

Exxon Valdez Oil Spill
Restoration Project Final Report

Resource Abnormalities Study

Restoration Project 95279
Final Report

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Study History: The Subsistence Restoration Project: Food Safety Testing (93017 and 94279) was an outgrowth of work begun by the Oil Spill Health Task Force in 1989 as part of the response to the *Exxon Valdez* oil spill. A final report was issued on the 1993 work by Miraglia under the title Subsistence Restoration Project, and a draft report covering both years' work was issued in 1995 by Miraglia under the title Subsistence Restoration Project: Food Safety Testing. The project effort was continued in 1995 with a new emphasis. This report covers the 1995 work.

Abstract: The goal of this project was to restore the confidence of subsistence users in their abilities to determine the safety of subsistence resources. The emphasis in the project's 1993-1994 phase was testing samples of subsistence resources for the presence of hydrocarbons. The 1995 project was designed to communicate information on subsistence food safety to the communities. A system was put in place for getting samples of abnormal resources from subsistence users to biologists and pathologists for study and reporting the findings of the scientists to subsistence users. All samples were taken from animals harvested by local hunters or fishers for subsistence use. Training sessions were held in 19 communities in the oil spill impact area. A total of 61 local volunteers were trained to preserve, package and ship the different types of samples. Each community received a videotape version of the training session to serve as a refresher course for volunteers as well as train additional residents. Sampling kits and instructions were placed in each community, and accounts were set up with air carriers to transport samples to Anchorage. A resource abnormality hotline was established, and posters were placed in participating communities listing local volunteers and the hotline number.

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

Project Data: All available data are incorporated in the report.

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EXECUTIVE SUMMARY

As demonstrated by data collected by the Alaska Department of Fish and Game's Division of Subsistence, subsistence uses of fish and other wildlife were injured by the *Exxon Valdez* oil spill. Annual per capita subsistence harvests declined dramatically (from a 4 percent to a 77 percent decline compared to pre-spill averages) in 10 of the communities in the path of the spill during the first year after the event.

In 1993 and 1994 the *Exxon Valdez* Oil Spill Trustee Council provided funding to test resources from subsistence harvest areas for the presence of hydrocarbons. Samples of species cited in community meetings as being of continued concern were collected. In coordination with the village councils collection sites were selected and local residents were hired to assist in the collection of samples. The samples were analyzed at the National Marine Fisheries laboratory in Seattle. Test results were reported to the communities in an informational newsletter and community visits.

In subsequent years, levels of subsistence harvests, ranges of uses, harvest effort, and the sharing of resources gradually increased in the affected communities. However, a view persisted in the communities in the oil spill area, that the natural environment had changed in ways that still posed a threat to their health and their way of life. This view was partly fueled by observed abnormalities in resource species. Frequently, subsistence users asked where they could send samples of abnormal animals that they had harvested, to find out what could have caused the abnormalities.

There was little to be learned about subsistence food safety from additional hydrocarbon testing. The FFY 1995 project was designed to continue efforts to communicate information on subsistence food safety to the communities. In addition, a system was put in place to get samples of abnormal resources from subsistence users to biologists and pathologists for study and to report the findings of the scientists to subsistence users. All samples were to be taken from animals harvested by local hunters, fishers or gatherers for subsistence use.

This project answered the need to continue to monitor the risks to human health from the oil spill, and in part, the need to involve residents of the spill area as partners in restoration activities. Additionally, the project gave biologists and pathologists the opportunity to see examples of abnormalities that they might not otherwise encounter given their limited time in the field.

A total of 61 volunteers were trained to preserve, package, and ship the different types of samples. Training sessions were held in the communities of Chenega Bay, Tatitlek, Cordova, Valdez, Nanwalek, Port Graham, Seldovia, Seward, Larsen Bay, Karluk, Old Harbor, Akhiok, Ouzinkie, Kodiak City, Chignik Lake, Chignik Bay, Chignik Lagoon, Perryville, and Ivanof Bay. A videotape version of the training session was left in each community to serve as a refresher course for the volunteers, and to allow for the training of additional community residents. Sampling kits and instructions were placed in each community, and accounts were set up with air carriers to transport samples to Anchorage.

A resource abnormality hotline was established, and posters were placed in each participating community listing the names of the local volunteers and the hotline number.

Although this project was only funded for one year, the Trustee Council provided funding to the Division of Subsistence to support the continuation of the hotline, the transport of

samples, and the replacement of sampling kit components for an additional year, as part of the Community Involvement and Use of Traditional Knowledge project (restoration project number 96052).

As of April 1996, four samples had been brought to the project, and two of these were suitable for examination or analysis. In each of these two cases, the abnormalities were found to be unrelated to oil contamination, and not a cause for concern to human health. The project organizers believed the small number of samples submitted during the first few months of the project was in part due to the fact that the season during which many residents do most of their harvesting was nearly over by the time the program was in place. For this reason, the Division issued a flyer in April 1996, to remind subsistence users in the oil spill impact area that the project was still in place and the resource abnormalities hotline was still in operation. In addition, Division research staff continued to remind community officials and other residents of the availability of this service in community meetings and household visits, in the course of their work on other projects.

It should be remembered, however, that even if the opportunity to have samples of abnormalities examined turned out to be little used, knowing that the service was available provided subsistence users with assurance that their concerns are taken seriously.

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 had 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 were 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 travelled to unoiled areas, sometimes outside their traditional use areas, to harvest subsistence resources.

Even in 1994, more than five 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 uses 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 were several factors preventing the complete recovery of subsistence harvests and uses to pre-spill levels. Many subsistence users in the oil spill impact area remained concerned over the possible long term health effects of using resources which may have been contaminated by oil. There had been a loss of confidence on the part of subsistence hunters and fishermen in their own abilities to determine if their traditional foods were safe to eat. Residents of a number of impacted communities expressed the fear that animals which came into contact with the oil had been altered in some way that could not be seen or detected in laboratory tests. In addition, people 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 (although the harbor seal population was already in decline throughout the Gulf of Alaska prior to the oil spill). Subsistence users in the spill area had 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 Alutiiq peoples against the harvesting or eating of animals which appear sick or abnormal. All of these factors continued 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 at the levels detected in the tested samples.

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 Shield¹."

Community representatives did not believe that one could compare smoked fish with fish contaminated by crude oil. 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 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 levels² of hydrocarbons and were safe to eat.

Marine mammals were also found to be safe to eat, although the blubber of heavily oiled seals showed elevated levels of hydrocarbons. These elevated levels were still below the threshold deemed unsafe by the Expert Toxicological Committee. The 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 and 1994 demonstrated that the blubber was 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 represented an increased health risk. Consequently, the Task Force recommended that subsistence users not harvest marine invertebrates from beaches where oil could be seen or smelled on the surface or sub-surface. 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 had declined or ended.

The Subsistence Division and Minerals Management Service Study

¹The 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.

²Background levels are the very low levels of hydrocarbons considered likely to have been present in subsistence foods in the oil spill area before the spill. These levels are based on tests of reference samples taken from areas not oiled by the spill, near Angoon and Yakutat, Alaska.

Directly related to the concern about subsistence food safety was the loss of confidence on the part of subsistence hunters and fishermen in their own ability to determine whether their traditional foods were safe to eat.

In 1989, the spill's immediate effects caused subsistence users to distrust the safety of subsistence foods. Direct observations of dead, injured and diseased wildlife, interpreted through traditional systems of knowledge, strongly suggested to subsistence users that resources might be unsafe for humans (Fall et al, 1995: v).

The Task Force studies were designed to provide vital information to subsistence harvesters to augment their own ability to judge whether subsistence resources were usable. The evidence, available from 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, suggested that the Task Force efforts to respond to this loss of confidence were incomplete. The study found that:

Contamination concerns about specific resources, while substantially reduced from the levels expressed in the first two years after the spill, persisted among many households, especially in Chenega Bay, Tatitlek, Port Graham, and Nanwalek. Substantial percentages of households reported that they had not received adequate information about the safety of subsistence foods. This illustrated an important finding that though the subsistence harvest levels in most of the communities of the oil spill area appeared to be rebounding from the low levels of the first and second post-spill years, many households in the spill area returned to using subsistence foods despite lingering contamination fears (Fall et al, 1995: iv).

For example, only 21.4 percent of households interviewed in 1991 in Chenega Bay, under the joint Subsistence and Minerals Management Service study, reported that they felt adequately informed about the safety of using subsistence foods from the oil spill area (see table 1). Households expressed concerns about the long term health effects of using some of these resources, especially shellfish. By 1993, 28.6 percent of respondents felt that they had been adequately informed. The reasons most commonly given by Chenega Bay residents for not feeling they had been adequately informed included: 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.

In 1991, 37.5 percent of Tatitlek respondents said that they felt adequately informed about the safety of subsistence foods. In 1993, 54.5 percent stated that they were adequately informed. In both Nanwalek and Port Graham, respondent's confidence in the safety of their subsistence food dropped from 1991 to 1993. In 1991, 62.1 percent of respondents from Nanwalek felt adequately informed about subsistence food safety. In April 1993, the percentage of households indicating that they had been adequately informed was down to roughly 39 percent. Port Graham residents confidence in the safety of their food dropped from 50 percent in 1991 to 31.9 and 39.6 percent in 1992 and 1993 despite concerted efforts by the OSHTF to address food safety concerns.

Respondents were also asked whether they felt specific resources from their harvest areas were safe for children to eat. When asked about clams in 1991, 75 percent of respondents in Chenega Bay said they were not safe (see table 2.) That figure declined to 50 percent in 1993. In Nanwalek in 1991, 34.6 percent said they felt clams were not safe to eat. That figure rose to 46.6 percent in 1992 and 40 percent in 1993. 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 Port Graham less than half of the respondents (45.4 percent) thought that clams were safe for children to eat in 1991. However, confidence jumped to 69.6 percent and 61.0 percent over the following two years, indicating a slightly diminished concern about safety. 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 in 1991, 54 percent of respondents in Chenega Bay said they were not safe (see table 3.) In 1992, 75 percent of respondents thought seals unsafe to eat. That figure dropped to 22.2 percent in 1993. In all the other communities, a majority of those respondents who indicated that they eat seal oil or seal meat said they thought seals from their harvest areas were safe. However, in 1993, 27.5 percent of respondents in Nanwalek, and 25.6 percent of respondents in Port Graham said 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, a high percentage of respondents in Chenega Bay said they were not safe (for all three years.) In 1992, 30 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.

The study presented a clear example of subsistence users concerns being raised by an observed resource abnormality:

Concerns on the part of Tatitlek residents regarding the herring stocks of Prince William Sound are perhaps the best illustration of the continuing issue in the village of the safety of subsistence foods and the health of all resources of the Sound following the spill (Seitz and Fall, 1995: V-20)

The 1993 herring run in PWS, infected by viral hemorrhagic septicemia (VHS), was half the forecasted size and provided the lowest harvest since 1983. Subsistence harvester's and other villager's direct observations of the diseased fish, which exhibited external lesions, created substantial doubts about the overall health of the natural environment. Traditional knowledge about food safety and edibility continued to inform people's decisions about subsistence uses.

A further problem was that the ADF&G had opened the community fishery based on assurances that the herring were safe to use without knowing what the cause of the aberrant behavior and hemorrhages might be... Thus, as in the first several years after the spill, the community raised questions about the quality of the information being used to reassure them about food safety, casting doubt about the trustworthiness of any advice about this critical issue (Seitz and Fall, 1995: V-22).

After the disease was identified, village residents remained concerned about the disease's impacts on both other animals in the food chain and on humans. Despite public health advisories, assurance by health professionals, pathologists, and ADF&G that the herring were safe to eat, "doubts persisted that traditional and scientific knowledge were enough to answer questions about what the spill had done (Seitz and Fall, 1995)".

These concerns supported a widely-held view in the village that oil contamination was creating long-term effects on the environment, some of which would only be detected years after the spill (Seitz and Fall, 1995: V-21).

By late 1993/94, there was an important shift in people's explanations concerning why the spill's impacts reduced their resource usage (see table 4). The vast majority of households cited reduced resource populations as the primary reason for reduced usage.

The study found that pre-spill levels of harvest had been approached or matched in most affected communities by 1993/94 (Fall, et al, 1995: iv).

However, in the severely impacted communities of Tatitlek, Chenega Bay, and Ouzinkie, harvest levels remain below pre-spill averages and the overall health of the ecosystem remains a concern.

In Tatitlek and Chenega Bay, harvests appear to have declined in the third year of the study from estimated levels from the first and second years, with a shift in harvest composition from a smaller portion of harvest of marine mammals to a larger portion of the harvest being fish (Fall, et al, 1995: iv).

In some cases, harvesters have traveled from the village's traditional areas to find resources. In part, this is due to continuing concerns about oil contamination, but it is also a result of declines in key resources (Seitz and Miraglia, 1995: IV-24).

The economic and cultural necessities of using subsistence foods have compelled Alaska Natives of the spill area to resume subsistence harvests even at increased costs of time, money, and health concerns (Fall, et al, 1995: iv).

In the view of many of the people interviewed as part of this project, and especially in Prince William Sound and among Alaska Native people, the spill had caused fundamental changes to natural resource populations and the natural environment overall that had yet to be adequately explained. This uncertainty had profound effects on the outlook for the future that people expressed in several communities, such as Tatitlek, Chenega Bay, and Cordova. This remained an important long-term impact of the spill (Fall, et al, 1995: v).

THE RESOURCE ABNORMALITIES STUDY

After evaluating the work of the Oil Spill Health Task Force and the results of the joint ADF&G and MMS study, it was evident that there was little more to be learned about subsistence food safety from additional hydrocarbon testing. Concern in the communities had shifted from hydrocarbon contamination levels to the effects of the oil and abnormalities observed in resource species. For this reason, the FFY 1995 project was designed to continue efforts to communicate information on subsistence food safety to the communities. An additional goal was to put in place a system for getting samples of abnormal resources from subsistence users to biologists and pathologists for study and reporting the findings of the scientists to subsistence users. All samples were to be taken from animals harvested by local hunters or fishers for subsistence use.

The goal of the project was to restore the subsistence uses of fish and wildlife damaged by the *Exxon Valdez* Oil Spill. It was expected that by responding to the specific oil spill related concerns of subsistence users, and reporting accurate health information back to the affected communities in clear, understandable language and in one-on-one discussions, subsistence users' confidence in the resource could be restored. Past efforts in this direction had been partially successful.

This project answered the need to continue to monitor the risks to human health from the oil spill, and in part, the need to involve residents of the spill area as full partners in restoration activities. Additionally, it was anticipated that the project could give biologists and pathologists the opportunity to see examples of abnormalities that they might not otherwise encounter given their limited time in the field.

Background

The project received formal approval to proceed from Molly McCammon, Executive Director of the Oil Spill Trustee Council on March 23, 1995. Subsistence Resource Specialist, Karen Shemet was assigned to carry the project out, with assistance from Division Oil Spill Coordinator, Rita Miraglia and other Division staff.

Shemet conducted a literature search to help her refine the research methodology for the project. Informational meetings and a brainstorming session were held within the Division to provide her with additional background on the genesis of the project and ideas on how to carry it out. At the end of March and beginning of April, Shemet and Miraglia visited communities in Prince William Sound and Lower Cook Inlet as part of subsistence restoration planning meetings (95428). Both Shemet and the Resource Abnormalities Study were introduced to community leaders and other residents. In order to get some idea of what sort of samples we should be planning for, Shemet asked people to report any abnormalities that they had heard about. This information was used to start the list of reported abnormalities which Shemet would add to

throughout the duration of the project (attached as Appendix D). In addition, she asked people to voice any concerns they had about abnormalities or about this new project, as well as ideas on how to restore wild foods and subsistence uses. This preparation period provided Shemet with useful information, allowing her to establish a preliminary plan for carrying out the project and also served to identify potential problems.

Request for Proposals

In early April, Shemet's focus shifted to writing the request for proposals to train the community volunteers. Due to staff inexperience with the competitive contracting process and insufficient administrative staff to assist, this process took two months, much longer than anticipated. This delay put the project behind schedule.

The request for proposals was issued on June 7, 1995, and the due date for proposals was June 28, 1995. Shemet spent much of the month of June working on related activities including setting up advertising, answering inquiries, and mailing out the proposal packet to potential proposers.

Researchers

At the same time, Shemet began work on organizational tasks related to setting up details of the project which fell outside the obligations of the contractor. One aspect of this was lining up researchers willing to examine samples of abnormal resources sent in. The response Shemet received to her inquiries was somewhat disappointing. A number of the people Shemet spoke with were reluctant to commit to the project on a volunteer basis due to their time constraints and already heavy work loads. This response had not been expected.

Early in the planning stages of the project, Miraglia had received enthusiastic responses to the idea of such a voluntary network in conversations with several researchers. In these earlier conversations, the researchers indicated that they would see this as an opportunity to examine abnormalities they might not otherwise encounter given their limited time in the field.

It is difficult to know why Shemet encountered so much resistance to the idea just a few months later. It is possible the researchers she spoke to did not clearly understand what level of effort would be required of them. Shemet recommended to the Division that we locate researchers as needed on a case by case basis as samples came in. This approach worked; we experienced no difficulty or delay in finding pathologists to examine either of the samples that were sent in.

During this time, Shemet also worked with the researchers she spoke to, as well as Division staff, on protocols for the collection of samples.

Communities

During the month of June, all 20 communities in the oil spill impact area were contacted by letter, and asked if they were interested in participating in the project. The letter and a brief questionnaire that accompanied it are attached as Appendix A. In general community leaders

were slow to respond to the letter. Shemet followed up via telephone and fax. People in the rural communities are busy during the summer months working and gathering resources. For this reason, contacting them and getting a commitment from them was a formidable task. In many communities most of the work related to keeping the community running is done by a handful of overworked people. Correspondence from people they do not know may be responded to slowly, if at all. Shemet eventually recruited the other Subsistence Resource Specialists, who are known in these communities, to assist her in establishing contact and getting responses. Ultimately, all of the communities, with the exception of Port Lions, decided to participate. Port Lions did not give a reason for declining this opportunity.

Dames & Moore, Inc.

The request for proposals protest period ended on July 9, and proposal review and evaluation started immediately following that. The contract was written, negotiated, and signed, and Dames & Moore, Inc. was hired on July 11, 1995.

Using the sample collection protocols and the request for proposals as guides, Dames and Moore staff drew up a draft procedures manual and a prototype sampling kit for use by the community volunteers. The draft procedures manual and prototype sampling kit were demonstrated by Dames and Moore staff Dave Erikson, Mark Vania, and Mike Fitzgerald at a practice training session, held at the Alaska Department of Fish and Game offices on August 4. This meeting was an opportunity for researchers and other professionals to provide input to the design of the field component of the project. The demonstration was observed by Division of Subsistence staff, Jill Follett and Jana Geesin who work in the ADF&G Pathology Laboratory, Carl Hild with the Rural Alaska Community Action Program, Inc., Henry Huntington with the Inuit Circumpolar Conference, Patricia Cochran with the Alaska Native Science Commission, and Betsy Nobmann with the Alaska Area Native Health Service.

A discussion followed the demonstration. One issue raised was whether the training would be adequate to allow the volunteers to handle formalin safely. It was suggested that formalin be dropped from the sampling kit. However, the pathologists made the case that without the use of formalin, it would not be possible to do some sorts of examinations. Freezing can destroy the cell structure used to identify tumors and other disorders. Many of the communities involved in the project are remote, making it unlikely that a fresh sample would reach the pathologist before decay set in. It was agreed that the community training sessions would emphasize the toxic nature of formalin. Further, it was decided that where possible, local health aides would be included in the training, and recommendations would be made to store the sampling kit in a location where children or individuals in a state of diminished capacity would not be able to get access to it.

The next week was spent incorporating changes suggested at the August 4 meeting in the design of the sampling kits, the procedures manual, and the training session.

Training Sessions

Shemet travelled to Prince William Sound, with Mike Fitzgerald of Dames and Moore, on August 15, to begin the community training sessions. The Prince William Sound training was completed on August 17. The team moved on to the lower Kenai Peninsula conducting training sessions in Seward on August 18, Seldovia on August 20, continuing on to the Kodiak

Archipelago on August 24. Training sessions were conducted in each Kodiak community, ending with Kodiak City on September 1. The team next travelled to the Alaska Peninsula, arriving there on September 4. Unfortunately, bad weather stranded the team in Chignik Bay for a few days. For this reason, the team was unable to complete the Perryville and Ivanof Bay training sessions in September as originally scheduled. Shemet and Fitzgerald trained volunteers in Port Graham and Nanwalek in separate sessions on September 13. The Ivanof Bay and Perryville training sessions were rescheduled for November 7 and 8, respectively, and were completed by Dave Erikson of Dames and Moore. In all, the team conducted 19 training sessions for community volunteers. Generally, Shemet provided an introduction, explaining the purpose of the project, describing how the sample transport system would work, and the role of the volunteers. Shemet also discussed reported resource abnormalities and the different types of abnormalities that might be encountered. (The text of Shemet's presentation is attached as appendix B). Next the Dames and Moore representative displayed and discussed the contents of the sampling kit. This included a discussion of formalin safety in handling, storage and first aid. The trainers then demonstrated how to prepare a fresh or frozen sample for shipping.

Next came the hands-on part of the training. Two volunteers prepared a sample preserved in formalin. The volunteers were guided through the process by the trainers. If the volunteers were willing, this portion of the training session was videotaped, adding it to the end of the copy of the generic videotaped training session to be left in that community. After the training session, the volunteers evaluated the training on a form provided to them. This provided the training team with valuable feedback which was incorporated into subsequent training sessions.

In general, the training sessions were well received. The volunteers successfully completed their training. Many expressed their approval of the project, and said they were thankful that the project was finally in place.

A total of 61 volunteers were trained to preserve, package and ship the different types of samples. Training sessions were held in the communities of Chenega Bay, Tatitlek, Cordova, Valdez, Nanwalek, Port Graham, Seldovia, Seward, Larsen Bay, Karluk, Old Harbor, Akhiok, Ouzinkie, Kodiak City, Chignik Lake, Chignik, Chignik Lagoon, Perryville and Ivanof Bay. A videotape version of the training session was left in each community to serve as a refresher course for the volunteers, and to allow for the training of additional community residents. Sampling kits and instructions were placed in each community, and accounts were set up with air carriers to transport samples to Anchorage.

Wrap Up

By September 13, most of the training sessions were complete, but there were a few loose ends that needed to be dealt with. The contract with Dames and Moore was amended to cover the additional cost of returning to Perryville and Ivanof Bay in November. The plan for shipping of samples had to be revised. Dames and Moore had simply provided Federal Express labels in the sampling kits. It quickly became evident that this would not work, because Federal Express does not serve many of the communities involved in the project. Shemet and Miraglia contacted local air carriers and set up accounts with Peninsula Air, Jim Air, Southcentral Air and Alaska Airlines Goldstreak Service. The volunteers had to be contacted to notify them of this change.

The volunteers were sent certificates attesting to their successful completion of the training. A resource abnormality hotline (1-800-267-2552) was established, and posters were

placed in each participating community listing the names of the local volunteers and the hotline number.

Samples

The first call to the hotline came on August 22, 1995, from a volunteer in Seward. A dead puffin had been found. The animal had been dead about two weeks, much too long to allow any sort of meaningful necropsy. The volunteer was told there was no point in sending the animal in.

On August 28, there was a call from Ouzinkie complaining that there was too much algae in the area. A sample of this algae was sent in to the ADF&G office in Kodiak City. There was nothing abnormal about the algae itself, other than the fact that there was more of it present than normal. Miraglia called the volunteer who had sent it in, and explained some of the possible reasons for an increased amount of algae in the area, including changes in water currents and winds, as well as changes in water temperature. The algae was not analyzed, because it did not fit into the types of phenomena the project is intended to deal with. However, the manner in which it was delivered to the Kodiak City office alerted us to the problems with the sample transport system set up by Dames and Moore. It was after this incident that steps were taken to set up the accounts with local air carriers.

On September 14, project volunteer Juanita Kelly of Kodiak collected a sample of a cod with abnormal growths in a gill cavity. Kelly followed the procedures she had learned in training, writing a description of the abnormal growths, taking a sample of the affected area, and preserving the sample in formalin. The sample arrived in Anchorage on September 27, and was examined by Jill Follett, a Fish Pathologist with the Alaska Department of Fish and Game. Follett identified the growth as a xenoma, which is caused by a one-celled animal called a protozoan. It is not likely this growth was caused by oil or other pollution. This type of growth is fairly common, and in some places is found in nearly three-quarters of all Bering Sea Pacific Cod. A fish with such a growth is still safe for people to eat, although the growth itself is unappetizing. The laboratory report was forwarded to Kelly, along with a cover letter explaining the results of the examination (the report and letter are included in Appendix F).

In February 1996, Don Kompkoff of Chenega Bay sent in a section of seal skin with an abnormality, from a harbor seal harvested near his community. The sample was forwarded to a Kimberlee Beckmen, a licensed veterinarian and research associate at the University of Alaska, Fairbanks, who specializes in marine mammal pathology. Beckmen prepared slides of the abnormality, and diagnosed it as an old healed-over abscess. The original abscess was probably caused by a wound that became infected. The slides were forwarded to Kathy Burek, a veterinary pathologist in Eagle River, who confirmed Beckmen's diagnosis. Kate Wynne, a Marine Mammal Specialist with the University of Alaska Fairbanks in Kodiak, wrote directly to Don Kompkoff explaining the results of the examinations (Wynne's letter is attached as part of Appendix F).

Follow Up

Although this project was only funded for one year, the Trustee Council provided funding to the Division of Subsistence to support the continuation of the hotline, the transport of samples, and

the replacement of sampling kit components for an additional year, as part of the Community Involvement and Use of Traditional Knowledge project (96052).

In April 1996, the Division sent out flyers reminding subsistence users in the oil spill impact area about the Resource Abnormalities Study, and that this service was still available to them. In addition, Division research staff continued to remind community residents of the availability of this service in both household visits and community meetings, in the course of their work on other projects.

DISCUSSION

In general, this project was well received by subsistence users in the oil spill communities. With the exception of Port Lions, every community invited to participate in the project chose to do so. In each community at least two, and in some communities as many as six, local people volunteered to be trained and to provide their services to their community free of charge. The training itself seemed to have been successful, as there were no problems with the condition of samples when they reached the pathologists. The first couple of samples sent in illustrated problems with the sample transport arrangements made by Dames and Moore, allowing us to make the necessary adjustments early in the process (Unfortunately, the Federal Express labels continued to cause problems into the second year of the project).

It was impossible to know before hand how many samples we could expect to receive. The unexpectedly low number (two) may be partly due to the fact that by the time most of the training was complete and the sampling kits were in place in the communities, the main harvesting season was nearly over. While subsistence users do harvest some resources throughout the year, most harvesting takes place in the spring, summer and fall.

Subsequent to the period covered by this report (after April 1996), it became evident that there was a problem with the way the hotline was set up. Rather than being an actual hotline with a 24 hour response, it was really just an additional line to a staff telephone at the Alaska Department of Fish and Game. If a call came in on a weekend or in the evening, it was not responded to until the start of the next working day. It is possible that people tried to call the hotline outside normal working hours during the first year of the project. If they did not leave messages, project staff would not have been aware of the problem. This may have discouraged people from calling the hotline.

Even if the opportunity to have samples of abnormalities examined was little used, knowing that the service was available provided subsistence users with assurance that their concerns were taken seriously. Community leaders, project volunteers, and other community residents expressed their appreciation for the project, both in community meetings and in one on one communication with Division staff.

At the Community Conference on Subsistence and the Oil Spill (restoration project number 95138) held in Anchorage on September 23, 1995, the idea of compensating community volunteers for their time as part of this project was discussed. A couple of conference attendees contended that local people should be paid for all participation in any project. Several others, among them volunteers trained as part of this project, said they viewed the time spent on this project as a service to their community. While the Division agrees that there are many instances in which local people should be paid for their participation in research, we think there is a danger in requiring payment for participation in every project. If such a policy were adopted, some projects desired by the communities, but not considered a high priority by researchers, might not

be funded. There are other forms of compensation besides money. In some projects, a service is provided to the community, in other cases information needed by the community may be provided. The form and amount of compensation for each project needs to be worked out between the researchers and communities involved, as was the case with the Resource Abnormalities Study.

The Resource Abnormalities Study was a service being provided to the communities in response to their requests to have abnormal resources examined. The sampling kits, training sessions, shipping, researcher examinations, interpretations, and health advice were all provided to the communities that chose to participate, free of charge. Therefore, volunteers were asked to provide their services to their community, also free of charge. The communities approved the project with the understanding that we would be seeking local volunteers. The commitment on the part of the volunteers involved attending a two-to-three hour long training session and then responding on a case by case basis to the abnormalities that turned up. It takes approximately 15-30 minutes to process and package a sample. This seemed a good and fair exchange for the free service provided. In fact, between two and six residents of each of the 19 participating communities agreed with this assessment. So much so, that they volunteered to participate.

Spill Area Resident Concerns

In the community meetings and training sessions, a number of related issues were raised by local residents. Shemet summarized them as follows:

- 1) The spilled oil was still causing problems in the environment.
 - a. Some oil sank and was poisoning bottom dwellers such as halibut and crabs.
 - b. The blasting of the intertidal zone with high pressure, hot water in 1989 drove the oil deeper into beach sediments.
 - c. Mussel beds were still oiled in some areas.
- 2) Concerns over potential human health risks remained.
 - a. Subsistence users received conflicting messages. On the one hand, that the effects of oil were unclear and uncertain, and on the other that it was safe to eat most resources.
 - b. The scientists said people needed to make their own decisions about what to eat or not eat, but the people were not confident of their ability to do so.
 - c. The turn around time to get the results of tests on samples was too long. Sometimes results were not returned to the communities at all.
 - d. There was concern that scientists seemed unable to say with certainty when it would be absolutely safe to eat local foods again.
- 3) The impact of the oil spill on local Native culture had been substantial and the negative affects persisted.
 - a. Sharing networks had broken down, there had been a loss in the sense of community, and the bonds between people had been weakened.
 - b. Because of the disruption of community life, the training of children in subsistence skills and other cultural activities had been neglected. This had weakened their connection to the land and the resources.
 - c. Local people had suffered the spill as a “mental wound”. There was no cultural precedent for healing from the shock and trauma of such a man-made, technological

disaster. People did not know how to deal with their grief, and some had exhibited unhealthy behaviors in the wake of the spill.

- d. Local people also expressed a sense of spiritual damage from the spill. The water was previously viewed as a source of life and food. It was now seen as diseased. This made people feel less connected to the environment and less connected to the generations that came before them.
- 4) A number of people in the communities in the oil spill impact area expressed the opinion the Trustee Council was not doing enough to address their concerns.

Researchers

Some of the researchers Shemet contacted stated that they did not think oil contamination and related problems were a real issue in these communities anymore. They argued that it was not *Exxon Valdez* oil causing abnormalities and problems with resource recovery, but that other causes such as diseases, genetics, and stress were to be blamed for most abnormalities. Some saw the project as a waste of time. It was evident from these comments that there was still a great deal of misunderstanding within the scientific community about what the project is expected to achieve.

It was not our contention that abnormalities had been caused by the oil spill; such a conclusion was outside the area of expertise of Division staff. Rather, we contended that the oil spill had caused subsistence users to more closely examine the animals they harvest. As a result, people were noticing and reporting abnormalities they may not have been concerned about before the spill. The intent of the project was not to catalog abnormalities caused by oil contamination. Instead, it was meant to help subsistence users deal with the increased anxiety caused by the oil spill. The main goal of the project was to help people understand the possible causes and possible human health implications of the abnormalities they were seeing. Crude oil may be weakly carcinogenic, but we also knew that, while it may not be the most appetizing prospect, eating a tumor will not cause a person to contract cancer. In most cases, the abnormalities seen were not expected to be linked to the oil spill or to health risks to the consumer.

In large part, the project was about empowerment. It was about giving people the opportunity to have their specific questions about a particular animal answered by a specialist. It was hoped that, given consistent, timely, and accurate information, people might increasingly learn to trust themselves to make decisions concerning resource safety.

Some researchers, upon hearing about abnormalities observed by subsistence users, expressed interest in obtaining samples. Because subsistence users have more day to day contact with resource species than most researchers, there was a greater likelihood they will encounter abnormalities. There was a very slight chance that a previously unknown impact of the oil spill on a resource population might be identified through this project. However, this was not a principal goal of the project.

Some researchers did agree to participate in the project, but the network of committed researchers envisioned did not come to fruition. Samples were instead handled on a case by case basis as they came in.

Different Ways of Knowing

The scientific community has often dismissed Native observations as anecdotal. Subsistence users in the oil spill impact area have expressed the fear that the environment had changed since the spill in ways that could not be seen or detected in laboratory tests. In a very real sense, this was an expression of the lack of faith many local people had in the information provided to them by researchers working on oil spill monitoring and restoration projects. This left some researchers thinking that communication with the local people is impossible. However, we believed that the answer lay in a one-on-one, case-by-case dialog on the specific questions that remained for subsistence users.

CONCLUSIONS

The project was successful in training local volunteers to collect samples of abnormalities observed in resource species. Of the 20 communities in the oil spill impact area invited to participate only one, Port Lions, declined the opportunity. The transport system and resource abnormalities hotline also seemed to work successfully in the first year of the project (although problems were identified in the second year, see Miraglia, 1997). Four calls were made to the hotline during the time period covered by this report, and two of these produced samples suitable for examination or analysis. In each of these two cases, the abnormalities were found to be unrelated to oil contamination, and not a cause for concern to human health. The project organizers believed the small number of samples submitted was in part due to the fact that the bulk of the 1995 subsistence harvesting season was nearly over by the time the program was in place.

Questions were raised by a couple of individuals about whether the community residents participating in the project should be paid. It was the opinion of the project organizers, as well as that of the participating communities and local volunteers, that this project was a service provided to the communities free of charge and it was appropriate to ask local residents to volunteer their services.

Local residents in the spill area expressed continued concern over oil spill impacts and the direction of oil spill restoration in the community meetings and training sessions. While progress had been made, there was still much work to do.

Another area that still required attention was improving communication between researchers on *Exxon Valdez* oil spill restoration projects and residents of the oil spill impact area. This work continued under the Community Involvement and Use of Traditional Ecological Knowledge Project (95052).

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