The lab has played a key role in marine environmental quality research and monitoring on a nation-wide scale.

Dr. Sin-Lam Chan, Deputy Director of the Environmental Conservation Division had explained that while the lab does the tests on the samples, the lab does not make any determinations about the safety of foods for human consumption. That role has been undertaken in the response to the *Exxon Valdez* oil spill by the U.S. Food and Drug Administration, the Oil Spill Health Task Force, and the Expert Toxicological Committee. Dr. Chan also talked about the analysis of flesh samples for the presence of hydrocarbons, and the "fingerprinting" of oil, which is a method that can be used to determine where the oil came from.

Sven Haakanson said, "I'm glad to know we can fingerprint oil. Now I can tell people to collect oil if you see it and we can tell where it's from." Robert McMullen asked whether oil can be fingerprinted even after it's in the bile. According to research chemist Doug Burrows, "You could not prove the source of the oil from the bile, but you could get some clues."

Tom Hom, a research chemist at the lab, gave an explanation of bile metabolite screening, which is an inexpensive way of finding out whether an animal has recently been exposed to oil.

When Robert McMullen asked whether the ingestion of oil would lead to mutations, Hom replied that the oil would be excreted before anything like that would happen. Dr. Chan added that the lab does look at lesions, but they have not found any mutations resulting from the exposure to oil.

Next the community representatives were given a tour by Catherine Sloan, who supervises the lab. They were not able to follow a single sample through the whole testing process, because it takes about one week for each sample to be tested. However, they did get to see different samples going through all the different steps (see "How the Tests Are Done" on page 3).

After the tour, Larry Evanoff asked, "Who signs off on the lab's expertise?" Don Brown, a research chemist, said "Other labs test our methods, and must be able to reproduce our results."

Sven Haakanson asked, "Do you get any money from Exxon?" Dr. Chan replied, "No, our funding comes from NOAA, some from state budgets, and other federal dollars." Robert McMullen asked "Has any of your staff worked for Exxon in the past?" The answer provided by Don Brown was "No."

The group returned to Anchorage the next day, and the representatives continued on their way back to their home communities. It is hoped that the community representatives came away with a better sense of how the tests are done, and that they can relay this understanding to others in their communities.

Tom Merculief and Daryle Boyd prepare to grind subsistence food samples for testing as Robert McMullen (left) and Roy Totemoff (right) look on.

continued from front page

The following test results are given in parts per billion, light aromatics/heavy aromatics.

PRINCE WILLIAM SOUND

Chenega Bay: Pete and Richard Kompkoff assisted in the collection of samples in June 1993. Three samples of mussels from Fox Farm, east of North Twin Bay on Elrington Island tested at 4/0.7 parts per billion or less. By comparison mussels collected at this same location in April 1990 tested as high as 1100/720 parts per billion. Three samples of mussels from Delenia Island, northwest of Chenega Island tested at 4/0.4 parts per billion or less. A brownish substance which looked like oil mousse was noted on the site, but it had no sheen or oily smell.

Also in June 1993, samples were taken from four black rockfish and six yelloweye rockfish caught in east Sawmill Bay, southeast of Johnson Cove on Evans Island. All the bile samples showed very low levels of petroleum metabolites, so low that there is no cause for concern about the safety of eating these fish.

Tatitlek: Jerry Totemoff assisted in the collection of three samples of littleneck clams from the southeast side of Reef Island which tested 6/0.4 parts per billion or less, three samples of mussels from the same site which tested 4/0.4 parts per billion or less, and three samples of mussels from North Bligh Island tested at 5/0.5 parts per billion or less, in July of 1993. In comparison, mussels collected from North Bligh Island in April 1990 tested at 10/0.8 parts per billion or less.

LOWER KENAI PENINSULA

Port Graham: Pat Norman assisted in the collection of three samples of chitons from the north shore of Port Graham which tested at 6/1 parts per billion or less, three samples of littleneck clams from Duncan Slough which tested at 8/6 parts per billion or less, and three samples of mussels from the same site which tested at 6/5 parts per billion or less, in June of 1993. For comparison, mussels taken from Duncan Slough in August 1989 tested 5/12 parts per billion or less, and littleneck clams collected there in March 1990 tested at 1/19 parts per billion or less.

Also in June 1993, samples were taken from seven black rockfish caught in an open water area between Dangerous Cape and Point Pogibshi, north of Point Graham. Bobby Kvansnikoff and Ephim Moonin from Nanwalek assisted in collecting the samples. All the bile samples showed very low levels of petroleum metabolites, so low that there is no cause for concern about the safety of eating these fish.

Nanwalek: Bobby Kvansnikoff and Ephim Moonin assisted in the collection of three samples of mussels at Russian Point, just north of Nanwalek which tested at 3/0.5 parts per billion or less, in June 1993.

Windy Bay and Anderson Beach: Pat Norman and Emilie Swenning participated in the collection of samples from Windy Bay and Anderson Beach in July 1993. The collection crew noted that there was still tar present in the upper intertidal area at WNB3, the easternmost of three small islands in Windy Bay when they collected three samples of mussels there which tested 5/1 parts per billion or less. By comparison, mussels collected in March of 1990 at WNB3 tested as high as 4500/870 parts per billion.

Three samples of mussels collected from Anderson Beach in July 1993 tested at 5/2 parts per billion or less.

continued on back page

How the Tests are Done

Once the samples reach the lab, they are unwrapped. In the case of shellfish, the shells are removed. For the fish samples, the parts of the sample that had been in contact with the aluminum foil wrapping are cut off. Next, the sample is ground into a paste. If the sample consists of several animals, they are blended together at this time. Once the sample is blended, five grams are measured out. This five gram sample is mixed with solvents, which help separate out any hydrocarbons in the sample. Other chemicals, called "internal standards" are also added at this time. "Internal standards" are chemicals with known properties, which are used later to judge how well the test worked. Next, several steps are taken to concentrate any hydrocarbons that are present and to filter out the material we are not interested in measuring. The mixture is put through a glass column containing silica/alumina. Different compounds go through the silica/alumina at different rates. The chemists know how long it takes hydrocarbons to flow through, so anything that comes out after the hydrocarbons is discarded. Only the hydrocarbons, and other materials that flow through at a similar rate, are retained. The extract obtained after this first filtering is concentrated by heating it, which allows the solvent to evaporate. The hydrocarbons are then further isolated by putting the extract through a process called high performance liquid chromatography. In high performance liquid chromatography, high pressure pumps are used to force the extract through a stainless steel column packed with silica microspheres (a specially prepared, very fine sand). As in the silica/alumina filtering, the hydrocarbons are separated out from other compounds which go through the silica at either a faster or slower rate. Gas chromatography is used to further separate out the different hydrocarbons. In gas chromatography, the extract is injected into a very fine coiled glass tube; the tube is about the width of a human hair. The mixture is then gradually heated until all the molecules present have reached their vapor point (the temperature at which something turns from a liquid to a gas). Different compounds have different vapor points. As each separated component vaporizes, it comes off of the column and enters the mass specrometer. The next step is to identify and measure the amount of each kind of hydrocarbon present. Mass specroscopy is used to measure the weight of a molecule. Each kind of molecule has a unique weight, so the weight can be used to identify it. As each component enters the mass specrometer, it is bombarded by a stream of high-energy electrons. This breaks up the molecules in the sample. The fragments then pass through a strong magnetic field, where they are deflected through stainless steel rods which sort them by their molecular weight. A detector then records the abundance of the fragments as they exit between the rods. The detector is hooked up to a computer, which presents the information collected in the form of a graph, with a peak representing each hyrocarbon detected. The height of the peak represents the amount of that hydrocarbon present in the sample. This graph is sometimes referred to as the "fingerprint" of the oil, because oil from a given source will produce a graph characteristic of oil from that source. The lab then interprets these graphs, or "fingerprints" to determine the amount and the kinds of hydrocarbons present in the sample.

Dr. Sin-Lam Chan (right) listens to a question from Sven Haakanson.

continued from previous page

KODIAK ISLAND

Karluk: Three samples of mussels were collected from the intertidal area at the mouth of Sturgeon River, with the assistance of John Reft in July 1993. These samples tested at 12/3 parts per billion or less. These levels are similar to the low levels found at this site in May 1990.

Larsen Bay: In July 1993, Roy Jones assisted in the collection of three samples of mussels at Chiefs Point on the northeast side of the entrance to Spiridon and Uyak Bay which tested at 4/0.5 parts per billion or less.

Ouzinkie: Andy Christofferson assisted in the collection of three samples of butterclams from Camel Rock at Low Island Anchorage which tested at 9/2 parts per billion or less, three samples of mussels from the same site which tested at 4/1 parts per billion or less, and three mussel samples from the south end of Sourdough Flats on Ouzinkie Point tested at 5/2 parts per billion or less, in July 1993. These very low levels are similar to those seen in samples collected from these same sites in 1989 and 1990.

Port Lions: Susan Voskofsky assisted in the collection of three samples of mussels from an island just east of the airstrip at Port Lions which tested at 5/2 parts per billion or less in July 1993. For comparison, mussels collected at this same site in May 1990, tested at 45/14 parts per billion or less.

Akhiok: Dave Erikson and Edwin Anderson attempted to go to Tanner Head to collect samples of shellfish in July and in September, but were unable to get there due to bad weather on both occasions. We will continue to try to sample this site in future rounds of sample collection.

The Alaska Department of Fish and Game, Division of Subsistence has received funds from the *Exxon Valdez* Oil Spill Trustee Council for a subsistence restoration project. Requests for more information on the project or comments and inquiries about information in this newsletter should be directed to the Division of Subsistence, Alaska Department of Fish and Game, ATTN: Rita Miraglia, 333 Raspberry Road, Anchorage, Alaska 99518. Phone (907) 267-2358.

Division of Subsistence
Department of Fish and Game
333 Raspberry Road
Anchorage, Alaska 99518

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Subsistence Restoration Project

February 1994 Report

John M. Totemoff and Eddie Levshakoff haul a seal aboard the *"Shaker"* in Prince William Sound.

Oil Contamination in Prince William Sound Seals Down Dramatically from 1989 Levels

Many harbor seals in Prince William Sound were covered with oil as a result of the 1989 *Exxon Valdez* oil spill. In 1989, some of the very heavily oiled seals showed elevated levels of low molecular weight hydrocarbons in their blubber, but not in other tissues in their bodies. According to Kathy Frost, a biologist with the Alaska Department of Fish and Game, who helped collect the 1989 and 1990 samples, this is because oil-based contaminants are attracted to fat, so blubber collects more of these contaminants than the muscle or organs. Exposure of people to very high levels of low molecular weight hydrocarbons, many times higher than those found in the seal blubber in 1989, is associated with short term effects such as light-headedness and nausea. In 1990, seals from some of the same areas showed much lower levels of the low molecular weight hydrocarbons, and slightly higher levels of the high molecular weight hydrocarbons. This is because low molecular weight hydrocarbons evaporate and dissolve relatively quickly, leaving behind the higher weight hydrocarbons as the oil weathers. The seals that were sampled in 1990 had been exposed to more weathered oil than in 1989.

Vicki Vanek, a technician with the Division of Subsistence, accompanied Chenega Bay hunters John M. Totemoff and Eddie Levshakoff on subsistence seal hunts in September 1993. Samples were taken of the blubber, liver and bile of five harbor seals. The samples were tested for hydrocarbon contamination at the Northwest Fisheries Center, National Marine Fisheries lab in Seattle. The results of these tests are shown in the accompanying table, along with test results for seal samples taken in Prince William Sound in 1989 and 1990. We knew from the earlier tests that even in those seals that were heavily oiled, the contamination did not show up in the muscle of the animals. For this reason, we did not test the muscle tissue of the seals sampled in 1993, but rather tested the blubber, where the contamination had concentrated in the heavily oiled seals. As you can see from the table, the blubber in all the seals

continued on page two

Test Results on Samples of Fish and Shellfish Collected in September 1993 Reported by NMFS Lab

A second round of subsistence food sample collection and testing has been completed as part of the 1993 Subsistence Restoration Project funded by the *Exxon Valdez* Oil Spill Trustee Council. A first round sample collection and testing was conducted in June and July 1993, and the results were reported in a previous newsletter.

As in the earlier round of sample collection, the work was coordinated by the Pacific Rim Villages Coalition, which is a joint undertaking by the village corporations of Chenega Bay, Tatitlek, Port Graham and Nanwalek and the Chugach Alaska Corporation, and is endorsed by the village councils of the Chugach region. The Pacific Rim Villages Coalition hired a biologist, Dave Erikson, to train local assistants in the collection process.

Samples of shellfish were taken from the subsistence use areas of Chenega Bay, Tatitlek, Port Graham, Nanwalek, Larsen Bay, Ouzinkie and Port Lions. Bad weather prevented the collection of samples from the subsistence use areas of Karluk and Akhiok, and also prevented sampling crews from getting to Windy Bay on the Kenai Peninsula and Delenia Island, near Chenega Island. The samples were tested at the NMFS lab in Seattle. According to Dr. Usha Varansi, director of the lab, "The concentrations of aromatic contaminants in these mollusc samples were very low and did not differ substantially from those found in samples from reference areas." The reference areas Dr. Varanasi refers to are subsistence use areas near Angoon and Yakutat, which were not oiled, where samples of subsistence foods were

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Year	Location	Date	Oiling	Muscle	Liver	Blubber
1989	Herring Bay	6/18/89	Very heavy	0.7/0.5	Not tested	170/7
	Herring Bay	6/18/89	Very heavy	ND	ND	150/1
	Herring Bay	6/18/89	Very heavy	ND	ND	98/8
	Bay of Isles	6/16/89	Very heavy	4/ND	ND	77/2
	Bay of Isles	6/16/89	Very heavy	ND	ND/0.4	85/1
	Bay of Isles	6/17/89	Very heavy	5/ND	2/ND	520/4
	Seal Island	6/16/89	Heavy	4/ND	ND	21/2
	Seal Island	6/16/89	Heavy	10/0.6	ND	26/ND
	Applegate Rocks	6/17/89	Light	ND	ND	19/1
	Big Fort Island	10/26/89	No sign	ND/0.4	ND	21/2
	Agnes Island	11/1/89	No sign	ND/0.4	ND	21/3
1990	Herring Bay	4/11/90	No sign	ND	ND	19/2
	Herring Bay	4/12/90	No sign	ND	ND	19/2
	Herring Bay	4/12/90	No sign	ND/0.3	15/ND	26/7
	Herring Bay	4/13/90	No sign	ND/2	ND	51/39
	Bay of Isles	4/13/90	No sign	ND/0.8	ND	86/15
	NE Elenore Island	4/12/90	No sign	ND	ND	28/2
	NE Elenore Island	4/12/90	No sign	6/1	ND	20/4
1993	Iktua Bay, Evans Island	9/21/93	No sign	Not tested	3/1	2/2
	LaTouche Island	9/18/93	No sign	Not tested	3/1	5/3
	Mummy Island	9/17/93	No sign	Not tested	2/5	3/1
	Mummy Island	9/17/93	No sign	Not tested	2/6	2/0.7
	Ship Island	9/21/93	No sign	Not tested	3/0.9	4/3

Test results on harbor seals from Prince William Sound. Test results are reported in parts per billion, light aromatics/heavy aromatics.

continued from front page

sampled in 1993 tested at 5/3 parts per billion or less. Compare this with the elevated levels shown in 1989 for the heavily oiled seals, which ranged up to 520/8 parts per billion, and the blubber of the 1990 seals of up to 86/39 parts per billion.

According to Dr. Usha Varanasi, director of the lab where the tests were done, "The concentrations of aromatic compounds in these harbor seal samples were very low and did not differ substantially from the method blanks." Method blanks are run through all the same steps as the samples, and are tested, but they do not contain any actual sample. In this way, the lab can tell how much the samples are being affected by the unavoidable trace contamination from the air and surfaces in the lab. The level of hydrocarbons found in the blubber samples from the seals was as low as the levels found in the method blanks, which is to say very low, or "background" levels, so low as not to be a concern for people eating meat or using blubber from these seals.

Oil Spill Health Task Force Meets to Discuss Continued Community Concerns

The Oil Spill Health Task Force held a meeting at the Alaska Native Medical Center, in Anchorage, on August 25th, 1993. Representatives from communities impacted by the *Exxon Valdez* oil spill were invited to attend, along with representatives of the Indian Health Service, Chugachmiut, the Alaska Department of Fish and Game, the National Oceanic and Atmospheric Administration, and Exxon.

Roy Totemoff presented a written statement from Gary Kompkoff, President of the Tatitlek Village Council, which stated in part: "Residents of the Native Village of Tatitlek were concerned with the safety of consuming any of the subsistence resources in 1989; it has been more than four years since the oil was spilled and the residents are still concerned and their concerns are growing with each failed commercial or subsistence fishing season."

Larry Evanoff from Chenega Bay agreed with Gary Kompkoff's statement, and added that seals are scarce in his area. He said "The beaches around Chenega Bay continue to ooze oil, and no one even tries to harvest clams from near their community, because they are afraid to."

Ephim Moonin from Nanwalek said that a lot of people from his community still don't trust the safety of the seafood, and tar balls are still found on the shores of the lower Kenai Peninsula.

Sven Haakanson from Old Harbor said that many people in his community still don't eat clams because they are afraid, and last summer four people got sick from eating clams. It seemed that the issue here was paralytic shellfish poisoning (PSP), rather than the oil spill, but that people do not make that distinction.

The group also discussed concerns about herring in Prince William Sound. Only one third of the expected number of herring returned to Prince William Sound in the spring of 1993. Many of the herring that did return had lesions. Residents of Tatitlek reported that there was very little spawning observed. Residents of Chenega Bay and Tatitlek use both the herring, and the herring spawn on kelp, for food. According to Ted Meyers, a pathologist with the Alaska Department of Fish and Game, the only pathogen identified in the herring was viral hemorrhagic septicemia virus (VHS), which is consistent with the symptoms observed in the herring. Meyers said that it is likely that the VHS virus has always been present in the herring population, but that something has stressed the fish and weakened their resistance to the virus. Meyers emphasized that the virus is not a threat to human health, although he acknowledged that the lesions are not very appetizing. According to Meyers, fish viruses do not pass to humans, even if a person eats a fish infected with the virus. Lab tests have shown that salmon are not easily infected with the VHS virus, but rainbow trout are susceptible.

The community representatives were asked what could be done to convince them that their subsistence foods were safe to eat. Larry Evanoff of Chenega Bay said, "Get the oil off the beaches." The advice of the OSHTF has been and continues to be that shellfish from beaches where oil is observed on the surface or subsurface should not be consumed. It was also pointed out that as long as people continue to see abnormalities, such as those observed in herring, they will be wary of consuming local wild foods. Additionally, there continues to be a scarcity of some resources.

Subsistence users in Prince William Sound, especially residents of Chenega Bay, have found it necessary to travel long distances to harvest foods to replace resources which are either unavailable or deemed unsafe to eat in their pre-spill harvest areas. These trips are being paid for by individual harvesters, at a time when few jobs are available in their communities, and those who rely on commercial fishing for their income are hurting with the failure of the herring and pink salmon runs in 1993. At the OSHTF meeting, funding for such harvesting trips and support for an exchange of resources between communities were again identified as urgent needs in the Prince William Sound communities.

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taken in 1989 and 1990. The very low levels of hydrocarbons found in these reference samples are considered to be the levels likely to have been present in fish and shellfish in the spill area before the spill.

Samples were also taken of rockfish from the harvest areas of Chenega Bay, Tatitlek, and Port Graham. The bile from these fish was analyzed for metabolites of oil at the NMFS lab. According to Dr. Sin Lam Chan, Deputy Director of the lab, "The concentrations of metabolites of flourescent aromatic compounds in the bile samples from the fifteen fish collected in September 1993 subsistence sampling were low to moderate, indicating minimal exposure to petroleum-related aromatic compounds." We know from past studies that fish with such low levels of hydrocarbon metabolites in their bile have very little, if any, contamination in their edible flesh.

The following test results are given in parts per billion, light aromatics/heavy aromatics.

PRINCE WILLIAM SOUND

Chenaga Bay: John M. Totemoff assisted in the collection of shellfish samples from Fox Farm, east of North Twin Bay on Elrington Island in September 1993. Three samples of mussels from this location tested at 4/1 parts per billion or less; by comparison mussels collected at this same location in April 1990 tested as high as 1100/720 parts per billion.

Also in September 1993, Sean Wilson and Clint Gregorieff assisted Dames and Moore biologist Steve Shaner in the collection of rockfish samples. Samples were taken from two tiger rockfish, two yelloweye rockfish, and one china rockfish caught in east Sawmill Bay, southeast of Johnson Cove on Evans Island. All the bile samples showed very low levels of petroleum metabolites, so low that there is no cause for concern about the safety of eating these fish.

Tatitlek: Steve Totemoff, Jr. assisted in the collection of samples from the Tatitlek area, including three samples of littleneck clams from the southeast side of Reef Island which tested at 3/1 parts per billion, three samples of mussels from the same site which tested at 2/0.8 parts per billion or less, and three samples of mussels from North Bligh Island which tested at 4/1 parts per billion or less, in September 1993. In comparison, mussels collected from North Bligh Island in April 1990 tested at 10/.08 parts per billion or less.

Also in September 1993, samples were taken of four quillback rockfish caught near Bidarki Point. All the bile samples showed very low levels of petroleum metabolites, so low that there is no cause for concern about the safety of eating these fish.

LOWER KENAI PENINSULA

Port Graham: Neil Hedrick, Cliff McGhan and Bob Hinebaugh assisted in the collection of three samples of chitons from the north shore of Port Graham which tested at 3/1 parts per billion or less, three samples of littleneck clams from Duncan Slough which tested at 5/9 parts per billion or less, and three samples of mussels from the same site which tested at 4/3 parts per billion or less, in September 1993. For comparison, mussels taken from Duncan Slough in August 1989 tested at 5/12 parts per billion or less, and littleneck clams collected there in March 1990 tested at 1/19 parts per billion. Also in September 1993, samples were taken from six black rockfish caught in an open water area between Dangerous Cape and Point Pogibshi, north of Point Graham. Dimitri Tanape from Nanwalek assisted in collecting the samples. All the bile samples showed very low levels of petroleum metabolites, so low that there is no cause for concern about the safety of eating these fish.

Nanwalek: Neil Hedrick from Port Graham assisted in the collection of three samples of mussels at Russian Point, just north of Nanwalek which tested at 3/0.9 parts per billion or less, in September 1993.

KODIAK ISLAND

Larsen Bay: In September 1993, Roy Jones assisted in the collection of four samples of mussels at Chief's Point on the northeast side of the entrance to Spiridon and Uyak Bay which tested at 3/.09 parts per billion or less.

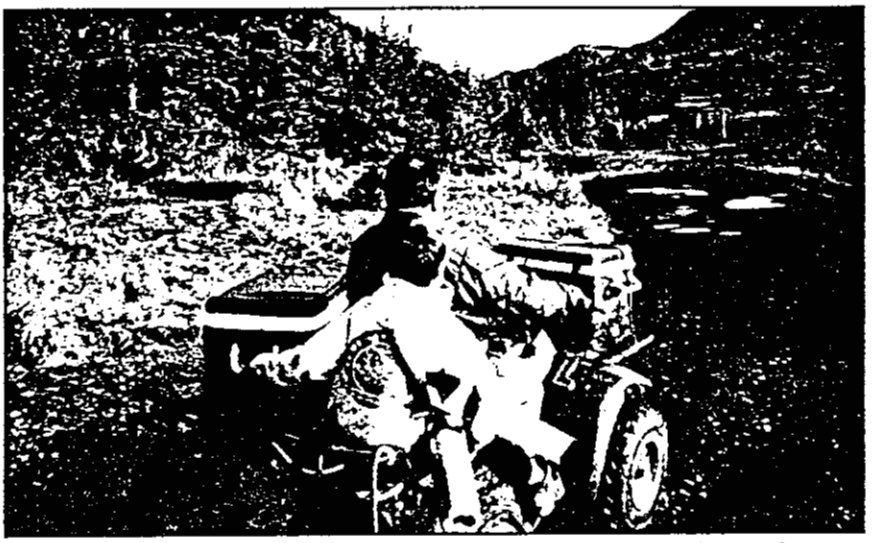
Ouzinkie: Roger Johnson assisted in the collection of three samples of butterclams from Camel Rock at Low Island Anchorage which all tested at 3/1 parts per billion or less, two samples of mussels from the same site which tested at 9/12 parts per billion or less, and three mussel samples from the south end of Sourdough Flats on Ouzinkie Point tested at 11/5 parts per billion or less, in September 1993. These very low levels are similar to those seen in samples collected from these same sites in 1989 and 1990.

Port Lions: Bobby Nelson assisted in the collection of three samples of mussels from an island just east of the airstrip at Port Lions which tested at 3/1 parts per billion or less in July 1993. For comparison, mussels collected at this same site in May 1990, tested at 45/14 parts per billion or less.

Vicki Vanek takes samples of a seal killed near Mummy Island in Prince William Sound.

The *Exxon Valdez* Oil Spill and Subsistence Food Safety

Since 1990, the Oil Spill Health Task Force has advised that all the fish, deer, ducks, seals and sea lions tested as part of the subsistence program were found to be safe to eat, but people should not use shellfish from beaches where oil is still present. Between 1989 and 1991, about 1,000 samples of fish and shellfish, 28 samples of deer, 19 samples of ducks, and 144 samples of marine mammals were tested. With the exception of shellfish and the blubber of heavily oiled seals, levels of hydrocarbons in the edible flesh were very low, many non-detectable. This is because fish, birds, marine mammals, and land mammals are all able to rid themselves of limited amounts of contamination in their bile. While this process may cause added stress and potential harm to the organism, it prevents the hydrocarbons from building up and contaminating the meat. However, shellfish are different, because they do not have the ability to get rid of hydrocarbons quickly. They accumulate these toxins and retain them for a long period of time.



John M. Totemoff and a young assistant take seal samples down to the dock at Chenega Bay.

Oil Spill Community Meetings Planned for February and March 1994

The Alaska Department of Fish and Game, Division of Subsistence is in the process of setting up community meetings to discuss the Subsistence Restoration Project. Meetings are planned for Chenega Bay, Tatitlek, Port Graham, Nanwalek and possibly Ouzinkie for late February or early March. We will be working with the village councils in the respective communities to decide on the actual dates and times of each meeting. We will also be conducting a meeting in Port Lions on February 22, 1994 for representatives from the communities of Port Lions, Larsen Bay, Karluk, Old Harbor, Akhiok, and Kodiak City, as well as representatives of the Kodiak Area Native Association.

Topics to be covered at the meetings include, a summary of the advice of the Oil Spill Health Task Force and the Expert Toxicological Committee, a review of the work done in 1993 as part of the Subsistence Restoration Project, any continued community concerns regarding subsistence food safety and the oil spill. We are also interested in hearing from the residents of the various communities about how much they think the project is helping, and what they would like to see us do in the future.

The Alaska Department of Fish and Game, Division of Subsistence has received funds from the *Exxon Valdez* Oil Spill Trustee Council for a subsistence restoration project. Requests for more information on the project or comments and inquiries about information in this newsletter should be directed to the Division of Subsistence, Alaska Department of Fish and Game, ATTN: Rita Miraglia, 333 Raspberry Road, Anchorage, Alaska 99518. Phone (907) 267-2358.

Division of Subsistence
Department of Fish and Game
333 Raspberry Road
Anchorage, Alaska 99518

APPENDIX 9:

Trip Reports and Related Correspondence

APPENDIX 9a:

Trip Reports and Related Correspondence

Kodiak Region

Alaska Department of Fish & Game
Division of Subsistence, Anchorage

MEMORANDUM

TO: James Fall
Regional Program Manager

DATE: February 28, 1994

FROM: Craig Mishler
SRS III

SUBJECT: Port Lions Conference
Trip Report, February 21-22

The Port Lions Conference was an subsistence oil spill project proposed by Rita Miraglia. Rita felt that a regional conference would be a more efficient way of fielding concerns than a long series of individual village meetings. Because Rita was needed in Valdez to work on MMS surveys, I volunteered to organize the conference and invited each village council to send two representatives.

Rita and I and Dean Hughes left Anchorage on February 21 at 10:05 a.m., arriving in Kodiak at 11:15. We had a 3 hour layover in Kodiak before catching the mail plane to Port Lions at 2:30 p.m. When we arrived in Port Lions, we were met by Bobby Nelson, the Tribal Council President, and Kevin Adkins, manager of the Lions Den Lodge. We received news that Pete Squartsoff had survived a quadruple bypass heart operation in Seattle and was recovering quite well.

After we checked in at the Lodge, I stopped to visit my old friends, John and Julia Pestrikoff, to get some more clarification of Alutiiq kinship terms, but Julia was taking a nap, so I arranged to return again after dinner. Then I phoned another longtime friend, Ivan Lukin, who invited me to come over. Ivan lives on the other side of the causeway, about a 15 minute walk from the Pestrikoffs. Ivan was just winding down from a day of carpentry, building a big two-bedroom addition to his house. We caught up on old times, and I made a special invitation for him to attend the Conference on Tuesday.

By the time I returned to the Lodge, the charter from Old Harbor, Larsen Bay, and Karluk had come in, so I spent a lot of time discussing issues with people as we waited for dinner. For no clear reason, the Akhiok contingent called Penair and cancelled out. Katy Adkins, the cook, put out a royal feast of prime rib, baked potatoes, corn on the cob, two salads, and two deserts. We really got spoiled. After dinner, I went back to the Pestrikoffs and worked with John and Julia on kinship terms, which was very helpful. Then I undressed and went into the banya. Roy Jones was the only other one who wanted to take some steam, so we had a good long chat. Roy is very talkative and quite interesting. I turned in early and slept until 7:30 a.m.

After Tuesday morning breakfast (another big hot meal), I went up to the City Office to update household lists for the upcoming harvest survey in March. The woman clerk who helped me was named Charlene, and she pointed out a significant number of changes from last year. The second charter came in about 9:15, bringing the Kodiak and Ouzinkie participants. Altogether, the people

who attended the Conference besides our staff were: Tony Azuyak from Old Harbor, Ronny and Donny Lind from Karluk, Randy Christiansen and Roy Jones from Larsen Bay, Mark Olsen, John French, and Kate Wynne from Kodiak, Herman Squartsoff and Nick Pestrikoff Sr. from Ouzinkie, and Sue Girard, Ivan Lukin, and Bobby Nelson from Port Lions.

I circulated an agenda and began by going around the table and asking for self-introductions. I told them we came to listen, not just to talk, and then I invited someone from each community to speak about their lingering concerns over the oil spill. We received a few reports of oil or tar ball sightings in various areas but the strongest concern was not over health risk but perceived major declines in shellfish populations--particularly around Ouzinkie and Larsen Bay. Ronny Lind added that in Karluk there has been a major decline in the abundance of red salmon and that some Karluk families were still not eating red salmon as a result of the spill. Ivan Lukin complained that Exxon oil is still lying on the ocean bottom and that as a consequence there needs to be more surveys done of bottom sediments and of the bottom fish and shellfish that feed on the bottom.

After the coffee break, I introduced Rita, who had a slide and overhead presentation prepared, but she never got beyond the first overhead because there were so many questions and interruptions. Her first overhead was a list of the expert toxicologists, and there were immediate challenges to the credentials of these people because all but one of them (John French) were from the 48 states and "probably didn't know the difference between a cockle and butter clam." At this point John French played a major role in the discussion, defending scientific methods and answering a lot of technical questions that neither Rita nor I would have been able to handle.

Most of the group was quite vocal, and what they said over and over was that they felt there should be more research on the growth and reproduction of the shellfish (the health of the populations) to explain better why they were disappearing. John French proved to be a good listener as well as a good speaker, and invited each of the villages to testify before the Trustee Council. The villagers were upset about having to pay their own way to go to Anchorage to testify and said "the Trustees should come to us." John French suggested teleconferencing.

Some memorable quotes from the discussion were:

"The oil spill took away our way of living"--Herman Squartsoff.

"The oil spill advanced the contamination of our area by a thousand years"--Roy Jones.

"What we're discussing here is not just oil but [scientific] credibility"--Mark Olsen.

"Seven hundred and fifty dollars per sample is pretty cheap compared to a life"--Sue Knagin.

"I've watched the deer come down to the water and eat oiled kelp, and since 1989 I have not touched the liver of a deer"--Ivan Lukin.

After a delicious lunch of halibut chowder, tossed salad, and submarine sandwiches, we reconvened about 1:15 p.m. and discussed the key issue of what species and what sites villagers wanted to be tested. The requests were as follows--

Port Lions--butter clams and mussels at Airport Beach; also butter clams "on the other side", i.e., Kazhuyak Bay near Ivan Lukin's house.

Larsen Bay--highest priority is sea urchins at LAB 3 known as "the lagoon right across from the village" for urchins; and butter clams at LAB 10. If money allows, test sea cucumbers and bidarkies, and the pink neck clams on Amook Island.

Old Harbor--butter clams and sea urchins on Sheep Island; would also be good to test these same two species in Amee Bay.

Karluk--test red salmon at Karluk village lagoon and butter clams at Sturgeon River. Also razor clams and butter clams in Halibut Bay [--note that Halibut Bay is about 25 miles from Karluk].

Kodiak--butter clams and littleneck clams in the gap between Holiday and Crooked Island; butter clams on Kalsin Island; bottom fish like halibut and sole in Chiniak Bay; sea otters (because they eat such large quantities of clams and crabs).

Ouzinkie--clams and chitons at Garden's Point; chitons on "the back side of the village" from the Narrows up to the airstrip.

Akhiok--still to be determined

After this inventory of needs, I asked Mark Olsen, Randy Christiansen, and Herman Squartsoff to talk a little about their work on the Kodiak-Aleutians Federal Advisory Committee. When they finished, I invited everyone present to work through this committee with proposals for changing subsistence regulations, and in particular, encouraging Tony Azuyak to resurrect Old Harbor's subsistence brown bear proposal.

We adjourned at 2:30 p.m. and left on the first charter at 3 p.m. It was fine weather, cold but sunny, with no wind. Rita and Dean made a quick connection for the return flight to Anchorage while I lingered on to have dinner with Rachel Mason and her new baby, Theodore. I left at 7:15 and arrived in Anchorage at 8:30 p.m.

Trip Summary: The majority of the people who attended the meeting were quite bright, vocal, and attentive. As a group they were fully engaged in the issues and the discussion never lagged. There was a lot of interest in the lingering effects of the oil spill and in the question of food safety, but the greatest concern was over the health and population of shellfish stocks. This input is very essential and should result in a somewhat different direction for future research, but it needs to be heard at the very highest levels. Roy Jones put his finger right on the button when he asked, "How much of what we're saying here today is actually going to be heard by the Trustees?"

2/22/94

My main concern is the damage done to our subsistence way of life (Survival) and what the long term affect will be to our health and traditional ways.

Funding from the Restoration Trustee Council must/needs to continue for the Division of Subsistence. Trustee Council must visit villages/areas where people depend on subsistence, they need to make personal contacts with each village Traditional Council.

Sue Libin Giard
Port Lions

MEMORANDUM
STATE OF ALASKA
DEPARTMENT OF FISH AND GAME
DIVISION OF SUBSISTENCE

TO: James A. Fall
Program Manager
Division of Subsistence
Anchorage

DATE: March 23, 1994

FROM: Rita A. Miraglia
Oil Spill Coordinator
Division of Subsistence
Anchorage

RE: Kodiak Regional Oil Spill Conference, 2-22-94

Summary: *Though subsistence users on Kodiak Island are not experiencing the kind of resource scarcity or abnormalities that those in Prince William Sound are, their concerns regarding contamination of subsistence resources by oil are similar. In fact, it seemed to me there was more concern about immediate health effects to humans from eating oil contaminated resources among the Kodiak representatives than I saw in the other regions impacted by the oil spill during this round of community meetings. Residents of the Kodiak Island communities have been less exposed to the information coming out of the Oil Spill Health Task Force and the Subsistence Restoration Project. We need to concentrate more on Kodiak Island in this year's subsistence restoration project than we have in the past.*

Some abnormalities in resources were mentioned. The most notable was reduced growth in sockeye salmon, clams and mussels.

There is a general concern that even if there is no oil in the edible flesh, that processing the oil contamination has somehow changed the animals in such a way as to make them toxic to humans.

There were several references made to oil in the beaches of Kodiak Island. This was the first time I had heard about subsurface oil on Kodiak Island, I don't know whether DEC has documented this.

The representatives indicated they want to have more direct contact with the Trustee Council, as they feel their concerns are not being heard. They would like to see the Trustee Council visit the villages on Kodiak Island. Trustee Council staff should canvas the Kodiak Island communities again to find out of they want to be included in the teleconference link for Trustee Council meetings

Craig Mishler, Dean Hughes and I left Anchorage via at 10:05 AM on February 21, 1994, and traveled to Kodiak City on an ERA scheduled flight. The descent into Kodiak City was rather bumpy, two women sitting in the row in front of me were screaming continuously for about ten minutes. We landed at Kodiak City at 11:00AM, exited the plane and kissed the ground.

We departed Kodiak City via a Penn Air scheduled flight at 2:30 PM, which stopped in Ouzinkie, and landed in Port Lions at 3 PM. We were met by our host, who drove us to the Lions' Den Lodge, where we settled in.

Ron and Donny Lind from Karluk, Roy Jones and Randy Christensen from Larsen Bay, and Tony Azuyuk from Old Harbor arrived on the first of our two charters, at around 4 PM. The representatives from Akhiok cancelled, presumably because of poor weather.

The second Old Harbor representative didn't make it in. Dean and I introduced ourselves to the representatives, as Craig was out visiting when they arrived.

After dinner, Port Lions residents Debbie and Bob May came by. They had previous plans that were going to prevent them from attending the meeting the next day, but wanted to know what we would be discussing. I showed them the test results for Port Lions, told them what the results meant and gave them copies of the two newsletters that reported the 1993 results, and the map for Port Lions, which show the 1989 and 1990 test results. I asked whether they thought people here were concerned about bottomfish anymore. They said they didn't think so. Debbie said she thought things were finally coming back after the damage of the spill. She said she meant in terms of politics in the community.

Dean and I talked with Ron Lind a while. He said traditionally the people of Kodiak Island ate brown bear, and they always left the skin where the bear was killed. Because the regulations became so stringent, and some hunters got in trouble, most people stopped hunting brown bears for food. Most of the young people haven't eaten it, and don't want it now. Brown bears have gone from being a valued food source to becoming a nuisance.

We started our meeting the next morning, after the arrival of the second charter, bringing in the representatives from Kodiak City and Ouzinkie, at 9:30 AM. Mark Olsen represented Kodiak City, and Nicholas Pestrikoff and Herman Squartsoff came from Ouzinkie. John French and Kate Wynne came in on the same flight. John French had been invited to attend as a member of both the Expert Toxicological Committee and the Public Advisory Group to the *Exxon Valdez* Oil Spill Trustee Council, and turned out to be an invaluable asset during the meeting. Sue Lukin Girard, Ivan Lukin, and Robert J. Nelson, all of Port Lions, also attended the meeting. I laid out the newsletters, and sampling maps on the conference tables. People were very interested in the maps. Unfortunately, I hadn't noticed that I didn't have any maps for the Karluk sampling areas (in fact I am completely out of these).

Craig briefly discussed the purpose of the meeting, and we went around the table and introduced ourselves. Craig then asked each community representative to make a brief statement about any continued oil spill concerns in their area. The following are summaries of those statements.

Port Lions: The red salmon that returned here in 1993 were smaller than they should have been. The people are not sure if this is due to the oil spill. They think more bottom surveys should have done. They want to know if there still oil laying on the bottom and whether or not it is dangerous? They are concerned about the bottom where beaches were cleaned near the old village.

Larsen Bay: Randy Christensen said they're still seeing tarballs at the tideline and oil stained drift wood on the beaches in the Uyak Bay area and the outer shores, especially in Sourdough Bay. He said, "You do still see tiny wisps of sheen coming off the beaches today". Roy Jones said there are lingering questions, people are worried about abnormalities in the resources. "The oil was there, where did it go?", he asked.

Ouzinkie: Herman Squartsoff said they are concerned about clams and sea urchins, there has been a big decline in these resources in their harvest areas. They are also concerned about deer and fish. Oil is still floating around in the area. They are eating subsistence foods, but are still in doubt about their safety. The main concern is about people getting cancer ten or fifteen years down the road.

Karluk: Ron Lind said their biggest concern is the decline of salmon, especially red salmon. They have also observed a decline in mallard ducks in their harvest areas. They are afraid to use clams and mussels. A lot of people from the community have died of cancer in the past. Very few people go to the Sturgeon River to harvest anymore. On some warm days, oil flows out of the beaches, and tar balls have been seen in Karluk Lagoon itself. They are worried about where the oil is and they are concerned about the risk of cancer.

Lind added that there are a lot less salmon inside the lagoon at Karluk, and fewer users, as well, because people are concerned about contamination. People haven't gone back to using salmon or other native foods since the initial scare of the spill. People were frightened by the initial restrictions and initial public health information. There were several salmon caught in 1989 that were yellow. Ron Lind says people may harvest salmon, but they give it away and send it out of the village. He also said the numbers of seals are down in the Karluk area.

Ouzinkie: Herman Squartsoff says they are concerned about bottomfish, especially halibut, and crab. He said, "Society has changed the way of living for the people, the oil spill made it worse, it scared everyone a lot more. We need to get back to the subsistence lifestyle, or we will lose it". Herman said "There needs to be more study on the effects of oil on the clams. There has been a big decline in clams everywhere. At Sourdough Flats (OUZ 7) there are now lots of big empty clam shells. There has also been a big decline on Cat Island. There is a massive amount of empty adult clam shells on the beaches near Ouzinkie". He said someone harvested a deer near Ouzinkie recently that smelled bad, and they discarded it.

Kodiak City: Mark Olsen says that people took subsistence for granted before the oil spill. He doesn't go out harvesting anymore since the spill. He is concerned about the safety of the food. He wants to see someone look at the food chain. He said people have reluctantly gone back to the beaches to harvest. They are seeing deformities in the resources. He said "I have deferred the enjoyment, trust and desire to eat subsistence food because of concerns about oil contamination".

Old Harbor: Tony Azuyak says there was an outbreak of paralytic shellfish poisoning in Old Harbor a few years ago, which really scared people. He eats clams anyway, but some people don't anymore. Recently, birds have been found in their area, with oil mousse on their feathers, and people have been seeing tarballs.

There was some conversation about more general oil spill topics, the main points are summarized below.

Ivan Lukin of Port Lions says he and his wife were part of a beach clean up crew in 1989, in some places the oil was two feet and deeper down in the beach sediments. The straits were loaded with sheen. That sheen hit the clam beds.

Herman Squartsoff Ouzinkie added, "That sheen stayed all summer".

Mark Olsen said, "The oil spill has changed peoples lifestyle". He also said he is concerned about the waste oil discharged by local people. He wants to see waste oil disposal facilities in each community.

Randy Christensen of Larsen Bay disagreed that waste oil is a problem. He said Larsen Bay already has waste oil disposal facilities and people use them. He is concerned about the intertidal area. The problems he sees don't have much to do with local waste.

He talked about a beach near Larsen Bay (LAB 10) where there are only steamer clams now. There used to be other clams there, and they are gone. Even the steamers are not as plentiful there as they used to be. He wants to see that beach tested again. He does not think the problem there is due to sea otters, because sea otters are rarely seen there.

Roy Jones, who was a local assistant on the subsistence sample collections coordinated by the Pacific Rim Villages Coalition in 1993 commented that the two shellfish sites sampled for Larsen Bay in 1993 were too far from the community. He also said that one of the sites tested near Larsen Bay in 1993, Chiefs' Point, used to have clams, but they are dead now. The beach was heavily oiled in 1989. Roy wanted to know whether we are only looking for oil in the animals. He asked, "What about changes in the animal? They have been contaminated. I saw it". I answered that the hydrocarbon tests we are doing are only to look for oil contamination in the edible meat of the animal. We are only looking at whether the animal is safe for humans to eat. We are not looking at the effects to the animal from exposure to oil. Other researchers are, and I described some of the effects they are reporting such as reduced growth rates, and reproductive impairment. I emphasized that we do keep track of the findings of the damage assessment studies, and that nothing that has come out of those studies contradicts the advice of the Oil Spill Health Task Force that with the exception of shellfish from contaminated beaches, the subsistence foods are safe for people to eat.

Mark Olsen of Kodiak City commented, "We're not just talking about oil here, we're also talking about credibility. The biomass is disappearing. King crab are disappearing. The problem won't be resolved until we have mutual respect".

John French said there needs to be more community testimony before the Trustee Council. He said most of the testimony from the Kodiak region has come from himself or from Mayor Jerome Selby. The trustees aren't hearing the sort of concerns that were being expressed at our meeting. Sue Girard of Port Lions said that the Trustees should come to the communities, rather than the other way around. I suggested it might be easier to get hooked into the teleconference link for the Trustee Council meetings than to send representatives to Anchorage. Sue Girard replied that the council should approach the communities to see if they want to be on the teleconference link. I said I would pass this along. There was a very strong feeling that the effort should come from the Trustee Council, rather than from the communities.

The representatives agreed that they have had problems in getting their concerns heard by the Trustee Council. Roy Jones pointed out that a community representative represents a lot of people and their testimony shouldn't be counted as that of one person, as sometimes seems to happen.

Next was my presentation. I started by telling the attendees that they should interrupt me if they had any questions or comments. I began talking about the Oil Spill Health Task Force, and the Expert Toxicological Committee. I got through one slide, and two transparencies, and the questions started. Mark Olsen from Kodiak City wanted to know where the members of the expert toxicological committee were from. His concern was that people from outside the area couldn't know anything about the subsistence resources people rely on. Ron Lind from Karluk echoed this concern. John French attempted to explain what the committee looked at, and that clams in the lower-48 react to oil the same way as clams on Kodiak Island.

The group was very lively, and had many questions. I abandoned my slides and overhead transparencies early on. We covered all of the points I had hoped to cover,

but we did it by answering the questions from the group. It was a good, dynamic meeting, and I think people were satisfied with our answers. It was exhausting, though.

We adjourned for lunch at noon, and reconvened half an hour later. We asked each community representative to tell us what resources and sites they want to see tested in 1994. Their responses are summarized below.

Port Lions: Would like to see us test clams at the airstrip, and butterclams from across the lagoon at Port Bailey.

Larsen Bay: Their top three priorities are to test sea urchins in the Lagoon, directly across from the village (LAB 3), and clams from LAB 10 (Jakes beach) and LAB 2. They would also like to see chitons tested. If possible, pinkneck clams from Amook Island should be tested, but this is the lowest priority.

Old Harbor: Tony Azuyuk tentatively said he thought we should test butterclams and sea urchins from Sheep Island, the Narrows or Amy Bay. He asked that we check back with him after he has had time to talk with other people in Old Harbor about this.

Karluk: The representatives listed the testing of razor clams and butterclams from Halibut Bay as their first priority. Craig has pointed out that Halibut Bay is about twenty-five miles from Karluk. They would also like to see us test butterclams from inside the lagoon, and bidarkies from inside the entrance to the lagoon, as well as butterclams at Sturgeon River, and red salmon from the lagoon.

Kodiak City: Mark Olsen said his first priority was to have butterclams and steamer clams tested on the spit running between Sheep Island and Gull Island. John French pointed out that is next to the boat harbor. Craig added that we have already tested there. Mark said he would also like to see clams on Kalsin Island tested, and bottomfish from the Chiniak Bay area. He said sea otters should be tested as an indicator of what's going on with shellfish.

Ouzinkie: Would like us to test horse clams from between the narrows and the airstrip across from Gardens Point. They also want to see chitons tested.

Kate Wynne announced that she has funding to go out to the villages to test seals for various contaminants. She said the in other parts of the world, evidence has been found for damage to the ovaries of female seals caused by PCBs.

Next the conversation shifted to the Federal Subsistence Board. Three members of the board were present. The general consensus was that the formation of these federal boards provide an opportunity to get more of a say in the management of fish and game for local people.

The meeting adjourned at 2:30 PM, so that we could catch our plane. The meeting probably could have continued for several more hours if we had the time.

We left Port Lions at 3 PM, on a Penn Air charter, arriving in Kodiak City at 3:45 PM. Dean and I left Kodiak City at 4 PM, on an ERA scheduled flight, arriving in Anchorage at 5:15 PM. Craig spent the evening in Kodiak City and took a later flight back to Anchorage.

cc: Craig Mishler
Dean Hughes

Alaska Department of Fish & Game
Division of Subsistence, Anchorage

MEMORANDUM

TO: Rita Miraglia
Oil Spill Coordinator

DATE: March 8, 1994

FROM: Craig Mishler
SRS III

SUBJECT: 1994 Sampling Program, Akhiok

This afternoon I talked on the phone with David Eluska Sr., Vice-President of the Akhiok Tribal Council. Since Akhiok was the only Kodiak community not represented at the Port Lions conference on February 22, I wanted to inquire about continued seafood testing for hydrocarbons in the Akhiok area.

David was affirmative on that point and said that there were two sites and species he wanted to have tested:

1) Razor clams at Tanner Head--perhaps reached only reliably by helicopter.

2) Butter clams outside Akhiok Island near the village.

David says the local skiff driver/trainee he recommends is Mitchell Simeonoff, our local assistant on the marine mammal project. Mitchell's number is 836-2210. Our 1993 skiff driver, Edwin Anderson Sr., did not respond to my invitation to attend the Port Lions meeting and has the added disadvantage of possessing no telephone. I would also recommend that Mitch be offered the job when Dave Erickson or whoever is in charge of the field team visits the community this year.

Davis echoed the complaints we heard from Ouzinkie and Larsen Bay that butter clams are increasingly harder to find, but also acknowledged that people haven't been harvesting as often of late.

cc: Jim Fall

APPENDIX 9b:

Trip Reports and Related Correspondence

Lower Kenai Peninsula

STATE OF ALASKA

WALTER J. HICKEL, GOVERNOR

DEPARTMENT OF FISH AND GAME

333 RASPBERRY ROAD
ANCHORAGE, ALASKA 99518-1599
PHONE: (907) 344-0541

June 9, 1993

Vincent Kvasnikoff, President
Nanwalek Village Council
General Delivery
Nanwalek, AK 99603

Dear Vincent:

This is to follow up on the conversation we had, on June 4, 1993, about the subsistence restoration project funded by the *Exxon Valdez* Oil Spill Trustee Council. Based on the discussions I had with several community residents during that same visit, we have selected two shellfish sampling sites and a bottomfish sampling site in the areas used by Nanwalek residents for subsistence. The two shellfish sites are Russian Point, just below the village, and Anderson Beach at the south end of the Kenai Peninsula, between Elizabeth and Pearl Islands. Samples of mussels, clams, snails and bidarkis will be collected at Russian Point. Samples of mussels and clams will be taken at Anderson Beach. We will also be returning to Windy Bay to collect samples of mussels there. The bottomfish site is just outside the mouth of Port Graham Bay. Rockfish will be sampled from this location.

The shellfish and bottomfish samples will be collected by Dave Erikson, working for the Pacific Rim Villages Coalition. Local residents will be hired to assist with the collection, and to receive training. The Kenai Peninsula sampling trip will occur between June 23 and June 26, 1993.

If you have any questions, please feel free to call me. I will be in Chenega Bay from June 10th through the 22nd, and you can leave a message for me at 573-5118. Or you can call Jody Seitz at 267-2361.

Thanks again for all your help.

Sincerely,

Rita A. Miraglia
Oil Spill Coordinator
Division of Subsistence

cc: Jim Fall
Ron Stanek

STATE OF ALASKA

WALTER J. HICKEL, GOVERNOR

DEPARTMENT OF FISH AND GAME

333 RASPBERRY ROAD
ANCHORAGE, ALASKA 99518-1599
PHONE: (907) 344-0541

June 9, 1993

Elenor McMullen, Chief
Port Graham Village Council
General Delivery
Port Graham, AK 99603

Dear Elenor:

This is to follow up on the meeting we had, on June 2, 1993, about the subsistence restoration project funded by the *Exxon Valdez* Oil Spill Trustee Council. Based on the discussion at that meeting, as well as conversations I had with other community residents, we have selected a shellfish sampling site and a bottomfish sampling site in the areas used by Port Graham residents for subsistence. The shellfish site is Duncan Slough in Port Graham Bay. Samples of mussels, bidarkis, softshelled clams, and snails will be collected there. We will also be returning to Windy Bay, to collect samples of mussels there. The bottomfish site is just outside the mouth of Port Graham Bay. Rockfish will be sampled from this location.

The shellfish and bottomfish samples will be collected by Dave Erikson, working for the Pacific Rim Villages Coalition. Local residents will be hired to assist with the collection, and to receive training. The Kenai Peninsula sampling trip will occur between June 23 and June 26, 1993.

If you have any questions, please feel free to call me. I will be in Chenega Bay from June 10th through the 22nd, and you can leave a message for me at 573-5118. Or you can call Jody Seitz at 267-2361.

Thanks again for all your help.

Sincerely,

Rita A. Miraglia
Oil Spill Coordinator
Division of Subsistence

cc: Jim Fall
Ron Stanek
Jody Seitz

11-K16L-

MEMORANDUM
STATE OF ALASKA
DEPARTMENT OF FISH AND GAME
DIVISION OF SUBSISTENCE

TO: James A. Fall
Regional Program Manager
Division of Subsistence
Anchorage

DATE: March 25, 1994

FROM: Rita A. Miraglia
Oil Spill Coordinator
Division of Subsistence
Anchorage

RE: Trip to Nanwalek
and Port Graham
2-24 thru 3-5-94

Summary: *I visited informally with residents of Nanwalek to discuss the subsistence restoration projects. People would like to see clams, bidarkies and sea weed tested from the Flat Islands, and bidarkies and octopus from Dogfish Bay. There was also interest in having fish and shellfish from Port Chatam tested, but this is not seen as having as high a priority. I also discussed other on-going Division projects with the Village Council President, and the proposed changes to the bag limits for black bear with the President, the members of the local fish and game advisory committee and several bear hunters.*

People in Nanwalek are concerned about the potential health effects on humans of accidentally eating coded wire tags in fish heads.

I conducted a community meeting on the subsistence restoration projects in Port Graham. Residents there were pleased with the 1993 test results, and would like to see whelks from Duncan Slough tested in 1994. I also presented information on several on-going Division projects, and the black bear issue, at the Port Graham Village Councils' Annual Meeting, and attended an Elders Day celebration.

I left Anchorage via an ERA scheduled flight at 10:05 AM on February 24, 1994, arriving in Homer at 11:00 AM. I left Homer at 11:30 AM via a Southcentral Air scheduled flight, arriving in Nanwalek at 11:45 AM.

The community meeting in Nanwalek was scheduled for 2 PM. I checked in at the house where I would spend the night, and had lunch with my hosts, then I went down to the council office and met with the village administrator.

I went to the community center and set up for the meeting. The heat was off in the building, and had been for some time. There were icicles in the sink, and the water in the toilet in the ladies room was frozen. I tried to get the heater going, but I think it was out of fuel, because it kept shutting itself off again. The village administrator said she would send someone out to look at it, but no one came. No one showed up for the meeting, either. We were scheduled to start at 2. I waited until 2:30, and then started going house to house.

I was later told that our meeting conflicted with a tsunami workshop at the school, and the community's traditional dance group was performing in Fairbanks. Very few people knew about our meeting, and many of those that did were under the misunderstanding that it was an Exxon meeting.

I spoke with some community residents at the store. They want to know what will happen to people who eat coded wire tags. The red salmon coming back this year included fish with coded wire tags in their heads. People here eat fish heads as a preferred food. This question came up several times during my visit to the community. People in Nanwalek wanted to know why the tags couldn't be put into some other part of the fish that they don't eat.

I met with the Village Council President in his home. I briefed him about the subsistence restoration projects, the proposed changes in black bear bag limits, the MMSII project, and the marine mammal project.

The Village Council President wants to see clams, bidarkies and sea weed tested from the Flat Islands. He said people used to get seals at the Flat Islands, but "you don't see seals there anymore". According to the Village Council President, some people are still afraid to eat seafood. He told me that in 1989 oil mousse hit the shore at Russian Point, and it also hit the below the runway. He said there was oil mousse on his allotment, too. He noted that the red salmon coming in last year were smaller than usual, but he doesn't know whether that is because of the oil spill or if it is because of the enhancement project. He said he would like to see a 2 bear bag limit for his area.

I visited with a member of the local fish and game advisory committee. I gave him the information on the proposed black bear bag limit changes. He promised to share this information with the other member of the committee, whom I had been unable to locate. He told me they still need to recruit two more members in Nanwalek to replace the two people who resigned. We also talked about subsistence food testing. He said we should test bidarkies and octopus from Dogfish Bay, but we shouldn't bother testing clams there, because the clams that are there are not the species people use. He would also like to see red salmon tested from the English Bay River.

Another resident I visited with suggested testing fish and shellfish at Port Chatam. He said there used to be butterclams and cockles there. Before the oil spill those shellfish beds seemed depleted. There was a lot of oil clean up in Port Chatam. He said people get a lot of fish out of there, especially pinks, chums, flounder and halibut. While he would like to see the resources there tested, he did not feel this should be the first priority. He agreed that testing shellfish from the Flat Islands and Dogfish Bay were both good suggestions.

We also discussed the need to set up an easy way to get abnormal specimens that people encounter to Anchorage so a pathologist or biologist can look at them. I need to talk with pathologists and biologists, and possibly set up an account with Southcentral Air, so people on this end don't have to pay to ship the samples.

The fish and game licence vendor In Nanwalek wanted to know if people need tags to hunt bears. I told her I would find out.

The lagoon here has frozen over for the first time in many years, and people have been ice skating and ice fishing. They have been catching some tomcod and Dolly Varden, but they really have to work at it to get anything.

One woman told me that hunters here traditionally leave the head and the brisket of a bear where the bear was killed. A school teacher went bear hunting with her husband last spring, and talked her husband into keeping the brisket of a bear they got. Her husband hasn't gotten a bear since.

This woman has gone hunting with her husband a couple of times, but men here believe a woman on a hunt is bad luck and will scare the game away.

An elder told me her father used to say women talking about the weather makes the weather worse. She said she always thinks about that when she sees women doing the weather forecast on television news shows.

I left Nanwalek the next morning at 9:45 AM, via a Southcentral Air scheduled flight to Port Graham, arriving there at 9:50 AM. I walked to the community center, and met briefly with the Chief. I briefed her on the black bear issue. I thought I would limit the oil spill meeting to restoration, but she said I should also talk about the other issues if we got more than a couple of hunters.

I spent the next hour or so making copies of the information on black bear to hand out at the meeting. Went to the store for lunch.

The meeting began at one PM. About a dozen people attended, most of them active hunters.

I summarized the results of the 1993 testing. When I said that the clams from Duncan Slough tested low, so low as to be within the margin of error for the tests, the Chief said, "Wonderful, that is just what I have been waiting to hear, now we can harvest our clams again". The group said they wanted to see whelks tested from the same location (Duncan Slough) this year, because whelks were observed eating the oil in 1989.

I mentioned that I have been trying to run down information on the boat cleaning station in Port Graham Bay. A number of people at the meeting worked at the station in 1989. They said VECO actually ran the station, and were able to give me partial names of the VECO foremen. One concern people here have is the effect of inhaling the chemicals used in cleaning the boats.

One of the men who worked at the boat cleaning station said they did not use the vacuum system Exxons' Rob Dragnich described to me for cleaning the outside of the boats here. That system was only used for cleaning the inside of fish holds. Outside, the spread of the chemicals was only controlled by boom.

The people attending the meeting also made the following observations about local resources in relation to the oil spill:

> The mussels in this area all died when the oil hit, and they have been growing very slowly since the spill.
>
> The birds have finally started coming back here. All the arctic terns died after the spill.
>
> This past year there were more herring and tomcods than the year before.
>
> One man said there were not very many dogs and silvers last year. The Chief said there were more reds, and she thought there were enough silvers. She also saw more ducks in the past year than she has in a while.
>
> The hunters agreed they are seeing somewhat fewer sea lions. People here are not concerned about any decline in sea otters. Some locals have been hunting them recently.

The group agreed that the number of seals reported for Port Grahams' 1992 harvest was too high. One hunter agreed that double reporting is probably part of the problem. He said he didn't know how many seals his brother, who is his hunting partner reported, so he reported all the seals they got during his survey. We need to revisit these numbers, and talk to the hunters again.

I spent the weekend in Port Graham visiting. While I was there, a group of young men went to Jackalof Bay in a seiner, stayed overnight, and harvested clams (mostly butterclams, with a few littlenecks mixed in) for the whole village. I ate almost nothing but clams for two days. I had steamed clams, two different kinds of clam chowder, clams fried on the half-shell, and clam fritters. I was also taught the right way to shuck clams.

I attended the Annual Port Graham Village Council meeting on March 1, 1994. The meeting began at noon, and most community residents attended. A copy of the agenda of the meeting is attached. The representatives of Chugachmuit and the Chugach Regional Resources Commission who were slated to make presentations were unable to get in because of bad weather.

Many issues of interest were discussed, including:

The push by the Indian Health Service to compact out the provision of services to native groups. The Chief is concerned that the compacting may result in the loss of services to members of the smaller regional corporations like Chugachmuit, and is afraid that the new native hospital may end up empty.

There was some discussion of trying the case against Exxon here in the village in a tribal court in April.

There is a serious problem with lead in the water at the school and the pre-school. The levels are 117 times higher than normal. Blood samples will be taken from the school children next week to check for lead.

The village councils of the Chugach Region are working with an attorney from the State Attorney General's office to oversee the distribution of the five million dollars DCRA got from the *Exxon Valdez* criminal settlement.

There was some discussion of the possibility of building small shelters at intervals along the shore, so people will have some place to go in an emergency.

Port Graham is the model community for an environmental program in the Chugach region. The goal of the project is to clean up the dumps, and keep toxic chemicals out.

There was a problem with last year's hatchery pinks, because they were released too close to the dock, and that's where they returned. The fish were difficult to catch because of where they were. The hatchery staff need to find a different place to release them. (The Chief said she was impressed with the ingenuity of some of the elder ladies in response to the problem with the pink salmon. They dug trenches down on the beach near the dock, and when the tide came up and went back, the salmon were trapped there, and the women could just pick them out of the trench by hand. The Chief says this was a revival of an old style of fishing.)

I was the last speaker on the agenda before the nominations for Village Council elections.

I presented the 1993 test results from the subsistence food safety testing project, emphasizing that all of the samples showed very low levels, so low they were within the "margin of error". I talked about the planned future testing, and summarized the discussions at the community oil spill meeting the previous Friday. There were a few questions, mainly about abnormalities people had heard about from Prince William Sound such as seals with yellow pus under their flippers, and viral hemorrhagic septicemia in herring.

I briefly outlined the seal and sea otter project, reported on some general findings of the MMSII project, and reminded people we would be conducting interviews again this spring. I talked about the marine mammal project, and mentioned we would be asking the marine mammal hunters again about their 1992 harvest, to find out if there was indeed a problem with double counting. I also talked about the proposed changes to the bag limit on black bear.

There was little discussion about any of the information I presented. I think this was partly because people were already tired. Another important factor was that a potluck dinner was scheduled to start as soon as I finished talking. People could already smell the food, which was laid out on the tables and waiting.

I was scheduled to return to Anchorage that evening, but was prevented from doing so by bad weather, which persisted for several days.

Still snowbound, I attended an elders day celebration at the school on March 3rd. The program is attached along with a copy of a community newsletter called "Arlluk Pride", which was distributed at the celebration. Most community residents attended the event, held in the school gym. The walls of the gym were lined with posters and crafts projects the students had put together, many of which dealt with traditional alutiq culture. One student had made a poster on the *Exxon Valdez* oil spill and its' effect on the community.

The Chief gave a keynote speech. She spoke eloquently about what subsistence means to her. Subsistence is more than just gathering food to her, it is sharing native foods with others, and feeling nurtured by the earth.

She related a story about taking her young grandson fishing for the first time. They were fishing for dog salmon. The boy kept looking over the side of the boat, and finally asked in fascination "What kind of fish is that Grandma". Without looking, she told him "Dog salmon". The boy looked over the side of the boat again and said "That sure is a dog salmon". She finally looked at what he was watching, and saw that there was a seal chasing the salmon under the boat, and the boy now thought the seal was a dog salmon.

They caught about twenty fish that day. The boy was very proud, and kept talking about how happy his mother would be with all that fish. His Grandmother told him that since this was their first catch of the year, the fish had to be given away. The boy was distressed by this, because he wanted to give all the fish to his mother. The Grandmother explained to him that they would catch fish again, and would be able to keep those, but that these had to be given away. They went to the home of an elder, and the Grandmother made the boy offer the fish to the elder. The elder took one fish out of the bucket. The boy was happy, because he thought he was done giving and he still had all those fish left. His Grandmother told him they weren't done. That day, she

took him from house to house, visiting all the elders, and each took one or two fish, until finally all the fish had been given away. The boy was upset he had nothing to show his mother. His Grandmother assured him they would go fishing again. In this way she did more than just telling her grandson about sharing, she showed it to him.

There followed presentations by the school children, including a slide show with photos of the community elders. As each elders' photo was shown, a child would step forward and talk about what makes that elder special. In most cases, it was a grandchild or a great-grandchild who spoke, and the statements were very personal and touching.

The smallest schoolchildren, wearing paper versions of native headdress, performed simplified versions of native dances.

The 4th-7th graders did something I found to be really clever. Two children sharing a sheet draped over their shoulders, walked to the front of the room, each holding a piece of paper with a syllable written on it. They would then face the audience, and each child would speak his or her syllable in turn, saying them closer together each time, and bringing the two pieces of paper closer together. When the papers touched, they would look down at them, read the entire word in unison, repeating it several times, as they acted it out. In this way they acted out the Alutiq words for "jump", "walk", and "shout".

The Paluwik Alutiq Dancers rounded out the program. They have recently started to make new costumes for the dancers. Several of the women in the community have been involved in both the research and the sewing to make the costumes as authentic as possible.

After the program, there was a potluck in honor of the elders, with a very heavy emphasis on traditional foods. I ate boiled humpies with seal oil, bidarkies, halibut, clams, and several different kinds of smoked salmon, including salmon backbones smoked and then boiled.

I remained stranded in Port Graham until March 5th. I spent the intervening time visiting, taking hikes and knitting.

I left Port Graham at 10:45 AM on March 5th, via a long anticipated Southcentral Air scheduled flight, arriving in Homer at 11:15. By the time the plane reached Port Graham, the weather had already started to close back in again. I was told it was possible this would be the only flight to get in for the next week. I left Homer at 11:30 via an ERA scheduled flight, arriving at home at 1:30 PM.

cc: Ron Stanek
Craig Mishler

MEMORANDUM
STATE OF ALASKA
DEPARTMENT OF FISH AND GAME
DIVISION OF SUBSISTENCE

TO: James A. Fall
Regional Program Manager
Division of Subsistence
Anchorage

DATE: March 29, 1994

FROM: Rita A. Miraglia
Oil Spill Coordinator
Division of Subsistence
Anchorage

RE: Trip to Chenega Bay, 3-11 thru 3-13-94

Summary: *Participated in a health fair in Chenega Bay, and did a brief presentation on the subsistence food testing project for the community. The Village Council President said he would get back to us with a decision on what sites and resources the community wants tested.*

Jody Seitz and I left Anchorage via Jim Air at 1:10 PM on March 11, 1994, arriving in Chenega Bay at 2:10 PM. We had very good flying weather. It hadn't been good in the morning, but we had 8,000 foot ceilings and good visibility the whole way. We flew down Turnagain Arm, through the pass over Blackstone Bay, and straight into Chenega Bay. As we flew over Evans Island, from Shelter Bay to Crab Bay, I could see the new runway. We had a traditional water landing. The saltery that used to stand in front of the village has been removed, and there is now a bare, black hillside there. The community plans to put a marine service and fueling dock there, with the ability to accommodate some of the large processing vessels that come to the area.

I walked up the hill to the community center. Chenega Corporation has built a new office extension onto the building, and I was told that there is a gravel pad on the other side of the community center, where the Corporation will be building a new office building. There are definite plans to build an apartment triplex as well. The triplex would house young couples waiting to get a house in the community, or elderly community residents who aren't interested in maintaining a house.

I met briefly with the vice president of Chenega Corporation, then continued down to the my hosts home. My hostess was cleaning and filleting about twenty red rockfish, and a few other fish that they had been given by commercial cod fishermen from their by-catch. Word came down today that the commercial cod season will be closing on March 16th. Some people here have also been given halibut by the cod fishermen.

Twenty-two people from here have been working at MacCleod Harbor on Montague, longshoring. None of the local people are doing any actual cutting of trees. One man, who has been working there, said they expect the cutting and longshoring at Patton Bay to last five more years.

The English Bay Band had been scheduled to play at a dance after the health fair, but was unable to come due to an illness. I met with the Village Council President, he said it had been decided, since the band wasn't coming, to have a community meeting after

the health fair instead of a dance. He suggested I do my presentation on the subsistence food safety testing project as part of that meeting.

I met with the Vice President of Chenega Corporation and Jody. The Vice President had some questions about my impressions of Kate Wynne. She also wanted to know where I thought a seal sampling project would lead in the long term, and what it would provide to the community. I told her I thought Kate would be a really good person for the community to work with. I know she is interested in exploring with residents the ways in which her project can give something back to the community. I also told her I thought once a seal sampling program was begun in Chenega Bay, it would be likely to continue for a number of years, because both the biologist and the hunters have an interest in seeing it continue. The problem up until now has been getting the funding and time to get it started.

The Vice President also showed us a letter from Gary Shigenaka, who works for NOAA, outlining a continuing research project to document the effects of both initial oiling and clean up on Prince William Sound shores. The project concentrates on the intertidal and the biota that live there. The Vice President was impressed because Gary's letter indicated a clear interest in involving the community in the work, and said there would be room on the project for one or two high school or college students from Chenega Bay to participate.

By evening, some serious weather had come in. First snow, then mixed sleet and rain with strong gusting wind.

The next morning, Jody and I took a cruise of Sawmill Bay on the Cape Kasilof. When I went back to my hosts house for lunch, I met Derenty Tabios, president of Chugachmuit, who had come in for the health fair that morning, and would be staying with us.

The health fair began at 1PM. Jody and I had a table there with information on the subsistence food testing program. About ten members of Chugachmuit's staff were there, manning tables on health and safety. The people who came in could have their weight, height and blood pressure measured, they also filled out a health questionnaire. Some blood tests, including a test for HIV, were available. Very few adults attended the health fair, we mostly saw children and teens.

Two of the marine mammal hunters spent the day hunting in Bainbridge Passage, and came back with a seal and a sea lion. They wanted to get some seal meat for some of the native visitors to the community to take back to Anchorage with them.

One hunter told me he got five ducks today. He said he's been having good luck with them, he got about ten other ducks in the last couple of weeks.

One man said he would like to see us test clams from just below the village again for hydrocarbon contamination. Another wants to see deer from Sleepy Bay tested. He said deer are more scarce than they were before the oil spill.

One resident asked for a copy of the general hunting regulations, especially those for Dall Sheep. Unfortunately, we hadn't thought to bring regulations along, so I told him we would send them to him.

A Chugachmuit employee who lives in Seward wanted to know if it is normal for herring to eat their own eggs or not. She says her husband is a commercial fisherman, and has recently observed herring doing this.

Paul Jackson of Chugachmuit wants to know if there is any information available on mercury levels in Alaskan seafood.

I went to church with my hostess at 6 PM. Most of the women wore black scarves on their heads. There was a black covering on a table at the front of the church. At one point during the service, people knelt, and pressed their foreheads to the floor.

There was a potluck dinner from 6:30 PM to 8:30 PM. There was lots of food, much of it brought down by Chugachmuit from Anchorage. However, there was also some local food. I are kippered red salmon and baked silver salmon.

After dinner certificates of appreciation were distributed to participants in the health fair, including one for the Alaska Department of Fish and Game, which is attached.

Evidently, there had been another change in plans. A decision had been made to have a dance after all, with recorded music. So there would not be a community meeting. The Village Council President asked me to get up and do our presentation at the potluck. It was at a bad time, between dinner and the awarding of door prizes, but it was all we had.

I gave a brief summary of the most recent test results, and asked that people let me know what they would like to see tested this year.

There were only a few questions, most of them from one person. There was no clear indication of what should be tested or where. I pointed out that Jody and I would be around if anyone had questions or suggestions.

There was a dance at 9:30 PM, I left at 10 because I was the only adult dancing.

The next morning I had breakfast with my hosts and Derenty Tabios and another man from Chenega. They were talking about curing sea lion flippers. One of the men from Chenega said he hangs them in the smokehouse for thirty days, and this tenderizes them. Derenty says his mother used to do this, too.

After breakfast, I went to church with my hostess. The service was similar to that of the night before, but longer. There was a bowl of sweetened rice on the table in the front of the church, with a lit candle in it. Towards the end of the service, everyone went up, kissed the icons, and took some of this rice and ate it. My hostess gave me some of the rice to eat.

I visited the Village Council President at home. I told him that I hadn't really gotten the feedback I needed from the community, in order to plan for this years sample collection and testing. I said I would send him a list of all the sites that had been tested in the Chenega Bay area and all the test results, so the village council could review what had already been done before making a decision on what they want done in 1994. I told him we wouldn't be going out to collect samples until May, at the earliest.

We left Chenega Bay at 2:10 PM via a Jim Air Charter arriving in Anchorage at 3:30 PM.

cc: Jody Seitz

APPENDIX 9c:

Trip Reports and Related Correspondence

Prince William Sound

TATITLEK VILLAGE IRA COUNCIL
P.O. Box 171
Tatitlek, AK 99677
Ph. (907) 325-2311
FAX (907) 325-2298

TRANSMITTAL

TO:

RECIPIENT	
Jim Fall	
COMPANY: ADF&G	DEPARTMENT: Subsist
ADDRESS	
CITY, STATE, ZIP	

FROM:

DATE	TELEPHONE NO.	FAX NO.
5/5/98		
THIS MESSAGE IS FROM: Gary Kompkoff		
FACSIMILE: 48	IF YES/FAX NO. 299-4712	PAGES SENT (INCLUDING THIS PAGE)
SENT BY (IF DIFFERENT THAN ABOVE)		

REFERENCE: Letter to EVOS Trustees

MESSAGE

Please do something!!!!!!!

CC:

REPLY

TATITLEK VILLAGE IRA COUNCIL
P.O. Box 171
Tatitlek, AK 99677

Ph. (907) 325-2311
FAX (907) 325-2298

May 4, 1993

Exxon Valdez Oil Spill Trustee Council
645 G Street
Anchorage, AK. 99501

Dear Sirs:

The residents of the Native Village of Tatitlek, most of whom are very dependent on subsistence resources for their lifestyles, have become extremely concerned (probably more concerned than we have been since the first days of the Exxon Valdez Oil Spill) with the safety of consuming any of the marine subsistence resources. Our concerns relate primarily to the condition of the herring, which is not only a staple subsistence resource in our village, but, also a main food source of many of the other resources that we enjoy. The effect that the herring may have on the safety of consuming any of the resources has necessaitated the discontinuance of harvests of any of the subsistence resources until we are certain that they are safe for human consumption.

Since the oil spill, the Village of Tatitlek has asserted their belief that the resources and environment were much more affected and for a much longer term than we were being led to believe; we continue to strongly assert this. The resources that our people have subsisted on for generations are no longer available to us, the numbers of these resources have been declining since March 24, 1989. We do not need scientists and researchers to tell us this, generations of knowledge and coexistence with these resources tell us this. We do, however, need the scientists and researchers to explain to us how the resources have been affected, how long we can expect these resources to remain affected, and the safety of consuming any of the resources.

While the Tatitlek Village IRA Council has not had a great degree of involvement in the restoration process, we have followed the progress of the process very closely and are very appreciative of the efforts of the Trustee Council. At this time, the Village of Tatitlek strongly urges the Trustee Council to give the Subsistence issues a higher priority than they have been given, and provide more funding for researching the affects that the oil spill has had on the resources that the residents of the spill affected areas subsist on. The importance of this research has been magnified greatly by the problems that are surfacing with the health of the Pacific Herring, which can adversely affect the health of the many resources that prey on the herring for their survival. More specific studies of most of the subsistence resources, including seals, seaslion, ducks, salmon, shellfish, and bottom fish, is required to determine the affects that the herring may have had on their health.

As mentioned above, the residents of this village are very worried about the condition of the resources in our area. The herring are sick, the ducks, to some degree are sick, the seal and sea lion populations are declining and we are very concerned about our future lifestyles. All indications are that the resources have been very adversely affected by the oil spill to some degree and we are being told not to worry.

In closing, we would like to express our sincere gratitude and appreciation for the incredible work that you all have done in addressing the restoration of the resources and environment impacted by the oil spill. We also hope that attention will be given to those organizations and communities who do not have the capability to attend the public meetings of the Trustee Council that other organizations do. It is very important that the issues that face the residents of the spill zone are recognized and addressed.

Thank you very much, take care.

Sincerely,

Gary P. Kompkoff,
President, Tatitlek Village IRA Council
Vice-Chairman, Chugach Regional Resources Commission
Chairman, Chugach Environmental Protection Consortium

gpk
cc: Mr. Jim Fall, Subsistence Div, ADFG
Chugachmiut
The Tatitlek Corporation

STATE OF ALASKA

WALTER J. HICKEL, GOVERNOR

DEPARTMENT OF FISH AND GAME

333 RASPBERRY ROAD
ANCHORAGE, ALASKA 99518-1599
PHONE: (907) 344-0541

May 20, 1993 - FAXED today

Gary Kompkoff, President
Tatitlek Village Council
PO Box 171
Tatitlek, AK 99677

Dear Gary:

There follows a fax regarding the disease in the Prince William Sound herring population. Dr. Ted Meyers of the Fred Division Fish Pathology Lab in Juneau and the team of pathology staff have isolated a virus from the Pacific Herring in Prince William Sound. The virus is North American Viral Hemorrhagic Septicemia. The virus was confirmed by scientists of the Seattle laboratory of the U.S. Fish and Wildlife Service.

The virus is strictly a fish virus and poses no threat to human health through eating affected herring or animals which have fed on the herring.

The sea lion from which samples were taken May 1 has been identified as having lesions which are common to sea lions and not harmful to the animal or to those who eat it. The lesions are thought to be caused by a fungus. Don Calkins of ADF&G has seen pictures we took of the animal and received the samples we sent in. He will be writing a memo about this to Jim Fall, which I will send to you when I receive it.

I would like to arrange to visit Tatitlek the first week in June with Carl Hild, marine mammals biologist for RuralCap. We would like to stay about 3 or 4 days and talk with people about marine mammals.

As usual, if I may be of further assistance, please call.

Sincerely,

Jody Seitz

Jody Seitz
267-2361

cc: Tasha Chmielewski
Jim Fall
Rita Miraglia

11-K16LH

Dr. Theodore Meyers, CFMD Division, ADF&G 05-11-93

North American Viral Hemorrhagic Septicemia Virus Isolated From Pacific Herring in Prince William Sound

The 1993 herring fishery in Prince William Sound was a complete failure with only 1/3 of the fish showing up to spawn in the Sound. About 15 to 37% of those fish arriving on the spawning grounds were observed to have hemorrhagic lesions of the skin and behaved abnormally. Viral Hemorrhagic Septicemia Virus (VHSV) was isolated from each of 2 groups of 10 such herring submitted to the Alaska Department of Fish and Game Fish Pathology Laboratory in Juneau. The team of pathology staff including Sally Short, Karen Lipson and Dr. Ted Meyers performed the initial virus isolations and identified the virus as a bullet-shaped rhabdovirus using electron microscopy. All three of the virus isolates were then confirmed to be the North American strain of VHSV by U.S. Fish and Wildlife scientists Bill Batts and Dr. James Winton in their Seattle laboratory using DNA probe analysis. VHSV was isolated from two Pacific cod in Prince William Sound by ADF&G pathology staff in 1990 and 1991. The occurrence of the virus in a marine fish species helped explain the possible origin of North American VHSV first isolated in returning adult chinook and coho salmon from Washington State in 1988. Whether this VHS virus is able to kill herring and was the cause of the failure of the Prince William Sound fishery this year is not yet known. Work will continue to examine this possibility by injecting healthy herring with the virus to monitor the fish for mortality and lesions similar to those observed in Prince William Sound herring. An important fact for Prince William Sound residents is that this virus is strictly a fish virus which poses no threat to human consumption of the affected herring nor of other animals feeding on the herring.

After isolation of VHSV in Washington State in 1988 the virus was again found in adult coho salmon returning to different locations in the state during 1989 and 1991. VHSV was first discovered in Denmark in 1938. Since then the European strain of VHSV has caused extensive mortality and economic losses in both juvenile and adult rainbow trout in Europe. Hence, the first appearance of VHSV in Washington caused considerable concern and the destruction of several million fry and eggs from infected parent fish in order to prevent potential spread of the virus to other fish stocks and watersheds. However, the North American isolates have been shown to be genetically different from the European strains of VHSV and relatively harmless for most salmonid fishes. However, fish pathologists are still very concerned about North American VHSV since rhabdoviruses have a high rate of evolution and it is possible that this agent could adapt to other fish species such as salmonids and become a serious pathogen.

Dr. Theodore Meyers, CFMD Division, ADF&G 05-11-93

North American Viral Hemorrhagic Septicemia Virus Isolated From Pacific Herring in Prince William Sound

The 1993 herring fishery in Prince William Sound was a complete failure with only 1/3 of the fish showing up to spawn in the Sound. About 15 to 37% of those fish arriving on the spawning grounds were observed to have hemorrhagic lesions of the skin and behaved abnormally. Viral Hemorrhagic Septicemia Virus (VHSV) was isolated from each of 2 groups of 10 such herring submitted to the Alaska Department of Fish and Game Fish Pathology Laboratory in Juneau. The team of pathology staff including Sally Short, Karen Lipson and Dr. Ted Meyers performed the initial virus isolations and identified the virus as a bullet-shaped rhabdovirus using electron microscopy. All three of the virus isolates were obtained from the Pacific cod in Prince William Sound by ADF&G pathology staff in 1990 and 1991. The occurrence of the virus in a marine fish species helped explain the possible origin of North American VHSV first isolated in returning adult chinook and coho salmon from Washington State in 1988. Pacific cod may not be the primary host species for the North American VHSV virus in light of the recent findings of the virus in several Pacific herring from the same Prince William Sound area.

Whether this VHS virus is able to kill herring and was the cause of the failure of the Prince William Sound fishery this year is not yet known. Work will continue to examine this possibility by injecting healthy herring with the virus to monitor the fish for mortality and lesions similar to those observed in Prince William Sound herring. An important fact for Prince William Sound residents is that this virus is strictly a fish virus which poses no threat to human consumption of the affected herring nor of other animals feeding on the herring.

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STATE OF ALASKA

WALTER J. HICKEL, GOVERNOR

DEPARTMENT OF FISH AND GAME

333 RASPBERRY ROAD
ANCHORAGE, ALASKA 99518-1599
PHONE: (907) 344-0541

June 1, 1993

Mr. Gary Kompkoff
President, Tatitlek IRA Council
P.O. Box 171
Tatitlek, Alaska 99677

Dear Gary:

The following is a more detailed project description of the restoration foods sampling project. They would like to sample shellfish and bottomfish, 4 samples of each from each site. The selection of species for sampling will take into account concerns expressed by the community.

We have agreed that the village council would discuss sites and settle on those they want tested. The sampling is scheduled for June and September, so the council should make its decision soon. Please call when you know which areas you want sampled.

Enclosed also is a memo from Don Calkins regarding the sea lion myself and others took samples of on May 1, 1993. The lesions are common, and pose no threat to human health, *according to department biologists.*

Thank-you as always for your considerable efforts on behalf of your community for these projects.

Sincerely,

Jody Seitz

Jody Seitz
Subsistence Resource Specialist II
267-2361

cc: Rita Miraglia

Post-It™ brand fax transmittal memo 7671	# of pages ▸
To GARY KOMPKOFF	From JODY SEITZ
Co. TATITLEK IRA Council	Co. ADFG Subs. Div
Dept.	Phone # 267-2361
Fax # 325-2298	Fax # 349-4712

2nd FAX on this restoration project description.

STATE OF ALASKA

WALTER J. HICKEL, GOVERNOR

DEPARTMENT OF FISH AND GAME

333 RASPBERRY ROAD
ANCHORAGE, ALASKA 99518-1599
PHONE: (907) 344-0541

June 9, 1993

Gary Kompkoff
President
Tatitlek Village Council
P.O. Box 171
Tatitlek, AK 99677

Dear Gary:

Just wanted to let you know that we are moving ahead with the subsistence restoration project funded by the *Exxon Valdez* Oil Spill Trustee Council. We have not heard back from Tatitlek regarding specific sites that people wanted to see tested. On the other hand, we know from the Oil Spill Health Task Force community meeting last summer, as well as conversations Jody Seitz has had more recently with you and with other community residents, that there continues to be concern over oil spill contamination to subsistence foods. To make sure that Tatitlek is not left out of the current round of testing, I have gone ahead and selected sites for testing, based on information from the previous food safety projects.

I have suggested that samples of shellfish be taken from North Bligh Island and Southwest Boulder Bay. Samples of rockfish will be taken from near Bidarki Point. The samples will be collected by Dave Erikson, working for the Pacific Rim Villages Coalition. Local residents will be hired to assist with the collection, and receive training. The Prince William Sound sampling trip will occur between June 29 and July 5, 1993.

If you have any questions, or would like to change the sampling locations, please contact me (267-2358) or Jody (267-2361).

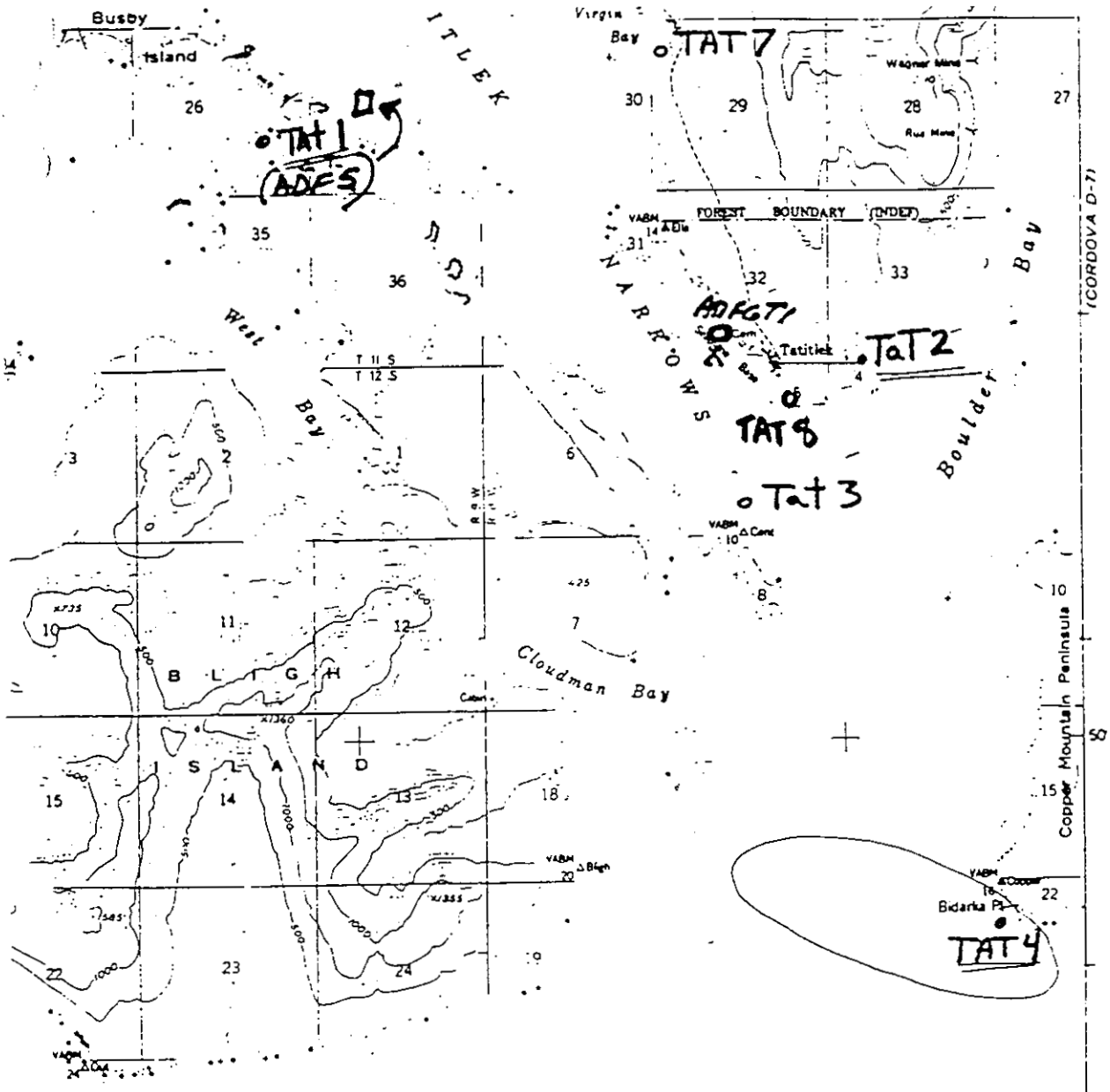
Thanks for all your help.

FAXED + ORIGINAL MAILED
6-9-93

Sincerely,

Rita A. Miraglia
Oil Spill Coordinator
Division of Subsistence

cc: Jim Fall
Jody Seitz



CORDOVA
D-8
ALASKA

SHELLFISH WILL BECOLLECTED FROM THE SITES LABELLED TAT 1 AND TAT 2

ROCKFISH WILL BE SAMPLED FROM THE GENERAL AREA LABELLED TAT 4

FIDALGO PORT

MEMORANDUM
SUBSISTENCE DIVISION
ALASKA DEPARTMENT OF FISH AND GAME

TRIP REPORT

TO: James Fall
Regional Program Manager
Subsistence Division

DATE: June 10, 1993

TEL: 267-2361

FROM: Jody Seitz
Subsistence Resource Specialist II

RE: 6/7-10 Tatitlek
Chenega Bay

Itinerary: Traveled to Tatitlek via JimAir with Carl Hild of RuralCap, Monday 11:30 a.m. Arrived Tatitlek 12:40 p.m. Left Tatitlek Wednesday, June 9, about noon, arrived in Chenega Bay at 12:30 p.m.

Purpose of Trip: to interview remaining key respondents in Tatitlek and Chenega Bay; introduce Carl Hild of RuralCap; meet with the village council to determine sites to be tested for shellfish and bottomfish near Tatitlek for the restoration project; answer questions regarding VHS; and get feedback on the total harvest we recorded for the marine mammal surveys this spring.

Summary: Carl and I interviewed two key respondents, we visited with several households and discussed the marine mammal project, community concerns about disease, and the incidence of abnormalities the community had observed recently. I passed on information about VHS to households and showed households my photos of the sea lion with "target lesions." None of those we visited with had ever observed herring with the present disease (It was first isolated in Alaska in 1990 in Pacific cod in PWS.) None of those we visited with (11 Tatitlek households, and a Tatitlek elder I saw in Chenega Bay) had ever seen target lesions before. The latter shook his head and vehemently stated he'd never seen anything like the target lesions on that sea lion before. In Chenega Bay I was able to interview one key respondent for NMFS project, check his harvest survey and complete an SEQ with him. Neither had he seen target lesions before.

The village council meeting, held at 1:00 on Tuesday, June 8, was a surprising show of community involvement. There were 9 people there, 7 members of the IRA council, and two additional members of the public. The council asked for a presentation on the restoration project. I went over the purpose of the project and asked for suggestions for sites. See memorandum of June 10, 1993. Sites selected included, for bottomfish: Bligh Reef, Knowles Head at the tanker anchorage, and Two Moon Bay. Sites for sampling shellfish included Reef Island, Knowles Head, Bligh Island, and Two Moon Bay.

I reviewed the marine mammal harvest numbers for the community, and received no comment from those present.

I passed around the photograph of the sea lion with target lesions. No one had seen them before.

Carl Hild made a presentation about RuralCap. He mentioned that his organization is trying to get some money to put together a book, rather like a field guide, to diseases and physical abnomalities commonly observed in marine mammals in Alaska. He is also quite interested in the issue of environmental contamination. Carl has worked for the public health service in Anchorage for the past 7 years, prior to working for RuralCap. He is soon to be the past president (for 3 years) of the International Society for Circumpolar Health. He is a mammalian physiologist by training and worked for about 6 years in Barrow, on a variety of things. He has worked with polar bears, and was an EMT with the Barrow Fire Department for several years. He is interested in cultural variations in physiological phenomena such as sudden infant death syndrome and cold water drowning.

Carl was adept at joining in conversation with people regarding a range of issues from hunting to abnormalities people have observed in resources.

At the council meeting hh17 mentioned the VFDA salmon smolts in pens in Boulder Bay. They have spots on them, he said, and would we care to look at them? Gary asked if we would accompany hh17 to the pens when he feeds the smolts to look at them. Carl and I went over with him about 8:00 p.m. We saw silver salmon smolts approximately 4 to 6 inches long in the water in pens. Some appeared to have white spots on their backs, along their spines and sides. When hh17 pulled some up in a net, he said they did not look like the herring. He decided they were fine, although he said several times that last year's smolts did not look like this. I encouraged hh17 to contact VFDA if they felt something was wrong with them.

He took us over to the other side of Boulder Bay, passing behind an island and in front of the isthmus separating Boulder Bay from Galena Bay. We stopped twice to look at the waterfalls. He says he comes here, anchors and fishes for halibut.

In Chenega Bay, I saw CarolAnn Wilson and Mary Kompkoff first. CarolAnn and I and Donia took a walk down to the dock, where we found hh5, who had just come in to the dock for lunch. He was working on the SERVS oil spill drill. He had several questions and comments for me. He noted that bears had not yet been seen in the village, which for this community, is quite unusual. He didn't know if this was due to all the noise around the village, from construction and whatnot. He asked about the herring virus and stated he would not eat them. Also, he's concerned about VHS infecting PWS salmon. He also wanted to know if hunters could contract herpes from sea otters. He hasn't eaten seal in 6 months. He asked about the sea lion we took samples of in Tatitlek.

CarolAnn told me that she had gone with her uncle yesterday to pick chitons at Fox Farm. They picked black and brown ones. One chiton was different. It had scratches and looked funny underneath, so she threw it away.

Community Concerns:

People are still concerned about herring. According to residents it is unusual for them to remain in the Tatitlek area so long. They can still be seen around the dock. Doris gave me a note she'd written about observing the herring at the dock....[On June 2, she and Evelyn Totemoff walked down to the dock and saw herring swimming under the dock. They saw some with scales on only half of their body. One third of the school were affected that way, they say. Some had sores on them and the fish seemed to be very slow moving. There were small, medium and large fish. They watched them for about 45 minutes. The water was milky.]

At the village council meeting, Gary expressed frustration that Tatitlek was the last to know about the virus, that the department was slow in responding to the concerns which they so widely disseminated, and that someone in the department had told a member of the community that the herring were safe to eat before the department knew what disease the herring had. He also wanted to know why someone (else) had not contacted the community regarding the virus.

Resource Notes:

Herring: Some of the herring swimming around the dock were very large, some small. They had sores all over them. They've been in the vicinity of the Tatitlek dock through the end of May. This past weekend (5/30-31) a resident caught 5 or 6 and cut them open. They still had eggs in them. They were very small. Some herring had meat falling off of them. She said about 1/3 of the herring looked sick. She could not understand why there were small eggs still present in a large fish. She wondered what made the herring keep their spawn. (from phone conversation 6/2/93)

Salmon: Last year the pink salmon stayed out by Green Island, and turned black before returning to their streams to spawn. Doris also said that last year they had chums in Boulder Bay that had nowhere to go. (from phone conversation 6/2/93).

Disease: Doris, "I'm not going to eat something that look like shit. A virus is a virus. You don't feed something sick to humans." (from phone conversation 6/2/93)

OFish: Doris says Ed says the cod are really weird. (from phone conversation 6/2/93) hh9 says they don't eat tomcod. "never have." 6/7/93

Ofish: Doris has seen wolf eels down at the dock in deep water. It's the first time she's seen them there. 060793

sea lion target lesions: hh23 says she's never seen them before. hh4 and hh12 have never seen them before. 060893

Herring: hh23 says this is the first year she can remember living here when there was no spawn around. She just got a little baggie with some spawn. Usually she fills one small chest freezer with spawn. hh4, hh12, hh9 and hh16 say they've never seen herring like this before. hh9 says she would not let her kids eat them. She can't remember in her lifetime there being no spawn. The first batch of herring to come through was very large (February-March). In Chenega Bay the beach was full of small herring. They were "teeny. The second batch were very little. hh4 and hh12 say they've never seen such a poor year for spawn and for herring. The herring came in during the time several Tatitlek residents were in Chenega Bay visiting due to a funeral.

sea lion: hh9, hh16, hh20 husband or wife had never seen target lesions before. HH9 says she usually does see the animals after they've been butchered, but she believes she would have heard someone talk about it if they had seen the lesions before. 060893

Ecology: Hh9 says there are no seagulls, ducks, spawn this year. She's lived here a little more than 30 years.

Salmon: hh16 says the reds usually come through about mid-June. They haven't arrived yet. hh9 was worried that the salmon fry in the pens to be released in Boulder Bay, have a

fungus such as they've seen on the herring. She says she won't eat hatchery fish. They're too soft and have blisters around their stomach. 6/7/93

Furbearers: hh23 got a beaver. (We don't have them here!) hh2 also commented on finding 2 beavers here recently. 060893

Game: The bear project has some local opposition. Hh9 says her husband explained it this way. We don't play with our animals. What would happen to the children if something happened to Greg? Also, bears don't like getting tranquilized. She felt that the bear attacks over the last year were due to bears being irritated with humans. 060793

Death: Gary mentioned that Kevin's death has really affected the whole community. "It's affected me. I feel like crying." He said they used to do a lot together. Kevin was a cornerstone of the community, always helping out. Gary mentioned the last 5 months have been hell (there have been 2 suicide attempts in the village since January.) Doris also commented on it. "It feels like a part of the community is missing. He was the maintenance man, power plant operator, friend, and handy man. If you needed something fixed Kevin did it. He was always around." 6/7/93

Sea otters: with Carl Hild: someone spread the word that it was okay to take sea otters "as many as you want" since their population was okay. So, a couple of crews went out and took a couple hundred. There was also a commercial buyer who promised to take all the furs. The buyer backed out. All the animals got dumped. Now the Sea Otter Commission is putting out a warning to only take what one needs for subsistence and personal handicraft use. They are concerned that such arrangements might be a set up to trap Native hunters. hh2 mentioned that the large sea otters near Cordova stay within the city limits. You can't get them. 060893

Seals: He and his uncle would go to Icy Bay. They would go seal hunting and have their catch skinned that night. Once, a long time ago, hh2 and his uncle got 27 seals in Icy Bay in one day. They quit. They had all they needed and their boat was full. It was "a handfull at that." They got them skinned that night. 060893

Disease: HH2 felt that as far as disease goes, the seals were okay, but he had seen some bitten by killer whales. He also says some sea lions he saw through his scope this spring had bumps on them. He did not believe they were scars from mating activities. 060893
Areas: HH2 says that seals used to be all around the islands here near Tatitlek, and in Port fidalgo, and Galena Bay. Now, he says, Fidalgo is like a dead sea. He went out looking for some seals. He learned of George's Market in Anchorage and thought he could market some meat. But, he says, he couldn't get enough to feed the people here, so forget about marketing meat! 060893

Pups: HH2 says no pups have been had here in Tatitlek this spring. chenega Bay has gotten them, they got pups in Icy Bay.

Harvest Levels: Hh2: "That's what I'm good at, hunting seals to perfection. This isn't a target shoot." He would go for 20 or so in a day. That would be a good day. Now, he says, he hardly gets anything. There are none around here, he says. There are more sea lions that seals! 060893

Bears: HH2: There are no bears around here, and none in Fidalgo - very strange. 060893

Costs: hh2 was reimbursement for traveling further to harvest resources. He says the animals have moved away and followed the herring. 060893

herring: hh20 asked if it was usual to see herring of all ages, big and very small. He believes they are staying around too late. The big schools usually move fast in the same pattern past the village. These here now are lethargic. The move slowly and not all in the same pattern. The mill around. They have stayed here around the dock. According to these lifelong residents, the herring have always spawned here near Graveyeard and Long Beach Point. This year there was only a little bit on Bligh Island, and it was pretty sandy. He says that the commercial herring fishery affected the pattern of the spawn. The commercial fisheries managers are not letting the herring stay in the area long enough to spawn. Usually when the herring spawn, people in the community could walk to the areas to get spawn. 060893

herring: hh20: He says he grew up on them, black ducks and spawn. He grewup on it. There's a spot for them out front and at Ellamar. He's 37 and "I've never seen anything like this." 060893

HH20 also mentioned that he's been summoned to be deposed again. 060893

Alcohol: According to one resident hh3, alcohol sometimes prevents people from doing subsistence activities. 060993

Gender: hh3 shamed some young men into cutting wood for an older woman. 060993

Disease: th29 says "we never ate anything strange. We hardly had occasion to throw away things. We want to know why we are seeing so many strange things. People were fishing cod in February (2/15). Cod spawn then. They gave him a cod. It looked, he said, like it was just starting to develop spawn in it. He speculated that maybe the cod and bottomfish are lying on oil. 060993

th29 has a pretty bleak outlook on recovery. He doesn't believe the state or Exxon will ever restore subsistence resources or make reparation to Natives. "they just keep doing studies and we understand that, but it's only to benefit themselves, not us. Only a Native person in our position of using these resources could understand what it means to us to lose them." 060993

Ch5: He has never seen the target lesions before in his life. "We've gotten lots in my day. (sea lions.) In Old Chenega we used to eat lots of sea lions. A year ago was approximately the time he last got one. He hasn't gotten too many after the Exxon Valdez Oil Spill.

Seals: Disease: His friend, th21, got a seal. Its stomach was bloated. th21 cut it open and found the stomach was full of worms. 060993

Herring: This morning Carl took a walk down to the beach and out on the dock. The herring are still here, he said. 060993

th21 was in Chenega Bay. He says he used to hunt with his dad. His dad told him how to tell good sea lions. The blubber had to be white and about 1.5 inches think, not red and thin.

th21 says he's never seen a sea lion with lesions like those in my picture of target lesions. 060993

cc: Rita Miraglia

MEMORANDUM
SUBSISTENCE DIVISION
ALASKA DEPARTMENT OF FISH AND GAME

TO: Rita Miraglia
Subsistence Resource Specialist

DATE: June 10, 1993

FROM: Jody Seitz
Subsistence Resource Specialist II

RE: restoration project

At the Tatitlek village council meeting Tuesday, June 8, with nine residents present, the following sites were chosen for sampling:

Bottomfish:

Bligh Island
Knowles Head at the tanker anchorage
Two Moon Bay

They are concerned about halibut, rockfish, and cod.

Shellfish

Bligh Island
Reef Island
Knowles Head
Two Moon Bay

Gary added to this, wherever ADF&G Subsistence Division feels is appropriate.

Since you had to go ahead with letters to the communities in preparation for the project, I will contact Gary Kompkoff and see which sites he feels the community like to change, if any. I'll be in touch with you after I talk with Gary.

cc: Jim Fall
cc: Gary Kompkoff

MEMORANDUM
SUBSISTENCE DIVISION
ALASKA DEPARTMENT OF FISH AND GAME

TO: Rita Miraglia
Subsistence Resource Specialist II

DATE: June 18, 1993

TEL: 267-2361

FROM: Jody Seitz
Subsistence Resource Specialist II

RE: conversation with
Ron Totemoff

Rita, after I got off the phone with you this morning I called Tatitlek IRA Council to leave a message for Gary to call us when he is in the office, after June 24. He has been away from the community this week. I gave Sandra the message. She had me talk with village council member Ron Totemoff, who was present at the village council meeting, and who suggested one of the sites to be sampled.

Ron preferred Knowles Head rather than Bidarki Point for sampling bottomfish. He also felt that Reef Island should be one of the sites chosen for sampling shellfish.

I told him that you would be in touch with Gary to confirm sampling sites next week.

cc: Jim Fall

MEMORANDUM
STATE OF ALASKA
DEPARTMENT OF FISH AND GAME
DIVISION OF SUBSISTENCE

TO: James A. Fall
Regional Program Manager
Division of Subsistence
Anchorage

DATE: March 29, 1994

FROM: Rita A. Miraglia
Oil Spill Coordinator
Division of Subsistence
Anchorage

RE: Trip to Tatitlek,
March 17, 1994

SUMMARY: *Conducted a community meeting to discuss the subsistence foods testing project, and any continuing oil spill concerns. There continues to be a concern in Tatitlek about the safety of subsistence foods, these result from a basic distrust of the advice they have been given, observed abnormailities in many of the resource species, and scarcity of most resource species. People here blame both the abnormalities and the scarcity on the oil spill. The village council will get back to us with a list of sites and resources they want to see tested in 1994. They would like to see seals from their harvest area tested this year.*

The village council president gave his approval to conduct MMSII and marine mammal surveys in Tatitlek this spring.

I left Anchorage at 12:30 PM on March 17, 1994, via a Jim Air charter, arriving in Tatitlek at 1:30 PM. I had planned to travel down to Tatitlek the previous day and stay overnight, but bad weather caused a delay. John Wilcock, a fish biologist from Cordova, who works with herring, arrived a few minutes after I did on a Cordova Air charter. I just had time to bring my bags up to the community center, when I saw his plane, and walked back to the runway to meet him. John had never been in the village before.

Together we walked back to the community center, and met with the Village Council President in his office. We chatted informally until it was time for the meeting to start. The President had just come back from his first ever visit to Washington, D.C., and told us about his trip.

We started the meeting at 2 PM. At that time, in addition to the Village Council President, there were two adults and a child present. Another adult came in later.

I talked a little about the test results from 1993. Then opened the floor for comments or questions.

The president said that stress related illnesses were up in the community. He blames this on the oil spill.

The president referred again to a comment he says Steve Behnke made at a meeting a number of years ago. According to the President, Behnke said whoever was telling people in the communities that the subsistence foods were safe to eat didn't know what they were talking about. Despite our repeated attemps to assure him either Behnke misspoke, or he misunderstood what Behnke said, this comment still rankles.

The president said that there were no herring in this area last summer, and because of this, there has been a scarcity of the animals that follow the herring. He said this has been a bad year for subsistence. There are no seals, no sea lions, and even very few deer.

Roy Totemoff, who participated in the Oil Spill Health Task Force meeting and visit to the lab last August, made the comment that the meeting and trip didn't help ease fears here. When he reported back to the community on the trip, people said "Let them come here and eat the food. Then we'll believe it's safe". The president added that Oil Spill Health Task Force members declined to eat local food when they were offered it. I think this may refer to Tom Nighswander's response when he was asked whether he would eat shellfish from an oiled beach.

There were a lot of questions for John Wilcock, I think it was good that he was there. He said that the winter of 1992-1993 was a hard one for herring. A poor plankton bloom meant that the herring were malnourished. He doesn't expect to see the same problem this year. Based on the herring he's already seen here, which are fat, he expects this years' herring will be more healthy.

One of the residents present at the meeting said no one ever remembers seeing herring with lesions like that. He also said they were concerned because the herring didn't spawn. John said some herring did spawn at Montague Island, but that the herring there also had lesions. John agreed that the oil spill may well be part of the problem with the herring, but the link would be difficult, if not impossible to prove. He said other factors are El Nino, and changes in ocean currents which change conditions in Prince William Sound.

There were also questions about viruses found in the salmon. These include something called IHN virus, which was found in hatchery sockeye salmon. This particular virus is transmitted to the eggs. Another virus mentioned goes by the acronym VEN.

One resident said they had seen unusually small red salmon with small eggs, which had blood spots at the end of the egg sac. He wanted to know where he could send samples of the abnormal sockeyes he finds. John Wilcock said he could send them to Sam Sharr in Cordova. He recommended sending the whole fish, fresh and not frozen. The fish should be kept cold and sent within twenty-four hours of death.

The president mentioned that he had received a letter from Jody asking for permission to conduct surveys in the community. He said he didn't see any problems with doing surveys in Tatitlek. He said, as usual, there would be some people who wouldn't want to participate. In general, he said most people understand that it helps the community to have this information recorded. He said he would get a letter out to Jody eventually, but that she should just plan on doing the surveys.

The president said that the lingering oil spill concerns are the same throughout the Sound. He would like to see seals tested from Tatitlek's harvest areas. He said the numbers of seals, sea lions, and everything else are down even from last year. He said we probably would have to have someone stay there at least a week in order to get samples of five seals.

The president said he fears that the future holds a drastic economic change for his community. He sees much more reliance on store bought foods.

The president wanted to talk to some people in the community before getting back to us about what sites and resources they want to see tested.

The meeting ended at 3 PM.

Since we had nearly an hour before we were scheduled to leave, I took John to visit with one of the communitys' elders. The elder was glad for the company, and invited us in for coffee and tea. He had a lot of questions for John, about herring and salmon and enhancement.

The elder said the octopus dens in the intertidal are still empty. John asked him how they caught octopus. The elder said "We used to go by the moon. When there was a good moon, the tide would go out, and we'd go down there and get them. We knew where they lived, their places under the rocks, and we had a long stick with a hook on the end, we'd push that under there, and pull them out". He also mentioned that people used to occasionally catch king crab on their halibut hooks. He said there aren't any king crab out there now.

We left the elders' house when we heard what turned out to be John's plane approaching. We headed down to the runway. John left at 4 PM. I had to wait a little while for my plane. Two engineers from R&M consulting were flying out with me. Unfortunately, the runway hadn't been plowed, and the new snow was melting into the gravel, making the runway soft in places. With three passengers, the pilot was unable to safely get up enough speed to take off. We had to deplane. The pilot took off alone, landed on the water, and met us on the beach next to the dock, where we again boarded the plane, and finally took off successfully, at 4:45 PM. I was home in Anchorage by 6:30 PM.

cc: Jody Seitz

STATE OF AL

WALTER J. HICKEL, GOVERNOR

DEPARTMENT OF FISH AND GAME

333 RASPBERRY ROAD
ANCHORAGE, ALASKA 99518-1599
PHONE: (907) 344-0541

May 11, 1993

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To LARRY EVANOFF	From RITA MIRAGLIA
Co. CHENEGA BAY IRA	Co. ADF+G
Dept.	Phone # 267-2358
Fax # 573-5120	Fax # 349-4712

Larry Evanoff
President
Chenega Bay IRA Council
General Delivery
Chenega Bay, AK 99574-9999

Dear Mr. Evanoff:

The Division of Subsistence has received funds from the *Exxon Valdez* Trustee Council for a subsistence restoration project. The project is summarized in the attached detailed description, and flyer.

As part of the project, meetings will be held in the communities impacted by the spill, to allow community residents to discuss any continued food safety concerns, document persistent oil in harvest areas, and to help plan the collection of samples of subsistence foods for testing. I would like to schedule a community meeting in Chenega Bay sometime in the next couple of weeks.

I will call you in the next few days so we can discuss the best time to schedule the meeting.

As always, if you have any questions, please feel free to call me at 267-2358.

Sincerely,

Rita

Rita A. Miraglia
Oil Spill Coordinator

cc: Jody Seitz, ADF&G
Chenega Corporation

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To GAIL EVANOFF	From RITA MIRAGLIA
Co. CHENEGA CORP	Co. ADF+G
Dept. VICE PRESIDENT	Phone # 267-2358
Fax # 573-5135	Fax # 349-4712

MEMORANDUM
STATE OF ALASKA
DEPARTMENT OF FISH AND GAME
DIVISION OF SUBSISTENCE

TO: James A. Fall
Regional Supervisor
Division of Subsistence
Anchorage

DATE: May 24, 1993

FROM: Rita A. Miraglia
Oil Spill Coordinator
Division of Subsistence
Anchorage

RE: Trip to Chenega Bay, 5-24-93.

SUMMARY: Only six people attended the community meeting to discuss the subsistence restoration project. I think this was due to poor timing rather than lack of interest. However, I feel I got enough from the meeting, and conversations I had with community residents during the day, to begin the sampling plan for the Chenega Bay portion of the subsistence food sampling. A few phone calls to follow up with individuals who missed the meeting will probably be necessary.

I left Anchorage at noon on May 24th via a JIM Air charter, with Una Swain, Assistant Wildlife Program Manager with the Division of Habitat and Restoration. We ran into three Chenega residents who just come up to Anchorage at JIM Air's offices. Unfortunately, two of them are people who have been very involved in oil spill issues in the past. We flew directly to Chenega Bay, arriving there at 1:15, just a few minutes after the mail plane. Una and I made our way up to the community center and met briefly with the village council president. A work crew was in the process of renovating the kitchen in the community hall, where we had planned to have our meeting. The village council president said that the crew had arrived a week earlier than expected, and would be working late into the evening. We decided to move the meeting to the school gym.

We took a break for lunch, and then went visiting. We ran into Jody at a household where she had just completed an interview. Although she had planned to return to Anchorage with us, Jody said that it would be necessary to remain in the village for another day or so.

It became evident while we were visiting, that quite a few people were either out of the village, fishing, or were working full time on one of a number of projects going on locally.

The meeting was only attended by six people. Two of these were teenagers, who came because their mother sent them. They took

some handouts, presumably to prove that they had come to the meeting, and left. The other four stayed, and had questions, comments and suggestions.

There was no interest in the persistent oil mapping exercise. I was told "DEC already knows where the oil is".

There were questions about the herring with sores on them. I explained that the sores were caused by a fish virus, and are not a threat to human health. I was told that tiny herring, only about two inches long came into the dock area at Chenega Bay this March. One woman said "They were so thick that you could just put in a dipnet and come up full. The crows were picking them out of the shallow water, that's how close in they came". Before the earthquake, herring used to spawn in the waters in front of the village on Chenega Island. Since the establishment of the settlement at Chenega Bay, herring have not been seen here. The herring that came this March were all about the same size, and did not have any sores. One of the men told me "They were just perfect. Nothing wrong with them". "I cooked them up whole and ate them like popcorn," another man said. Some community residents have observed sores on bottomfish, probably cod. I passed this information along to Evelyn Brown by phone today. She said it doesn't surprise her that these juvenile herring showed no sign of disease for two reasons, first, they think the disease is latent and the lesions only manifest themselves in the last stages, and second, until they are about three years old, herring stay in a cohort group all of the same age, the fish observed in Chenega Bay were probably spawned in 1992, so these fish may not have been exposed to the infected fish.

A number of shellfish sampling sites were suggested. One man, who did not attend the meeting wanted us to go back and test at Port Ashton. I told him we would most likely not test there, and that people should not consume shellfish from there. Although some oil did reach there during the spill, the main source of contamination at that site is unrelated to the spill. He said that he does eat shellfish from that beach. Unfortunately, considering the degree of contamination of there, it is one of the few places on the east side of Evans Island where people can find enough large clams to make the trip worthwhile.

Delenia Island in Dangerous Passage, a tiny island just off the northwest shore of Chenega Island was also suggested as a sampling site. The island was an important subsistence shellfish site both before the earthquake and after the establishment of the new settlement at Crab Bay, and was heavily oiled in the 1989 spill. According to the village council president, there is interest in going there to harvest shellfish, but people are still afraid of contamination there. The same is true of Kake Cove on Chenega Island. Both these sites are more important than they might be because Chenega Island has recently become the site of periodic community picnics. The emphasis at these picnics is to eat native foods and participate in traditional activities.

While other native foods have been harvested and used at these gatherings, shellfish been avoided because of uncertainty about their safety.

Whale Bay, just below Claw Peak, and the head of Shelter Bay on Evans Island were also suggested as important clam beaches, which could be tested.

Most of the other shellfish sites mentioned at the meeting were important before the earthquake, but are too far from the present community site to be accessible for most residents. Golden, north of Esther Island in Port Wells was described as an important place for harvesting cockles before the earthquake. People also used to get clams from the Esther Island side of Esther Passage, and the reef at the west end of the passage.

People did not have specific suggestions for locations for bottomfish sampling, but thought it was a good idea to test bottomfish.

At the meeting I also discussed our plans to take samples from seals and ducks harvested for subsistence. I was told that most of the people who hunt for seals do so in the spring and take pups, because they are the best eating, but that we may still be able to work with a hunter that harvests beyond the spring. I was told that hunters are now seeing a lot fewer seals along the west side of Knight Island. This is interesting because over the last two years some Chenega Bay seal hunters were saying the seals were disappearing, while others said they weren't sure whether the numbers were declining or the seals were just moving away from the areas immediately adjacent to the village and toward the west side of Knight Island. The hunters present at the meeting also said there used to be a lot of seals at Iktua Rocks at the north end of Evans Island, as well as at Gibbons Anchorage on Green Island and Fox Farm on Elrington. They said they no longer see seals at any of these places.

One of the men present at the meeting indicated he might be willing to work with us to get duck samples.

At 7:15 PM, we boarded the plane for our return flight to Anchorage, landing on Lake Hood at 8:10 PM.

Although I was disappointed with the poor turnout for our meeting, I think this was more a result of bad timing than lack of interest. Several key people were out of the village either because of medical emergencies or because they were commercial fishing. Many others are presently working full time, and didn't get off work in time for the meeting. I think we got a significant amount of input from the both those who did attend the meeting, and the people I spoke to informally during the day.

Pending some follow-up phone calls to some of the key people who missed the meeting, I think we should sample shellfish from

Delenia Island. I think it is also essential that we go back to one site we tested during our previous project, I think Fox Farm on Elrington Island is the best place to go back to. If we had unlimited funds (which we don't), I would also like to test shellfish from Kake Cove, Shelter Bay and Whale Bay.

cc: Jody Seitz

STATE OF ALASKA

WALTER J. HICKEL, GOVERNOR

DEPARTMENT OF FISH AND GAME

333 RASPBERRY ROAD
ANCHORAGE, ALASKA 99518-1599
PHONE: (907) 344-0541

June 9, 1993

Larry Evanoff, President
Chenega Bay IRA Council
General Delivery
Chenega Bay, AK 99574-9599

Dear Larry:

This is to follow up on the meeting we had about the subsistence restoration project funded by the *Exxon Valdez* Oil Spill Trustee Council. Based on the discussion at that meeting, as well as conversations I had with other community residents, we have selected two shellfish sampling sites and two bottomfish sampling sites in the areas used by Chenega Bay residents for subsistence. We wanted to return to one site of each type, that had been tested in the earlier subsistence food safety projects, so we could compare the new test results to those we got at the same sites in previous years. We also wanted to add one new site of each type, based on community concerns. The two shellfish sites are Delenia Island, in Dangerous Passage, northeast of Chenega Island, and Fox Farm, east of North Twin Bay on Elrington Island. Samples of mussels, butterclams, and littleneck clams will be collected from these sites. The two bottomfish sites are just north of Shelter Bay, on the north end of Evans Island, and east Sawmill Bay, just southeast of Johnson Cove on Evans Island. Rockfish will be sampled from both these locations.

The shellfish and bottomfish samples will be collected by Dave Erikson, working for the Pacific Rim Villages Coalition. Local residents will be hired to assist with the collection, and to receive training. The Prince William Sound sampling trip will occur between June 29 and July 5, 1993.

No decisions have been made yet regarding the seal and duck sample collections that will also be conducted in the subsistence areas used by residents of Chenega Bay. We will need to hire local hunters to participate in this portion of the project as well. As I mentioned during our meeting, I think Paul Kompkoff Jr. would be a good person to help with the seal project, if he is interested, and I was hoping the Don Kompkoff might be interested in helping with the duck project.

If you have any questions, please feel free to ask me. As you know, I will be in Chenega Bay from June 10th through the 22nd. Or call Jody Seitz at 267-2361.

See you soon. Thanks for all your help.

Sincerely,

Rita A. Miraglia
Oil Spill Coordinator
Division of Subsistence

cc: Gail Evanoff, Chenega Corporation
Jim Fall
Jody Seitz

MEMORANDUM
STATE OF ALASKA
DEPARTMENT OF FISH AND GAME
DIVISION OF SUBSISTENCE

TO: James A. Fall
Regional Program Manager
Division of Subsistence
Anchorage

DATE: March 29, 1994

FROM: Rita A. Miraglia
Oil Spill Coordinator
Division of Subsistence
Anchorage

RE: Trip to Chenega Bay, 3-11 thru 3-13-94

Summary: *Participated in a health fair in Chenega Bay, and did a brief presentation on the subsistence food testing project for the community. The Village Council President said he would get back to us with a decision on what sites and resources the community wants tested.*

Jody Seitz and I left Anchorage via Jim Air at 1:10 PM on March 11, 1994, arriving in Chenega Bay at 2:10 PM. We had very good flying weather. It hadn't been good in the morning, but we had 8,000 foot ceilings and good visibility the whole way. We flew down Turnagain Arm, through the pass over Blackstone Bay, and straight into Chenega Bay. As we flew over Evans Island, from Shelter Bay to Crab Bay, I could see the new runway. We had a traditional water landing. The saltery that used to stand in front of the village has been removed, and there is now a bare, black hillside there. The community plans to put a marine service and fueling dock there, with the ability to accommodate some of the large processing vessels that come to the area.

I walked up the hill to the community center. Chenega Corporation has built a new office extension onto the building, and I was told that there is a gravel pad on the other side of the community center, where the Corporation will be building a new office building. There are definite plans to build an apartment triplex as well. The triplex would house young couples waiting to get a house in the community, or elderly community residents who aren't interested in maintaining a house.

I met briefly with the vice president of Chenega Corporation, then continued down to the my hosts home. My hostess was cleaning and filleting about twenty red rockfish, and a few other fish that they had been given by commercial cod fishermen from their by-catch. Word came down today that the commercial cod season will be closing on March 16th. Some people here have also been given halibut by the cod fishermen.

Twenty-two people from here have been working at MacCleod Harbor on Montague, longshoring. None of the local people are doing any actual cutting of trees. One man, who has been working there, said they expect the cutting and longshoring at Patton Bay to last five more years.

The English Bay Band had been scheduled to play at a dance after the health fair, but was unable to come due to an illness. I met with the Village Council President, he said it had been decided, since the band wasn't coming, to have a community meeting after

the health fair instead of a dance. He suggested I do my presentation on the subsistence food safety testing project as part of that meeting.

I met with the Vice President of Chenega Corporation and Jody. The Vice President had some questions about my impressions of Kate Wynne. She also wanted to know where I thought a seal sampling project would lead in the long term, and what it would provide to the community. I told her I thought Kate would be a really good person for the community to work with. I know she is interested in exploring with residents the ways in which her project can give something back to the community. I also told her I thought once a seal sampling program was begun in Chenega Bay, it would be likely to continue for a number of years, because both the biologist and the hunters have an interest in seeing it continue. The problem up until now has been getting the funding and time to get it started.

The Vice President also showed us a letter from Gary Shigenaka, who works for NOAA, outlining a continuing research project to document the effects of both initial oiling and clean up on Prince William Sound shores. The project concentrates on the intertidal and the biota that live there. The Vice President was impressed because Gary's letter indicated a clear interest in involving the community in the work, and said there would be room on the project for one or two high school or college students from Chenega Bay to participate.

By evening, some serious weather had come in. First snow, then mixed sleet and rain with strong gusting wind.

The next morning, Jody and I took a cruise of Sawmill Bay on the Cape Kasilof. When I went back to my hosts house for lunch, I met Derenty Tabios, president of Chugachmuit, who had come in for the health fair that morning, and would be staying with us.

The health fair began at 1PM. Jody and I had a table there with information on the subsistence food testing program. About ten members of Chugachmuit's staff were there, manning tables on health and safety. The people who came in could have their weight, height and blood pressure measured, they also filled out a health questionnaire. Some blood tests, including a test for HIV, were available. Very few adults attended the health fair, we mostly saw children and teens.

Two of the marine mammal hunters spent the day hunting in Bainbridge Passage, and came back with a seal and a sea lion. They wanted to get some seal meat for some of the native visitors to the community to take back to Anchorage with them.

One hunter told me he got five ducks today. He said he's been having good luck with them, he got about ten other ducks in the last couple of weeks.

One man said he would like to see us test clams from just below the village again for hydrocarbon contamination. Another wants to see deer from Sleepy Bay tested. He said deer are more scarce than they were before the oil spill.

One resident asked for a copy of the general hunting regulations, especially those for Dall Sheep. Unfortunately, we hadn't thought to bring regulations along, so I told him we would send them to him.

A Chugachmuit employee who lives in Seward wanted to know if it is normal for herring to eat their own eggs or not. She says her husband is a commercial fisherman, and has recently observed herring doing this.

Paul Jackson of Chugachmuit wants to know if there is any information available on mercury levels in Alaskan seafood.

I went to church with my hostess at 6 PM. Most of the women wore black scarves on their heads. There was a black covering on a table at the front of the church. At one point during the service, people knelt, and pressed their foreheads to the floor.

There was a potluck dinner from 6:30 PM to 8:30 PM. There was lots of food, much of it brought down by Chugachmuit from Anchorage. However, there was also some local food. I are kippered red salmon and baked silver salmon.

After dinner certificates of appreciation were distributed to participants in the health fair, including one for the Alaska Department of Fish and Game, which is attached.

Evidently, there had been another change in plans. A decision had been made to have a dance after all, with recorded music. So there would not be a community meeting. The Village Council President asked me to get up and do our presentation at the potluck. It was at a bad time, between dinner and the awarding of door prizes, but it was all we had.

I gave a brief summary of the most recent test results, and asked that people let me know what they would like to see tested this year.

There were only a few questions, most of them from one person. There was no clear indication of what should be tested or where. I pointed out that Jody and I would be around if anyone had questions or suggestions.

There was a dance at 9:30 PM, I left at 10 because I was the only adult dancing.

The next morning I had breakfast with my hosts and Derenty Tabios and another man from Chenega. They were talking about curing sea lion flippers. One of the men from Chenega said he hangs them in the smokehouse for thirty days, and this tenderizes them. Derenty says his mother used to do this, too.

After breakfast, I went to church with my hostess. The service was similar to that of the night before, but longer. There was a bowl of sweetened rice on the table in the front of the church, with a lit candle in it. Towards the end of the service, everyone went up, kissed the icons, and took some of this rice and ate it. My hostess gave me some of the rice to eat.

I visited the Village Council President at home. I told him that I hadn't really gotten the feedback I needed from the community, in order to plan for this years sample collection and testing. I said I would send him a list of all the sites that had been tested in the Chenega Bay area and all the test results, so the village council could review what had already been done before making a decision on what they want done in 1994. I told him we wouldn't be going out to collect samples until May, at the earliest.

We left Chenega Bay at 2:10 PM via a Jim Air Charter arriving in Anchorage at 3:30 PM.

cc: Jody Seitz

APPENDIX 9d:

Trip Reports and Related Correspondence

Alaska Peninsula

Memorandum

Alaska Department of Fish and Game
Division of Subsistence

To: Rita Miraglia
Oil Spill Coordinator/ SRS II

From: Lisa Scarbrough
SRS II

Date: April 8, 1994

Subject: Oil Spill concerns / 3 Chigniks/ Perryville and Ivanof Bay/ 1993-1994

When I was conducting the seal and sea lion surveys in Chignik Bay, Lake, Lagoon, Perryville and Ivanof Bay in March 1993, I asked several people if they were still concerned about the safety of eating wild resources in their area as a result of the EVOS.

My impression overall, is that most of these people no longer fear the safety of their subsistence foods (due to oil contamination as a result of the EVOS), except for clams with PSP. Many people, however expressed to me that they thought clams, salmon, birds and marine mammals were down considerably since the EVOS in 1989, and most blame it on contamination of the oil on the resources. They feel that because the ocean currents carry all the oil from north to south/west which takes the oil past their beaches/ some of which in the form of tar balls and patties ends up on their beach. All animals eating the oil and traveling in the oils path dies. Many feel that the oil is not cleaned up, and rather has sunk and when storms churn up the water, the oil gets spit out.

This was occurring when I was in Perryville in March of 1993. They took me out to the beach and I noticed much oil in the form of balls and patties on their beach (average 1 3 inch patty/ball spaced every 20 feet along the beaches next to Perryville). Everyone in Perryville were very concerned about the oil, and most thought it was the EVOS oil. They were afraid to get shellfish from the local beaches, and saw some dead murres washing up on the beach and wondered if they died from oil ingestion.

As you recall, I collected one murre, and USF&WS tested it saying it died from starvation, which might be indirectly affected by the spill, if oil depleted the food the murre eats. I also collected some tar balls which I gave some to DEC and others to the attorney of the village of Perryville. DEC asked me to collect the tar balls, but after I gave them the oil, they told me Perryville would have to pay for the tests. I don't know if they ever tested the oil to determine its source.

Most people I spoke with in both communities feel the first year caused the most disruption (1989) in their communities, and they feared to eat the wild foods. Today,

business is as usual, but many feel there are fewer resources available to harvest in the area since the oil spill, and most blame it on the spill.

In April, 1994, I spoke to a person in Perryville and Ivanof Bay. They said they recently got sick from eating razor clams from Humpback Bay, (PSP). There are still tar balls coming up on the beaches after big storms, but don't appear to be as much as a year ago. They feel clams were down in numbers in 1993, and not as big, and "puffy" as in the past. This spring (1994), however, they say the clams look good. One thought it might be a cycle, and not the oil spill.

I feel there would be interest in testing clams for PSP, but few mentioned a desire or need to do further tests for oil spill contamination, but I did not ask them either.

The following comments were made to me while I was in these villages doing Sea Lion subsistence surveys in March, 1993.

March 1993

Chignik Lake
"Before the oil spill, we use to see alot of seals around Chignik Lake and along the beach. Use to see alot more ducks too, don't see them like before. Fish this winter in the Lake (salmon) didn't seem to be as much as before. More bears however."

Chignik Lagoon
Saw tar balls along the beach of Lagoon, last summer. Recently saw many dead murres on beach of Lagoon by village. Don't know what caused them to die. Haven't seen many seals in the area since the EVOS (I fish and am out alot).

I still don't have alot of confidence in the clams, birds and salmon. Have seen horrible looking salmon since the spill. Reds and silvers, with black sores, others have yellow meat. We caught alot of these in our nets in the Lagoon last summer.

I have noticed in the last 3 years, that have harvested salmon with red splotches on them. Never noticed this before with a fish. Have found others with 2 backbones, and one was puffed out with water. Still see beaches along the eastern Pacific Alaska Peninsula with oil on the beaches last summer. I feel during the stress of the oil spill, many of the pregnant seals aborted their young.

I believe everything on earth is connected- do away with one wipes out the other.

We use to get Eider ducks this time of year, but ever since the EVOS, fewer and fewer birds are here. Only saw a dozen this year. The oil spill hurt the birds the worse in this area. I feel it is safe to eat clams. There are fewer of them though due to increase number of sea otters.

Chignik Bay

I worked on the clean-up in Kodiak, chartered my boat. It was phenomenal after the spill. Don't really see what we use to see- bird life, worked the spill in Kodiak and was amazing what is going on - chain reaction of birds dying, fox, bears eating oiled animals, dying. The spill came here too. Moose balls and sheen came here but I was never concerned about getting any shellfish or anything here, but if I lived in Kodiak, I would be asking more questions. I also worked on test fishery here in Chignik in 1989 summer. In 1989 we would make sets and test all the fish for oil. We never found any oiled fish. We spotted sheen.

Perryville

Tar balls are coming in more and more near village. Haven't seen any near river. Finding some with tarred feathers stuck to oil. Collected some. Our salmon runs have been very poor since the oil spill. It must have something to do with the decline.

Haven't seen many seals around since the EXXON deal. There are some dead birds washing up on the beach, more than usual, tar balls coming up too. They are all over. We use to see seals all along the beach, now don't see many. Finding alot of tar balls along the beach west of here. Saw one 2 feet in diameter. All winter seeing dead birds along the beach. Haven't noticed if any were oiled or not. It would be nice to have more testing done, not sure how safe shellfish are to eat.

Saw a half dozen murres dead on the beach. Told Refuge about it, but they weren't interested. We have no more silvers left in our river. The sea lion is starving, and there aren't many here anymore.

Ivanof Bay

I have noticed sick murres "hell divers" on beach about 6 months ago. Don't know what caused their death. There should be a tissue sample collected to see if they are being affected by the aftermath of the EXXON Valdez oil spill. Ron Hood F&WS came down said to collect them. There are still oil balls are still coming up on the beach.

A couple of years ago, I wasn't feeling to confident. Along the coast, I found black crude oil inside of barnacles. I still dig and eat clams, but wonder about their safety.

Don't really know what is causing declines of seals and sea lions in our area, maybe it is pollution, or lack of food. It might have something to do with the oil spill, we are still finding oil outside of the bays.

Saw some tar balls at Humpback Bay the other day. There were big ones, found at Ivanof Bay too, near first creek.

cc: Jim Fall

APPENDIX 3:

Cooperative Agreement Between ADF&G and PRVC