Exxon Valdez Oil Spill
Restoration Project Final Report

Subsistence Restoration Planning and Implementation

Restoration Projects 94428 and 95428
Final Report

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Study History: The project was initiated under Restoration Project 94428 and continued as Project 95428. Annual reports were not prepared. FY 95 was the last year for this subsistence restoration planning and implementation effort, with support for subsistence restoration project planning to take place in FY 96 in Restoration Project 96052.

Abstract: Subsistence uses are a vital natural resource service which was impaired by the *Exxon Valdez* oil spill, and have not fully recovered. The project attempted to develop a comprehensive approach to subsistence restoration by organizing a planning team, meeting with community and regional organization representatives, and assisting communities and organizations in preparing subsistence restoration project proposals for funding either from the civil settlement Restoration Fund or a $5 million appropriation by the Alaska Legislature of criminal settlement funds. Projects funded from the civil settlement needed to demonstrate a direct link to an injured natural resource. Redirecting some project proposals to the criminal settlement funding made possible a broader approach towards restoration of the environmental, social, and cultural dimensions of subsistence. The project resulted in an enhanced role for subsistence users and communities in the restoration process, as evidenced by a notable increase in funding of subsistence restoration projects. A review of findings of a joint Alaska Department of Fish and Game/Minerals Management Service research project suggests that while partial recovery of subsistence uses has occurred, restoration is not complete. A directed effort should continue to actively involve subsistence users and communities in oil spill restoration activities.

Key Words: Alaska Peninsula, Cook Inlet, *Exxon Valdez*, Kodiak Island Borough, Prince illiam Sound, subsistence.

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EXECUTIVE SUMMARY

INTRODUCTION

Subsistence use of fish and wildlife is a vital natural resource service (a human use) that was impaired as a result of the *Exxon Valdez* oil spill. Primarily as a consequence of concern that resources had been contaminated by oil, subsistence harvests, the range of resources used, and participation in subsistence activities all declined in the year after the spill. Although some recovery has occurred, the spill's effects on subsistence remain.

In October 1991, the United States and the State of Alaska settled civil and criminal claims against Exxon regarding natural resource damages caused by the spill. Under the civil settlement agreement, Exxon agreed to pay $900 million over a ten-year period into a restoration fund administered by the *Exxon Valdez* Oil Spill Trustee Council. Subsistence uses are one of several lost or reduced services for which restoration projects may be funded by the Trustee Council. Also, the State of Alaska allocated $5 million of its criminal settlement funds for subsistence restoration projects, to be awarded as grants to unincorporated communities of the oil spill area.

The purpose of the Subsistence Restoration Planning and Implementation Project was to design a coordinated approach to subsistence restoration and implement a planning process to develop subsistence restoration project proposals for consideration by the Trustee Council for federal Fiscal Year 1995, FY 1996, and beyond. Project ideas not approved by the Trustee Council could be considered for funding from the state criminal settlement money.

OBJECTIVES

The Subsistence Restoration Planning and Implementation Project had three objectives. These were: design a comprehensive approach to subsistence restoration; meet with residents of the subsistence communities in the spill area to identify community needs and priorities related to injured subsistence resources and services; and work with communities to develop proposals to restore reduced or lost subsistence resources and services.

METHODS

A planning team was formed consisting of representatives of the Alaska Department of Fish and Game, the Alaska Department of Community and Regional Affairs, the National Park Service, and the US Forest Service. The planning team met with Trustee Council staff and attorneys to plan the program and develop guidelines for projects. Three rounds of community and regional meetings took place, involving representatives of 19 communities. Planning team members described the restoration process during these meetings, and then assisted community representatives in identifying and prioritizing project ideas. The planning team also assisted communities and organizations in developing project proposals for consideration for civil and criminal settlement funding.

RESULTS

A total of 16 subsistence restoration project proposals were submitted to the Trustee Council for consideration for funding in FY 1995. Of these, three received funding from the Trustee Council, and an additional seven received criminal settlement funding. For the FY 1996 Work Plan, 22 project proposals were submitted to the Trustee Council, with 11 receiving funding. In 1995, three additional projects received criminal settlement funding, for a total of about $3 million of the available $5 million criminal settlement appropriation being committed by September 1995.

The planing team's efforts to develop a "comprehensive approach" to subsistence restoration encountered some obstacles, stemming from the terms of the settlement agreement governing the use of the restoration fund. A restoration plan adopted by the Trustee Council in 1994 clarified that projects to restore or enhance an injured service had to demonstrate a direct connection to an injured natural resource. Given this limitation, the planning team concluded that a comprehensive approach to subsistence restoration that addressed the environmental, social, and cultural dimensions of the subsistence way of life would not be possible. The team emphasized to communities the need to link project proposals to natural resource recovery. The team remained committed to a comprehensive approach in a geographic sense.

DISCUSSION

Due in part to the planning and implementation project, participation by communities of the spill area in the restoration process was greatly enhanced. The project contributed to an overall increase in the commitment of civil settlement funds to subsistence restoration projects. This commitment rose from about $600,000 in FY 94 to over $1,000,000 in FY 95. During the same time, the percentage of subsistence restoration funds supporting community-proposed projects or going to local communities and Alaska Native organizations increased from 23 percent to 34 percent. Of the $1,291,400 authorized for FY 96, 79 percent went to community-proposed projects or was awarded to communities and Alaska Native organizations through contracts.

Although an overall increase in subsistence restoration project funding has taken place, participation in the restoration process is still largely confined to communities of Prince William Sound and lower Cook Inlet. This reflects the greater familiarity in these communities with the restoration process. A need remains to more fully involve Kodiak and Alaska Peninsula communities in the Trustee Council process.

The support of 10 projects by the State of Alaska through grants from the criminal settlement funding broadened the scope of the total package of the subsistence restoration program. A number of these projects, such as a spirit camp and subsistence foods processing facilities, attempted to restore the social and cultural aspects of subsistence uses which could not be directly addressed by the full Trustee Council.

The report reviews selected findings from another project conducted by the Department of Fish and Game and the US Minerals Management Service, independent of Trustee Council funding, to access the status of the recovery of subsistence uses as of 1994. Subsistence harvest levels have increased throughout the spill region since dropping precipitously in 1989, but those of the Prince William Sound communities of Chenega Bay and Tatitlek remain below prespill

levels. By 1994, most respondents to a questionnaire administered as part of the ADF&G/MMS study reported that they believed that harbor seals were safe to eat, but there was less confidence regarding clams. A substantial number of the respondents in the Prince William Sound and lower Cook Inlet villages believed that the spill continued to affect sharing and children's participation in subsistence activities. Although in 1989 the spill's effects on subsistence were attributed to fears of oil contamination of subsistence foods, by 1994 more respondents were pointing to spill-caused reductions in subsistence resources as the cause of lower subsistence uses.

CONCLUSIONS

Despite the limitations on the scope of eligible projects, the planning effort succeeded in contributing to an enhanced role for subsistence users and communities in the restoration process. Participation was greatest in Prince William Sound and lower Cook Inlet, with more frustration expressed in Kodiak and the Alaska Peninsula over a lack of familiarity with the restoration process. Redirecting some project proposals to the criminal settlement funds made possible a broader scope for the subsistence restoration program, and more attention to the social, cultural, and spiritual dimensions of subsistence uses in Alaska.

Several recommendations are supported by these conclusions.

- A directed effort should continue to actively involve subsistence users and communities in oil spill restoration activities.

- To the maximum extent allowed by law, subsistence restoration projects should strive to address all oil spill impacts on subsistence uses, including those to the natural resource base as well as to the sociocultural foundation which supports subsistence activities in Alaska communities and which was disrupted by the oil spill.

- Finally, there needs to be a recognition in law that for assessing the damages caused by disasters such as oil spills, Alaska is a special case, in that it is the only state with hundreds of communities and tens of thousands of people whose economic, social, and cultural well-being and survival are linked directly to the subsistence uses of natural resources. Future attempts to restore the damaged "natural" environment in Alaska need also to directly address the environmental, social, cultural, and spiritual dimensions of the subsistence way of life. A comprehensive approach to subsistence restoration requires nothing less.

INTRODUCTION

As noted in the *Exxon Valdez* Oil Spill Restoration Plan (*Exxon Valdez* Oil Spill Trustee Council [EVOSTC] 1994a), subsistence uses of fish and wildlife are a vital natural resource service (i.e. a human use) that was impaired as a result of the *Exxon Valdez* oil spill. Subsistence uses of fish and wildlife resources continue to be a cornerstone of the economic, social, and cultural well-being of much of rural Alaska, especially in Alaska Native communities (Wolfe and Walker 1987). As defined by state and federal statutes, subsistence uses are customary and traditional uses for food, fuel, manufacturing crafts, and noncommercial exchange. The *Exxon Valdez* oil spill fouled waters, beaches, and resources used for subsistence by 15 predominately Alaska Native communities as well as by the Alaska Native and non-native inhabitants of several larger communities, including Cordova, Valdez, Seward, Seldovia, and Kodiak (Fall 1991).

As illustrated in Figure 1, in the year after the spill, subsistence harvests declined from 9 percent to 77 percent in 10 Alaska Native communities of Prince William Sound, lower Cook Inlet, and the Kodiak Island Borough. In addition, the sharing of resources was reduced, and the transmission of skills and knowledge about natural resources was disrupted. Initially, the primary reason for this decline was subsistence users' fear that oil contamination had rendered the resources unsafe to eat (Fall 1991; Fall and Field, forthcoming).

Subsistence harvest levels and participation in subsistence activities rebounded somewhat after the first two post-spill years, but effects of the spill have remained. These include concerns about the long term human health effects of using resources from the spill area, a loss of confidence in individuals' abilities to judge if resources are safe to eat, scarcity of certain injured subsistence resources (natural resources such as harbor seals, marine invertebrates, and waterfowl) in traditional harvest areas, increased costs associated with subsistence harvests, and reduced opportunities for young people to learn the subsistence way of life (Fall 1992; Fall and Utermohle 1995).

Correspondingly, an overview of natural resource damage assessment (NRDA) studies conducted after the spill identified several continuing impacts to subsistence (ICF Technology Incorporated 1993). These included:

1) uncertainty concerning the availability and wholesomeness of key subsistence resources;
2) reduced availability of many subsistence species; and
3) reduced efficiency in subsistence harvesting activities because resources of smaller individual size have been harvested in reduced amounts during each harvest effort.

This report concluded that it is likely that the persistence of oil in the environment, such as in mussel beds, will continue to harm resources and retard biological recovery. In addition to reduced subsistence harvests, these biological impacts can be linked to non-natural resource aspects of subsistence use, including nutrition, sharing, cultural knowledge, and social organization.

In October 1991, the United States District Court approved a settlement of civil claims of the State of Alaska and the United States against Exxon for natural resource damages caused by the spill. Under this agreement, Exxon agreed to pay $900 million over a ten-year period. Most of these funds are deposited in a restoration fund administered by a six member Trustee Council.

The Trustee Council is composed of three federal and three state of Alaska representatives. Under the terms of the court approved Memorandum of Agreement, these restoration funds, which are called "civil settlement funds" in this report, must be used,

> For the purposes of restoring, replacing, enhancing, or acquiring the equivalent of ***natural resources*** injured as a result of the Oil Spill and the reduced or lost ***services*** provided by such resources (EVOSTC 1994a:3-4; emphasis in the original).

A "service" is a human use of natural resources. Subsistence is one of several reduced or lost services for which restoration projects may be funded by the Trustee Council.

In 1994, the Trustee Council adopted a Restoration Plan to guide its restoration program. The plan contains the following "recovery objective" for subsistence uses:

> Subsistence will have recovered when injured resources used for subsistence are healthy and productive and exist at prespill levels, and when people are confident that the resources are safe to eat. One indication that recovery has occurred is when the cultural values provided by gathering, preparing, and sharing food are reintegrated into community life (EVOSTC 1994a:55).

The Restoration Plan also noted that,

> Subsistence users say that maintaining their subsistence culture depends on uninterrupted use of resources used for subsistence. The more time users spend away from subsistence activities, the less likely they will return to the activities. Continuing injury to natural resources used for subsistence may affect the way of life of entire communities (EVOSTC 1994a:54).

Consistent with the goal of promoting the recovery of subsistence uses as soon as possible, the purpose of the Subsistence Restoration Planning and Implementation Project was to design a coordinated approach to subsistence resource restoration and to implement a planning process to develop subsistence restoration project proposals for the Trustee Council work plans for federal Fiscal Year 95 (FY 95), FY 96, and beyond. A further goal was to insure the participation of subsistence users in these and other planning efforts. Such projects could propose to directly restore resources used for subsistence, provide alternative natural resources, or restore access or people's use of the resource. The project was to develop guidelines for project content, solicit project ideas and priorities through a public process, evaluate project proposals, and present a set of project proposals to the Trustee Council for funding consideration from the Restoration Fund.

Additionally, it was recognized that project ideas developed through this planning process which did not become part of the FY 95 Work Plan could be eligible for funding through grants from a $5 million appropriation of *Exxon Valdez* criminal settlement funds by the Alaska Legislature. In 1991, under a criminal plea agreement, Exxon agreed to pay restitution of $50 million to the United States and $50 million to the State of Alaska. These funds are managed separately by the respective governments and are not under the authority of the Trustee Council.

The Alaska Legislature authorized the Department of Community and Regional Affairs to award grants from this $5 million appropriation to unincorporated rural communities in the oil spill area in order to restore, replace, or enhance subsistence resources or services damaged or lost as a result of the spill (Section 11, Chapter 79, SLA 1993). There are nine such communities: Tatitlek, Chenega Bay, Port Graham, Nanwalek, Karluk, Chignik Lagoon, Chignik Lake, Perryville, and Ivanof Bay. The legislation requires that selection of grant recipients shall be made after consultation with the state members of the Trustee Council.

OBJECTIVES

The Subsistence Restoration Planning and Implementation Project had the following objectives:

1. Design a comprehensive approach to subsistence restoration.
2. Meet with residents of the subsistence communities in the spill area to identify community needs and priorities related to injured subsistence resources and services.
3. Work with communities to develop proposals to restore reduced or lost subsistence resources and services.

METHODS

Following approval of the project in concept by the Trustee Council, the first step in the planning effort was the formation of a subsistence restoration planning team. The team consisted of the following representatives of state and federal agencies.

- Alaska Department of Fish and Game, Division of Subsistence
    - ◊ James Fall, Regional Program Manager (overall project coordinator)
    - ◊ Rita Miraglia, Subsistence Resource Specialist
    - ◊ Craig Mishler, Subsistence Resource Specialist
    - ◊ Lisa Scarbrough, Subsistence Resource Specialist
    - ◊ Vicki Vanek, Fish and Wildlife Technician
- Alaska Department of Community and Regional Affairs
    - ◊ John Gliva, Planner
    - ◊ Mary Remole, Planner
- US Department of the Interior, National Park Service
    - ◊ Don Callaway, Subsistence Specialist, Alaska Regional Office

- US Department of Agriculture, Forest Service

    ◊ Steve Zemke, Subsistence Coordinator, Chugach National Forest

In addition to the team itself, the staff of the Trustee Council and attorneys with the Alaska Department of Law assisted with the project design and the evaluation of proposals. Trustee Council staff participated in some of the community and regional meetings as well.

Following approval of the detailed project description (the DPD) and authorization by the executive director to spend funds, the planing team developed an agenda for the first round of community and regional meetings. The presentation consisted of the following topics:

1. Introduction: The Restoration Process in General
    The Trustee Council process
    Work Plan schedules
    The goals of subsistence restoration
    The goals of the subsistence restoration planning project
    Rules governing project eligibility for civil and criminal settlement funding
2. Discussion of the two sources of funding: civil settlement and criminal settlement
3. Discussion of continuing subsistence and natural resource injuries that community members are observing, using Table B-1 from the draft Restoration Plan as a guide (EVOSTC 1993:B-6)
4. Solicitation of project ideas
5. Identify project priorities
6. Work on specific project proposals

Discussions between Trustee Council staff and agency personnel to design this planning effort did not get underway until March 1994, long after most FY 94 restoration projects had been approved by the Trustee Council. The Trustee Council did not approve the subsistence planning project until April 11, 1994. Consequently, project activities got off to a late start relative to the FY 95 Work Plan planning process. Also, due to extensive review of the project work plan (the detailed project description or "DPD"), authorization from the executive director to expend the funds was not obtained until June 8, 1994. Because of these delays, meetings were limited to Prince William Sound and lower Cook Inlet for FY 95 Work Plan; there was an extension for submission of subsistence proposals to July 12, 1994.

Table 1 provides a list of the community and regional meetings held as part of this subsistence restoration planning effort. The first round included meetings in Cordova, Valdez, Tatitlek, Chenega Bay, and Port Graham. Representatives from Nanwalek attended the Port Graham meeting. A total of 16 project proposals resulted from these meetings.

After the first round of meetings, the planning team met with Trustee Council staff and state and federal attorneys to review and evaluate the 16 proposals. Based upon this consultation, Trustee Council staff and the planning team decided to submit all of the proposals for consideration for civil settlement funding. The Trustee Council acted on the FY 95 Work Plan in August 1994, and funded three of these proposals (Projects 95127, 95131, and 95138) (Table 2). Also, at least seven of these projects were identified as potentially eligible for

criminal settlement funding. The planning team assisted the state members of the Trustee Council with review of the seven proposals in November 1994, and all were approved (Table 3).

Following actions on the FY 95 Work Plan, the planning team conducted regional meetings in September 1994 (Table 1). One regional meeting took place in Kodiak on September 21 and involved representatives from the seven Kodiak Island borough communities. Also, planning team members traveled to the Alaska Peninsula, holding a regional meeting for the three Chignik communities (Chignik Bay, Chignik Lagoon, and Chignik Lake) in Chignik Bay, meeting separately with Ivanof Bay representatives in Chignik Bay, and holding a community meeting in Perryville (Table 1). As in the previous round, these meetings were designed to inform communities about the restoration process, discuss project ideas and priorities, and develop project proposals for the Trustee Council Work Plan (now looking ahead to FY 96) and for consideration for criminal settlement funding. A similar outline to the one presented above was followed. A major difference between these meetings and the first set was that Kodiak Island Borough and Alaska Peninsula attendees were much less familiar with the restoration process, much less prepared with project ideas and proposals, and more in need of assistance in understanding the guidelines for restoration funding and writing proposals that had any chance of either civil or criminal settlement funding. Many project ideas were discussed at these meetings. The team concluded that a number of proposed projects were most likely to eligible for criminal settlement funding. Consequently, ADF&G and DCRA personnel continued to develop these proposals in consultation with the communities and, in the case of the Alaska Peninsula, with the Lake and Peninsula Borough. For potential civil settlement funding, the team concluded that additional meetings closer to the deadline for proposal submission for the FY 96 Work Plan would be appropriate.

The final set of community and regional meetings took place in March, April, and May 1995, in anticipation of meeting deadlines for submission of FY 96 Restoration Work Plan proposals (Table 1). In the Chugach region, community meetings occurred in Cordova, Tatitlek, Chenega Bay, Port Graham, and Nanwalek. As a follow-up, a regional meeting for Chugach Region communities took place in Anchorage on April 13, with representatives from the seven Chugach communities and three regional organizations (The Chugach Heritage Foundation, the Chugach Regional Resources Commission, and Chugachmiut). Also, a second regional meeting was held in Kodiak, attended by representatives of the seven Kodiak Island Borough communities. Finally, meetings took place in the Alaska Peninsula communities of Chignik Lake, Chignik Lagoon, and Perryville as a follow up to the earlier regional Alaska Peninsula meeting. Participation by Ivanof Bay in the Perryville meeting did not occur due to poor weather which inhibited travel.

The agenda for this set of 1995 meetings called for most of the meeting time to be focused on project idea development, prioritization, and proposal writing. However, it was necessary to also devote time to a review of the restoration process, the rules governing restoration project funding, and the two sources of funds for subsistence restoration projects. As in the earlier round of meetings, representatives from the Chugach Region communities were generally more familiar with the process than were the Kodiak and Alaska Peninsula community representatives, and were therefore better prepared to come up with viable project proposals. In total, over 50 project ideas were generated as a result of these meetings in 1995 (some of these involved cultural/archaeological resources). Because of clearer guidelines and more experience as to what kinds of projects were eligible for funding from the civil settlement, the planning team

and community representatives developed a subset of these project ideas for consideration by the full Trustee Council, for a total of 22 projects. In a few cases, communities themselves developed other proposals independent of this process. The other project ideas were set aside for consideration by the State Trustees, or for further review.

RESULTS

The planning team's efforts to develop a "comprehensive approach" to subsistence restoration encountered obstacles. The planning effort was comprehensive in a geographic sense; all the communities in the spill area had opportunities to participate. However, a comprehensive approach would have also fully and openly addressed the several categories of injuries to subsistence, including the resource base, technology, and the sociocultural context which supports subsistence activities, including resource exchange, enculturation of the young, traditional knowledge, and cultural values. As the planning effort was getting underway, the Trustee Council was developing its draft Restoration Plan (EVOSTC 1993). The draft plan (p.12) listed the following policies to guide projects designed to restore or enhance an injured service:

- must have a sufficient relationship to an injured resource,
- must benefit the same user group that was injured, and
- should be compatible with the character and public uses of the area.

The draft plan further clarified that, "The policy requires that a project to restore or enhance an injured service much be sufficiently related to a natural resource' (EVOSTC 1993:12). This requirement proved to be a primary guide as well as a limiting factor in the subsistence restoration planning project. Clarifying this requirement with the assistance of state and federal attorneys, which took place simultaneously with the drafting of the DPD for the project, was essential, and led to delays in project start-up. It was inadvisable for the planning team to begin meeting with communities until the limitations on what could be funded were understood. Once this clarification occurred, and following several meetings with Trustee Council staff and attorneys, the planning team concluded that a comprehensive approach to subsistence restoration that addressed the environmental, social, and cultural dimensions of the subsistence way of life, would not be possible. Consequently, the team decided to emphasize to communities the need to link project proposals to natural resource recovery. The team remained committed to a comprehensive approach in a geographic sense (see below).

As noted above, community and regional meetings took place prior to the deadline for submitting proposals for the FY 1995 and FY 1996 Restoration Work Plans. FY 1995 planning was limited to Prince William Sound and lower Cook Inlet (Chugach Region) communities. In total, five meetings attended by about 54 local residents from six communities took place. Seventeen project ideas were generated and prioritized during the first round of meetings. An additional nine subsistence restoration projects were proposed outside of this planning process, for a total of 26 subsistence projects listed and evaluated in the draft FY 1995 Work Plan (EVOSTC 1994c:B-28). All project proposals developed during the planing meetings were submitted for Trustee Council consideration. Of the 26 proposals, nine were approved for a total

of $1,006,900 in funding in FY 1995 (Table 2). Additionally, seven proposals were referred to the state trustees for potential funding from criminal settlement funds (see below). The remaining proposals were not funded, primarily because they were not linked to an injured resource (such as a proposed mental health center and a community store) or because of technical problems (such as a Tatitlek sockeye salmon release program).

As shown in Table 1, 14 community and regional meetings took place to develop project ideas for the FY 1996 restoration work plan. Twenty-two subsistence restoration proposals were discussed and submitted to the Trustee Council for consideration for civil settlement funding under the 1996 Work Plan. In total, the council in August 1995 approved eight subsistence restoration projects for FY 1996 funding of $878,400; two more projects were approved in December 1995 (with supplemental funding added to three others). This action brought the total funding for subsistence restoration for FY 96 to $1,291,400 (Table 2).

As noted above, subsistence restoration projects which were not funded by the full Trustee Council were evaluated for possible funding from a $5 million appropriation by the Alaska Legislature of criminal settlement funds. State of Alaska attorneys advised the planning team that while a link to injured natural resources was still necessary for projects funded from the criminal settlement, this link did not need to be as direct as for civil settlement funding. Consequently, projects which addressed aspects of subsistence such as disruption of the transmission of traditional knowledge and skills, and development of alternative resources or harvest areas, had a better chance of funding from the criminal settlement money. Project staff from the Division of Subsistence ADF&G and the Department of Community and Regional Affairs prepared project overviews and recommendations for projects. Three consultations with the three State of Alaska members of the Trustee Council took place. To date, ten projects from six communities have been funded with a commitment of $2,954,650 (59 percent of the available funding of $5 million) (Table 3). ADF&G and ADCRA intend to continue work on potential criminal settlement projects until the entire appropriation is committed. Many of these ideas for potential projects originated during the meetings for this planning effort. It should be noted that the ADCRA staff received no monetary support for salaries from civil settlement funds for work on these criminal settlement projects, and ADF&G staff who were supported by such funds assisted with work on the potential criminal settlement projects while also addressing civil settlement projects and the broader project goal of involvement of subsistence users in the restoration effort.

DISCUSSION

The effectiveness of the subsistence restoration planning and implementation program can be evaluated in several ways. The first is to examine how well the project's specific objectives were met.

The first project objective was to design a "comprehensive approach to subsistence restoration." Because of the limitations imposed by the Restoration Plan, which are themselves derived directly from the Memorandum of Agreement governing the civil settlement, the planning team had difficulty in developing a truly comprehensive approach to subsistence restoration. The guidelines required that any subsistence restoration project have a direct connection to an injured natural resource. In practice, this meant that project proposals had to demonstrate how the project would restore an injured resource, either directly or by providing

alternative resources towards which to target subsistence harvests. Thus projects with goals to teach young people subsistence skills which have been disrupted since the spill or projects to improve technological efficiency to compensate for the scarcity of natural resources were not eligible for funding. On the other hand, the planning approach was comprehensive in a geographic sense, in that communities with strong subsistence components to their economies and ways of life in all the regions of the oil spill impact area were able to participate. Furthermore, the planning team strove to assist in demonstrating connections between subsistence restoration project ideas and natural resource recovery that might not be readily apparent. For example, the Trustee Council funded an elders/youth conference because a goal of the conference was to discuss ways in which subsistence users could support natural resource restoration and conservation. Consequently, projects such as the elders/youth conference (95138), the harbor seal hunting documentary (96214), and the harbor seal/sea otter restoration project (95244) received funding support from the civil settlement money.

A second objective of the planning effort was to meet with subsistence users of the spill area to identify subsistence restoration issues and ways to assist with restoring subsistence uses and resources. Implicit in this objective was the goal to involve subsistence users meaningfully in the restoration process and increase understanding of the process. As discussed above, several rounds of community and regional meetings took place. Based upon their success in submitting a number of project proposals which received Trustee Council funding, this objective appears to have been met for the Chugach Regional communities. However, there was less success for Kodiak and Alaska Peninsula, where the team needed more time to build a basic understanding of the restoration process and to assist communities in developing viable proposals.

A third project objective was to develop subsistence restoration project proposals, which could then be considered for either civil or criminal settlement funding. In total, over 40 project proposals were developed during the project, with submissions from all regions to either the full Trustee Council for civil settlement funding or to the three State Trustees for criminal settlement funding.

The project also contributed to an overall increase in the commitment of civil settlement funds to subsistence restoration projects. This is summarized in Figure 2. About $600,000 was committed to such projects in FY 94, but this rose to about $1,007,000 in FY 95 and $1,291,400 in FY 96. Further, the percentage of subsistence restoration funding from the civil settlement which supported projects submitted by local communities or regional organizations, or provided to such groups through contracts from agency projects, increased from 23 percent in FY 94 to 34 percent in FY 95 and 79 percent in FY 96. The total of such funds increased markedly, from $137,400 in FY 94 to $339,100 in FY 95 and $1,017,900 in FY 96. Although the Subsistence Restoration Planing and Implementation Project cannot be credited with all of this achievement, there can be no doubt that the effort greatly contributed to this increased commitment to subsistence restoration and the involvement of local communities in the restoration process.

Although an overall increase in subsistence restoration project funding has taken place over the last three fiscal years, participation in the restoration projects is still largely confined to communities of Prince William Sound and, secondarily, to lower Cook Inlet (Table 4). Of the 20 subsistence restoration projects funded in FY 95 and FY 96, only one did not involve a Prince William Sound community. A total of 11 involved lower Cook Inlet villages, but Kodiak Island Borough and Alaska Peninsula villages were included in just four in FY 95, all of which were multi-regional projects involving the entire spill area. In FY 96, the Kodiak Island Borough

community of Ouzinkie was added to the clam restoration project (96131). Most criminal settlement funding has so far also gone to Prince William Sound and lower Cook Inlet villages. This again is a reflection of the greater familiarity in these subregions in the restoration process and the greater attention paid to involving these villages. It is also important to note that it is not inappropriate that the bulk of subsistence restoration efforts be focused on Prince William Sound, in that the greatest injuries to subsistence uses and subsistence resources occurred there.

Examination of projects funded by the criminal settlement broadens this assessment and provides a better picture of the overall approach to subsistence restoration achieved by this planning effort. For example, criminal settlement projects supported a "spirit camp" for Chugach region villages, several education and subsistence food processing facilities, and several resource enhancement and replacement projects. A number of these projects attempted to restore the social and cultural aspects of subsistence uses which could not be directly addressed by the full Trustee Council.

Another way to assess the effectiveness of the subsistence restoration planning program is to review the status of the recovery of subsistence uses. The Restoration Plan describes three indicators of recovery of subsistence uses (EVOSTC 1994a:55). These are:

1. When injured resources used for subsistence are healthy and productive and exist at prespill levels
2. When people are confident that the resources are safe to eat
3. When the cultural values provided by gathering, preparing, and sharing food are reintegrated into community life.

A fourth objective suggested at the 1995 Restoration Workshop and currently under review is (EVOSTC 1995a:82):

4. Subsistence will have recovered when subsistence users' diet composition and harvest effort exist at pre-spill levels, and when the youth of the community have had the opportunity to learn subsistence skills first hand.

The Division of Subsistence has conducted studies independent of Trustee Council funds to monitor subsistence uses and understand the continuing impacts of the spill on communities of the spill area. In addition to the ADF&G, major funding for these projects has been provided by the US Fish and Wildlife Service (Fall 1992) and the US Minerals Management Service (Fall and Utermohle 1995). Selected findings from these studies are presented here to provide an assessment of subsistence recovery through 1994.

As illustrated in Figure 3, subsistence harvest levels as estimated in pounds usable weight per person, have increased throughout the spill region since dropping precipitously in 1989. This rebound was slowest in the Prince William Sound communities of Chenega Bay and Tatitlek. In 1991/92 in Chenega Bay, the estimated harvest of 345 pounds per person was about the same as the prespill average (and the 1992/93 harvest topped this average), although in both Chenega Bay and Tatitlek in 1993/94, the rebounding trend was reversed, and the harvest estimates dropped to about 270 pounds per person in each village.

Although these data suggest at least a partial recovery of harvest levels, several qualifications are in order. First, prespill estimates for Chenega Bay likely underestimate

subsistence harvests in the years just prior to the spill, because the only available comprehensive prespill estimates pertain to the first two years after the village's resettlement on Evans Island after a 20-year absence from the western sound. It is highly likely that harvests in the late 1980s in Chenega Bay were similar to those of Tatitlek (pre-spill average of 483 pounds per person).

Second, harvesters in a number of villages have reported that they must expend considerably more effort to achieve desired harvests of key subsistence resources than before the spill (Fall and Utermohle 1995). This has resulted in increased costs in terms of time, money, and equipment. At times, harvesters have traveled outside the spill area to harvest subsistence foods, in some cases substituting resources such as caribou that have not been traditionally used in their villages. Thus, increased harvests themselves are not a reliable indicator that subsistence uses have returned to prespill patterns. As Piper (1993:113) observed,

> It is important to note here that a gradual return to subsistence harvests in these villages was probably inevitable, regardless of the absence or presence of oil. One factor . . . is that as time passes from the event, the "cravings" for the foods people are used to started to overcome or overwhelm some fears. But more important, these villages have no other realistic option for replacing the foods they gather from the ocean and shorelines. Cash income for the villages is limited and jobs are nearly nonexistent . . . Putting cultural imperatives and tradition aside for a moment, the basic fact about subsistence in coastal villages is that subsistence is how people eat.

As noted above, harvest composition is another indicator of the recovery of subsistence harvests. In lower Cook Inlet and Kodiak, the composition of subsistence harvests in 1991, 1992, and 1993, was broadly similar to prespill harvests. The range of resources used (average number of different kinds of resources used per household) also recovered in these communities to virtually match prespill levels. In contrast, in Prince William Sound villages, and especially Chenega Bay, post-spill subsistence harvests continue to be dominated by fish, with a much lower harvest of marine mammals and marine invertebrates than was typical before the spill. While the range of resources used for subsistence in Chenega Bay and Tatitlek has rebounded since plummeting in 1989, this range remains lower than before the spill (Fall and Utermohle 1995). In summary, harvest levels and harvest composition data demonstrate that the fourth recovery objective has not been met, especially in Prince William Sound.

It is important also to note that subsistence users' own assessments of the present status of subsistence harvests is further evidence that the recovery of subsistence is incomplete, especially for Prince William Sound communities. This is illustrated in Table 5 and Figure 4. Although the percentage of Prince William Sound households who point to the spill as a cause of lowered subsistence uses has declined from about 84 percent in 1989 to 58 percent in 1993, a majority of households still do not view their subsistence uses as recovered from the spill's effects (Fig. 4). In contrast, there has been a more marked decline in this assessment in the lower Cook Inlet and Kodiak Island Borough communities, where most households no longer cite the spill as the cause of low harvest and use levels.

Another indicator of subsistence recovery is whether subsistence users believe that subsistence resources are safe to eat. (See also the reports on Projects 94279 and 95279). The joint ADF&G/MMS project asked respondents whether they believed seals and clams were safe

for children to eat. For seals, the general consensus in the 1991 - 1994 study period in all four oil spill subregions was that seals were safe (Figure 5) One exception was in the 1992/93 study year in Chenega Bay, when just 20.0 percent of the respondents were confident that seals were safe to eat. (Tatitlek was not surveyed in this year.) This doubt was probably due to the presence of target lesions on sea lion killed at Tatitlek in April 1993 when the questionnaire was being administered (an incident widely known in Chenega Bay), and the outbreak of viral hemorrhagic septicemia in Prince William Sound herring stocks at about the same time (Fall and Utermohle 1995).

There was far less confidence regarding the safety of eating clams (Figure 6). By 1993, just over half the Prince William Sound households and about 60 percent in lower Cook Inlet were sure that clams were safe for children to eat. There was a higher level of confidence in the Kodiak Island Borough and the Alaska Peninsula. However, even by 1993, most households in oil spill region villages who distrusted clams continued to point to the spill as the cause of their concerns. As shown in Table 6, in the three years of the ADF&G/MMS study, a large majority of Prince William Sound respondents who believed that clams were unsafe blamed the oil spill, rather than paralytic shellfish poisoning (PSP), or other reasons (such as non-oil spill sources of pollution). Oil spill-related reasons prevailed in most study years in lower Cook Inlet and Kodiak Island Borough communities, although non-spill reasons were more common than in Prince William Sound.

By 1993, the fifth year after the spill, few households blamed resource contamination as a cause of reduced overall subsistence harvests, unlike 1989 when this was the primary cause of lowered subsistence uses (Figure 7; Table 5). In contrast, reported declines in resource availability, often blamed on the spill, increased notably as a cited cause of continued lowered harvests, especially in the Prince William Sound communities. This shift from contamination to population concerns indicates the need for increasing interactions and information exchanges between subsistence harvesters and restoration project scientists, and also supports projects which aim to enhance injured subsistence resources.

As shown in Figure 8, a substantial portion of households in Prince William Sound and lower Cook Inlet communities continue to believe that the oil spill has affected children's participation in subsistence activities, again indicating that goals 3 and 4 for subsistence restoration have yet to be achieved. Further evidence is presented in Figure 9. In 1993, over half the Prince William Sound households and about a third in lower Cook Inlet reported that subsistence sharing is lower than before the spill.

An encouraging finding of the ADF&G/MMS research was that a large majority of respondents in all four oil spill subregions said "No," when asked if they liked living in their communities less since the spill (Figure 10). The percentage who answered "Yes" declined over the three years of the project in Prince William Sound, and remained low in lower Cook Inlet and Kodiak Island Borough villages. This finding must be tempered with the qualification that some families for whom the spill continued to have impacts have left the villages.

CONCLUSIONS

Despite encountering obstacles such as delays in project authorization and limitations on the scope of eligible subsistence restoration projects, the planning project succeeded in contributing to an enhanced role for subsistence users and communities in the restoration process. Meetings to inform subsistence users about the restoration process were held in 11 communities with representatives from 19 communities participating. In 1995, a total of over $1 million was committed to subsistence restoration, a marked increase from the $317,800 committed in FY 93 and the $590,300 in FY 94. The amount funded for subsistence restoration in 1996 was even higher ($1,291,400), with an even larger percentage (79 percent) committed to projects proposed by subsistence communities or regional organizations or to portions of projects contracted to such communities or organizations. Additionally, ten projects and $3 million in funding were approved for criminal settlement funding by the State of Alaska. In combination, these projects funded natural resource enhancement efforts, research with an enhanced role for local communities, continued testing of subsistence foods, support for community and regional meetings, a spirit camp, subsistence food processing facilities, and a community oil spill conference. Clearly this represents a major step forward towards a comprehensive recovery of subsistence from injuries caused by the *Exxon Valdez* oil spill.

Several qualifications to this assessment are necessary. Participation was greatest, and success in funding proposals highest, for communities of Prince William Sound and lower Cook Inlet. Much more frustration was expressed in Kodiak Island Borough and Alaska Peninsula communities over lack of familiarity with the restoration process. This is reflected in the results of Trustee Council actions, which funded no subsistence restoration projects proposed by Alaska Peninsula or Kodiak Island Borough communities for FY 1995 or FY 1996 (although one Kodiak community was added to a continuing project in FY 96). Partially balancing this gap is the funding of two projects for Alaska Peninsula communities with criminal settlement funds. Although injuries to subsistence uses in the Kodiak Island Borough and Alaska Peninsula were not as large or enduring as those in the Chugach Region, there appears to remain an inequity that should be addressed in the future.

Given the limitation on the scope of subsistence restoration projects imposed by the civil settlement, it was indeed fortunate that the State of Alaska made funding from the criminal settlement available for subsistence restoration, and that, if only to a limited extent, this planning project was able to inform communities of this funding opportunity and assist in generating project ideas. It was also advantageous that the Trustee Council was able to redirect some project proposals to the criminal settlement funds. Without including the projects funded through the criminal settlement, the overall package of subsistence restoration projects is more restricted in scope and limited in its attention to the social, cultural, and spiritual dimensions of subsistence uses in Alaska.

Several recommendations are supported by these conclusions.

- A directed effort should continue to actively involve subsistence users and communities in oil spill restoration activities. This should include assistance in developing proposals as well as communicating study findings to the communities. The Trustee Council has funded projects in FY 1995 (95052) and FY 1996 (96052) with these goals in mind.

- To the maximum extent allowed by law, subsistence restoration projects should strive to address all oil spill impacts on subsistence uses, including those to the natural resource base as well as to the sociocultural foundation which supports subsistence activities in Alaska communities and which was disrupted by the oil spill.

- Finally, there needs to be a recognition in law that for assessing the damages caused by disasters such as oil spills, Alaska is a special case, in that it is the only state with hundreds of communities and tens of thousands of people whose economic, social, and cultural well-being and survival are linked directly to the subsistence uses of natural resources. Future attempts to restore the damaged "natural" environment in Alaska need also to directly address the environmental, social, cultural, and spiritual dimensions of the subsistence way of life. A comprehensive approach to subsistence restoration requires nothing less.

ACKNOWLEDGEMENTS

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Table 1. Overview of Subsistence Restoration Planning Meetings, 1994 and 1995

Community	Date	Approximate Attendance	Notes
First Round, Prior to FY 95 Proposal Deadline			
Chenega Bay	14-Jun-94	8	
Tatitlek	15-Jun-94	7	
Cordova	15-Jun-94	8	
Port Graham	20-Jun-94	20	Includes 2 Nanwalek representatives
Valdez	23-Jun-94	11	
Later Rounds, Prior to FY 96 Proposal Deadline			
Kodiak	21-Sep-94	12	Regional meeting; representatives from Akhiok, Karluk, Kodiak, Larsen Bay, Old Harbor, Ouzinkie, and Port Lions
Chignik Bay	21-Sep-94	8	Included one Chignik Lake representative
Ivanof Bay	21-Sep-94	2	Held in Chignik Bay
Perryville	22-Sep-94	11	
Chenega Bay	29-Mar-95	4	
Cordova	30-Mar-95	9	
Tatitlek	31-Mar-95	6	
Port Graham	5-Apr-95	14	
Nanwalek	10-Apr-95	8	
Anchorage	13-Apr-95	12	Regional meeting for Chugach communities; representatives from Chenega Bay, Cordova/Eyak, Nanwalek, Port Graham, Seward, Tatitlek and Valdez; Chugach Heritage Foundation; Chugach Regional Resources Commission
Kodiak	14-Apr-95	12	Regional meeting; representatives from Akhiok, Karluk, Kodiak, Larsen Bay, Old Harbor, Ouzinkie, and Port Lions; Kodiak Area Native Association
Chignik Lake	17-May-95	5	
Perryville	18-May-95	4	Includes meetings in individuals' homes
Chignik Lagoon	20-May-95	6	Includes meetings in individuals' homes

Table 2. Summary of Subsistence Restoration Projects Funded with Civil Settlement Funds

Project Number	Project Title	Proposer[1]	Fiscal Year Authorization[2]
93017	Subsistence Restoration Project (Food Safety)	ADF&G	307,100
93016	Chenega Chinook and Coho Salmon Release Program	Chenega Bay	10,700
	Fiscal Year Total		*317,800*
94279	Subsistence Food Safety Testing	ADF&G	379,200
94244	Harbor Seal and Sea Otter Co-op Subsistence Harvest Assistance	ADF&G	54,500
94428	Subsistence Restoration Planning and Implementation	ADF&G	99,084
94272	Chenega Chinook Release Program	Chenega Bay	57,400
	Fiscal Year Total		*590,184*
95009	Survey and Experimental Enhancement of Octopus	PWSSC	125,000
95052	Community Involvement and Use of Traditional Knowledge	ADF&G	152,000
95127	Tatitlek Coho Salmon Release Program (NEPA Compliance)	Tatitlek	5,000
95131	Clam Restoration	CRRC	226,900
95138	Elders/Youth Conference	Tatitlek,ADF&G	76,400
95244	Harbor Seal and Sea Otter Co-op Subsistence Harvest Assistance	ADF&G	93,900
95272	Chenega Chinook Release Program	Chenega Bay	47,200
95279	Subsistence Food Safety Testing	ADF&G	180,600
95428	Subsistence Restoration Planning and Implementation	ADF&G	99,900
	Fiscal Year Total		*1,006,900*
96009	Survey of Octopuses in Intertidal Habitats	PWSSC	142,300
96052	Community Involvement and Use of Traditional Knowledge	CHF, ADF&G	271,000
96127	Tatitlek Coho Salmon Release Program	Tatitlek	26,600
96131	Chugach Native Region Clam Restoration	CRRC	274,900
96210	Prince William Sound Youth Area Watch	CRRC	115,000
96214	Harbor Seal Hunting Documentary	Tatitlek	77,400
96220	Eastern PWS Wildstock Salmon Habitat	Eyak	92,000
96222	Chenega Bay Salmon Restoration	Chenega Bay	16,100
96225	Port Graham Pink Salmon Subsistence Project	Port Graham	95,300
96244	Community-Based Harbor Seal Management & Biological Sampling	ANHSC,ADF&G	128,500
96272	Chenega Bay Chinook Release Program	Chenega Bay	52,300
	Fiscal Year Total		*1,291,400*

[1] ADF&G = Alaska Department of Fish and Game; CRRC = Chugach Regional Resources Commission; ANHSC = Alaska Native Harbor Seal Commission; PWSSC = Prince William Sound Science Center; CHF = Chugach Heritage Foundation

[2] Funding totals include project management and general administration funds for the lead Trustee Counci agency for each project.

Sources: EVOSTC 1993:Table A-4; EVOSTC 1994b; EVOSTC 1994d:B-18; EVOSTC 1995b; EVOSTC 1995c

Table 3. Summary of Subsistence Restoration Projects Supported with Criminal Settlement Funds

Project	Community	Date Approved[1]	Date Awarded[2]	Total Cost
Tatitlek Mariculture	Tatitlek	11/3/94	11/23/94	$387,600
Tatitlek Mariculture, Capital Outlay	Tatitlek	11/3/94	11/23/94	$606,000
Fish and Game Processing Facility	Tatitlek	11/3/94	11/23/94	$187,000
Nuchek Spirit Camp	Tatitlek[3]	11/3/94	3/7/95	$228,000
English Bay River Sockeye Rehabilitation	Nanwalek	11/3/94	11/29/94	$424,200
Chenega Mariculture	Chenega Bay	11/3/94	6/7/95	$337,300
Chenega Bay Subsistence Support	Chenega Bay	11/3/94	11/29/94	$100,000
Subsistence Education Center	Perryville	3/31/95	4/20/95	$125,000
Port Graham River Coho Rehabilitation	Port Graham	8/2/95	8/8/95	$438,800
Chignik River Weir Operation Extension	Chignik Lagoon	8/2/95	8/8/95	$120,750
Total Awarded as of 9/30/95				$2,954,650
Balance of $5,000,000 Available, 9/30/95				$2,045,350

[1] Date of State Trustee Council members' consultation and endorsement.

[2] Date of award of grant by commissioner of the Department of Community and Regional Affairs.

[3] Grant administered by the Chugach Heritage Foundation. Participation by all Chugach Region communities.

Source: John Gliva, Alaska Department of Community and Regional Affairs, personal communication

Table 4. Geographic Distribution of Subsistence Restoration Projects

Number	Project Name	Prince William Sound	Lower Cook Inlet	Kodiak Island Borough	Alaska Peninsula
Fiscal Year 1995 Work Plan					
95009	Octopus	X			
95052	Community Involvement	X	X		
95127	Tatitlek Coho Salmon	X			
95131	Clam Restoration	X	X		
95138	Elders/Youth Conference	X	X	X	X
95244	Harbor Seal/Sea Otters	X	X		
95272	Chenega Bay Chinook	X			
95279	Resource Abnormalities	X	X	X	X
95428	Subsistence Restoration Planning	X	X	X	X
Fiscal Year 1996 Work Plan					
96009	Octopus	X			
96052	Community Involvement	X	X	X	X
96127	Tatitlek Coho Salmon	X			
96131	Clam Restoration	X	X	X	
96210	PWS Youth Area Watch	X			
96214	Harbor Seal Hunting Documentary	X			
96220	Eastern PWS Wildstock Salmon	X			
96222	Chenega Bay Salmon	X			
96225	Port Graham Pink Salmon		X		
96244	Harbor Seal/Sea Otters	X	X		
96272	Chenega Bay Chinook	X			
Criminal Settlement Funding					
	Tatitlek Mariculture	X			
	Tatitlek Mariculture Capital Outlay	X			
	Tatitlek Processing Facility	X			
	Nuchek Spirit Camp	X	X		
	English Bay River Sockeye		X		
	Chenega Bay Mariculture	X			
	Chenega Bay Subsistence Support	X			
	Subsistence Education Center				X
	Chignik River Weir				X
	Port Graham River Coho		X		

Table 5. Household Assessments of Changes in Subsistence Uses Since the Exxon Valdez Oil Spill, 1989 and 1993

Community and Year	Number of Households (valid responses)	Percentage of Households with Lower Subsistence Uses than Before the Spill		Oil Spill-Related Reasons for Lowered Subsistence Uses			
				Oil Contamination Concerns		Reduced Resource Populations	
		Less Due to Any Reason	Less, Due to an Oil Spill Reason	Percentage of All Households	Percentage of Households with Oil Spill-Caused Reductions	Percentage of All Households	Percentage of Households with Oil Spill-Caused Reductions
Chenega Bay 1989	17	94.1%	94.1%	70.6%	75.0%	17.6%	18.8%
Chenega Bay 1993	12	91.7%	75.0%	8.3%	11.1%	58.3%	77.8%
Tatitlek 1989	20	85.0%	80.0%	65.0%	81.3%	5.0%	6.3%
Tatitlek 1993	17	100.0%	94.1%	0.0%	0.0%	88.2%	93.8%
Nanwalek 1989	33	97.0%	90.9%	66.7%	73.3%	0.0%	0.0%
Nanwalek 1993	28	67.9%	42.9%	14.3%	33.3%	32.1%	75.0%
Port Graham 1989	47	91.5%	80.9%	61.7%	76.3%	0.0%	0.0%
Port Graham 1993	43	48.8%	27.9%	9.3%	33.3%	23.3%	83.3%
Ouzinkie 1989	29	82.8%	62.1%	44.8%	72.2%	0.0%	0.0%
Ouzinkie 1993	44	54.5%	22.7%	6.8%	30.0%	15.9%	70.0%
Larsen Bay 1989	30	70.0%	50.0%	30.0%	60.0%	0.0%	0.0%
Larsen Bay 1993	28	50.0%	10.7%	7.1%	66.7%	3.6%	33.3%
Port Lions 1989	29	62.1%	51.7%	27.6%	53.3%	0.0%	0.0%
Port Lions 1993	38	36.8%	5.3%	2.6%	50.0%	2.6%	50.0%

Sources: Fall and Utermohle 1995, Fall et al. 1995

Table 6. Reasons Cited for Why Clams are Unsafe for Children to Eat, by Oil Spill Subregion, 1991, 1992, and 1993

Oil Spill Subregion	Study Year 1991				Study Year 1992				Study Year 1993			
	N[1]	Reason Why Clams are Unsafe to Eat			N[1]	Reason Why Clams are Unsafe to Eat			N[1]	Reason Why Clams are Unsafe to Eat		
		Oil Spill Contamination	Paralytic Shellfish Poisoning	Other Reasons[2]		Oil Spill Contamination	Paralytic Shellfish Poisoning	Other Reasons[2]		Oil Spill Contamination	Paralytic Shellfish Poisoning	Other Reasons[2]
Prince William Sound	12	75.0%	0.0%	25.0%	12	100.0%	0.0%	0.0%	12	75.0%	8.3%	16.7%
Lower Cook Inlet	21	38.1%	19.0%	42.9%	23	78.3%	4.3%	17.4%	22	81.8%	4.5%	13.6%
Kodiak Island Borough	21	42.9%	19.0%	38.1%	15	40.0%	33.3%	26.7%	14	64.3%	7.1%	28.6%
Alaska Peninsula	11	18.2%	36.4%	45.5%								

[1] N = number of respondents who believe clams are unsafe for children to eat. Does not include respondents who were uncertain about safety. N is not expanded to entire population. Regional totals not weighted by community.

[2] "Other Reasons" includes non-oil spill pollution and responses of "not sure" why clams are unsafe.

Source: Fall and Utermohle 1995

Figure 1. Changes in Subsistence Harvests in the Year after the Exxon Valdez Oil Spill, 15 Alaska Native Communities of the Oil Spill Area

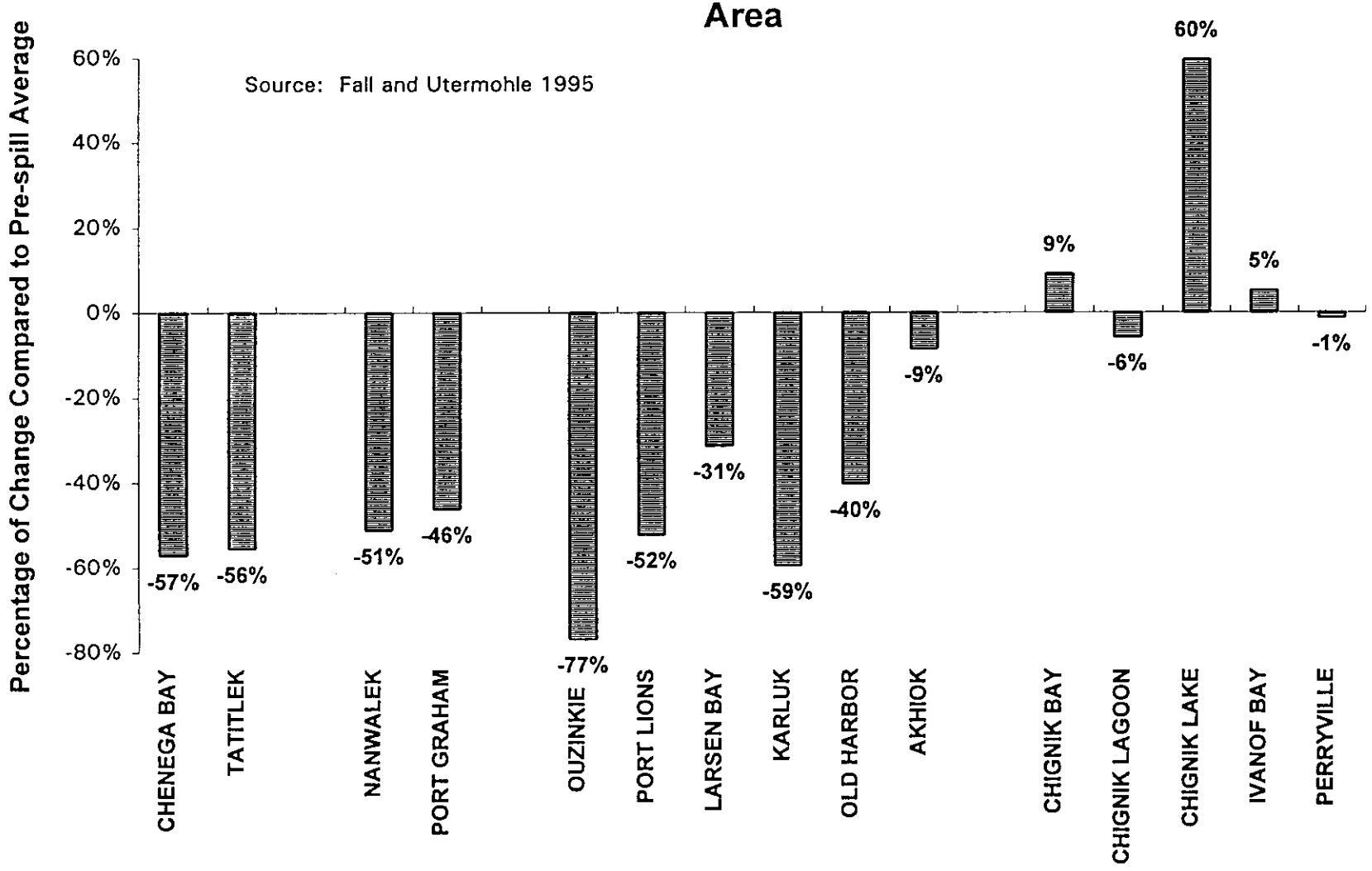


Figure 2. Allocations to Subsistence Restoration Projects, Oil Spill Restoration Work Plans (Civil Settlement Funds)

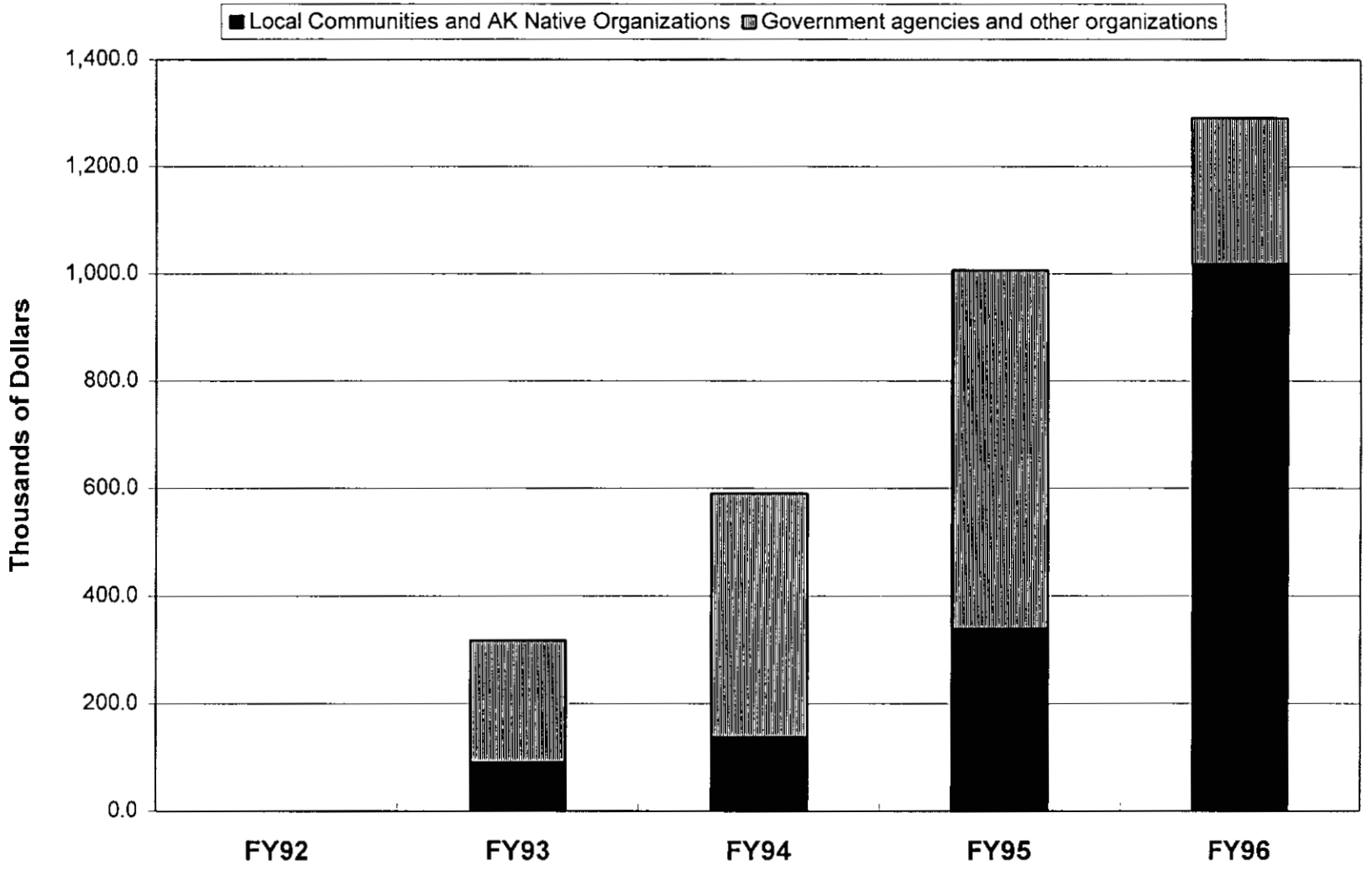


Figure 3. Subsistence Harvests after the *Exxon Valdez* Oil Spill Compared to Prespill Averages

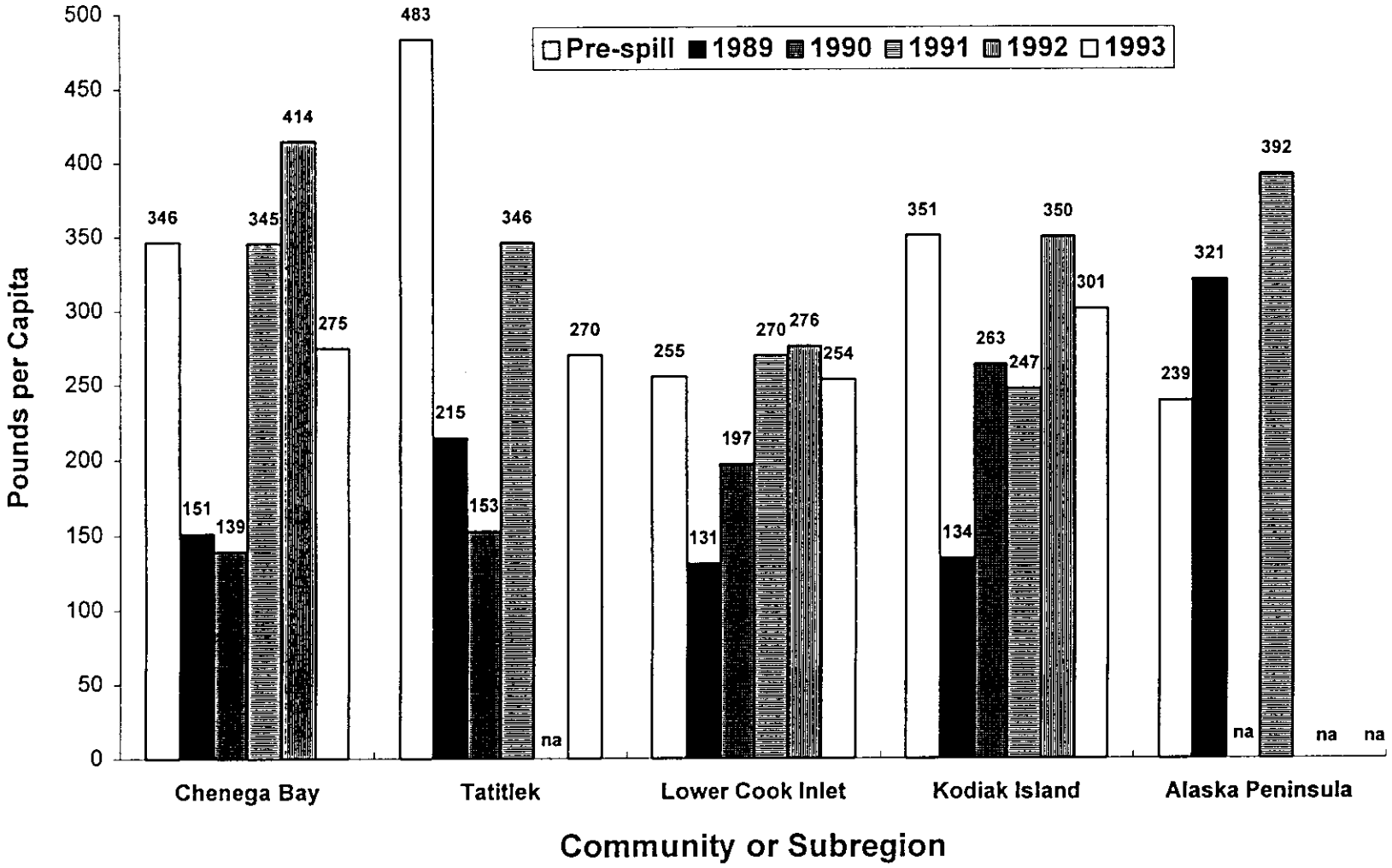
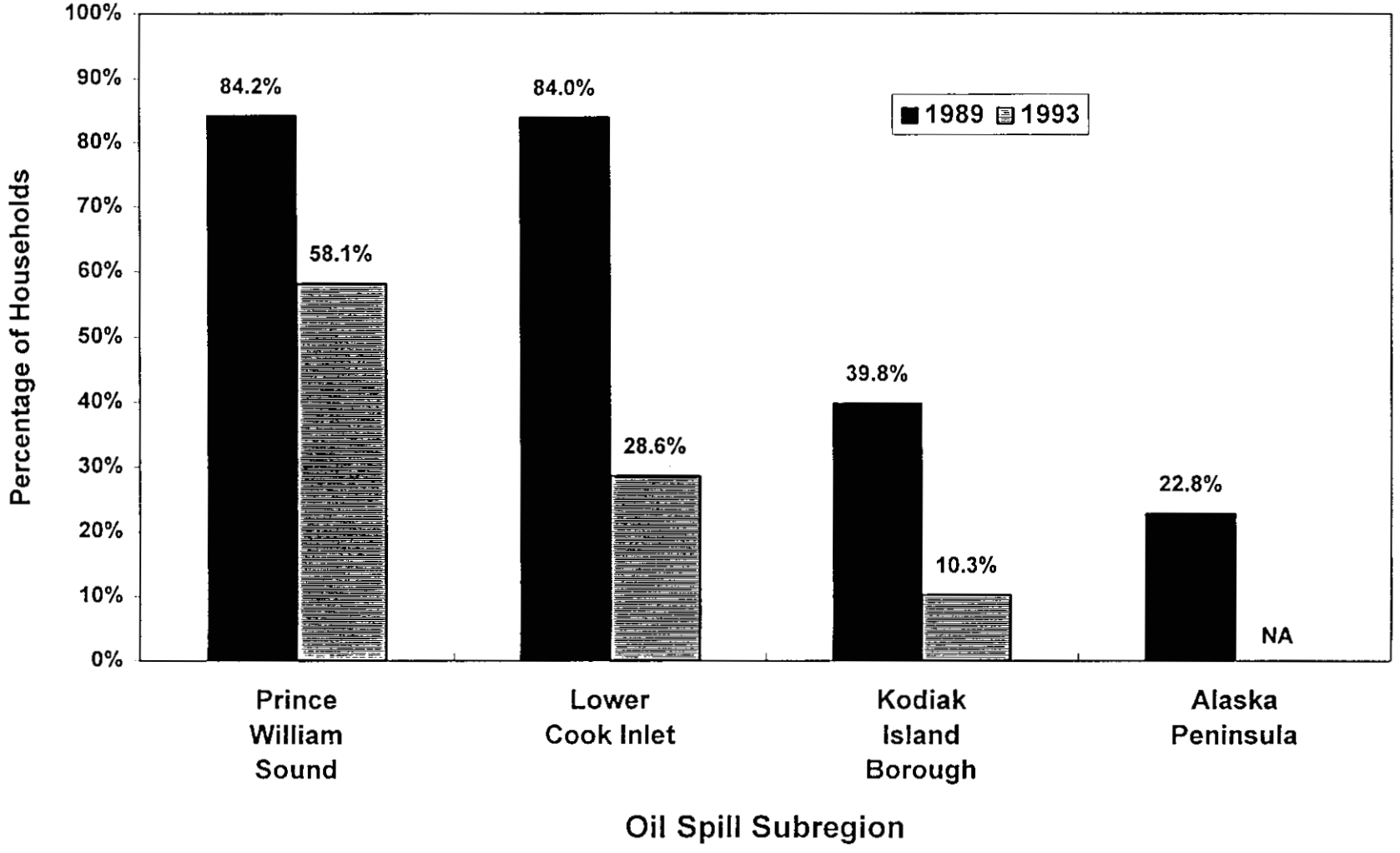


Figure 4. Percentage of Households Reporting Lower Subsistence Uses Because of the Exxon Valdez Oil Spill, 1989 and 1993



Sources: Fall and Utermohle, 1995; Fall et al., 1995

Figure 5. Percentage of Respondents Believing that Harbor Seals Are Safe for Children to Eat, Villages of the Oil Spill Region

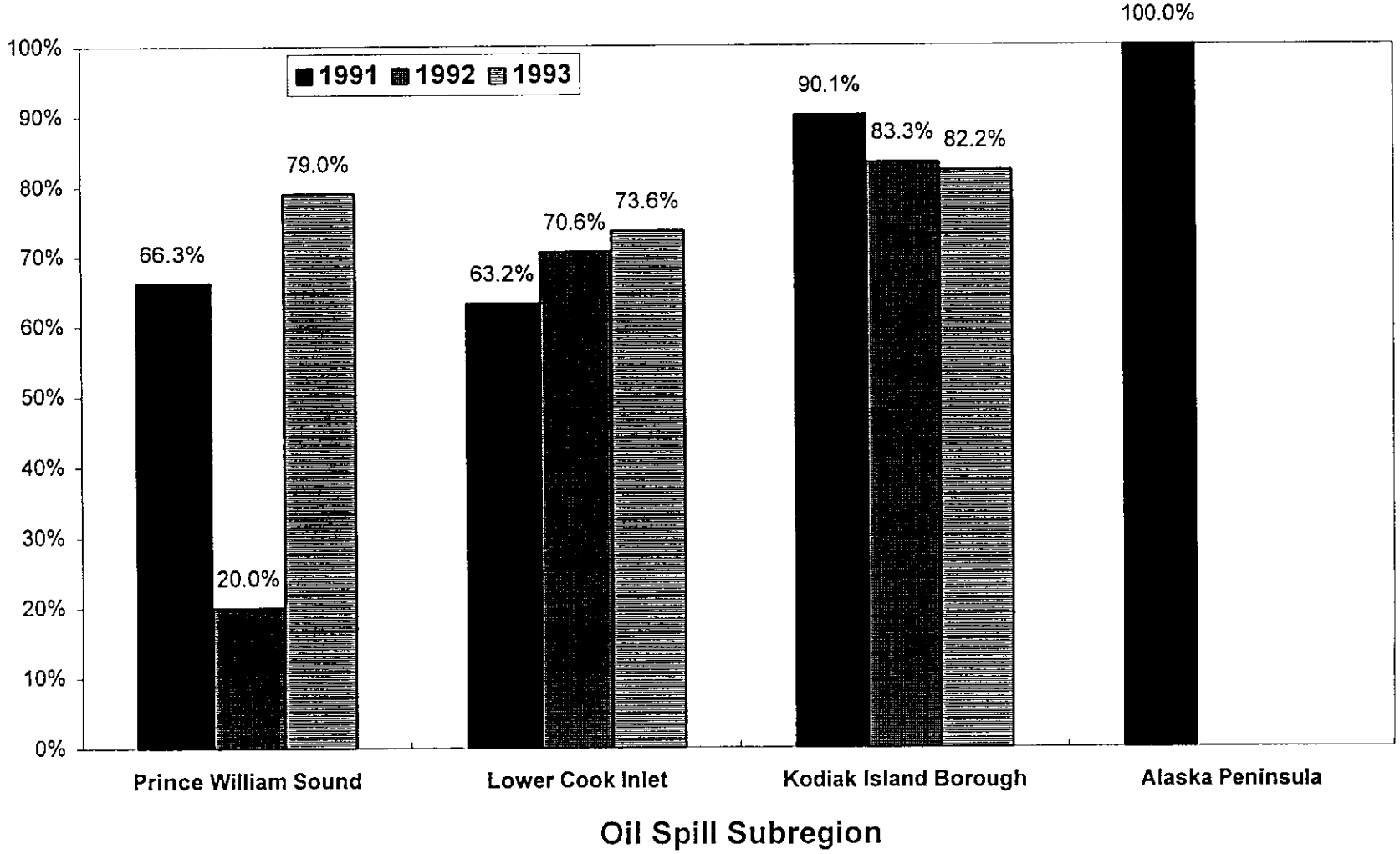


Figure 6. Percentage of Respondents Believing that Clams Are Safe for Children to Eat, Villages of the Oil Spill Region

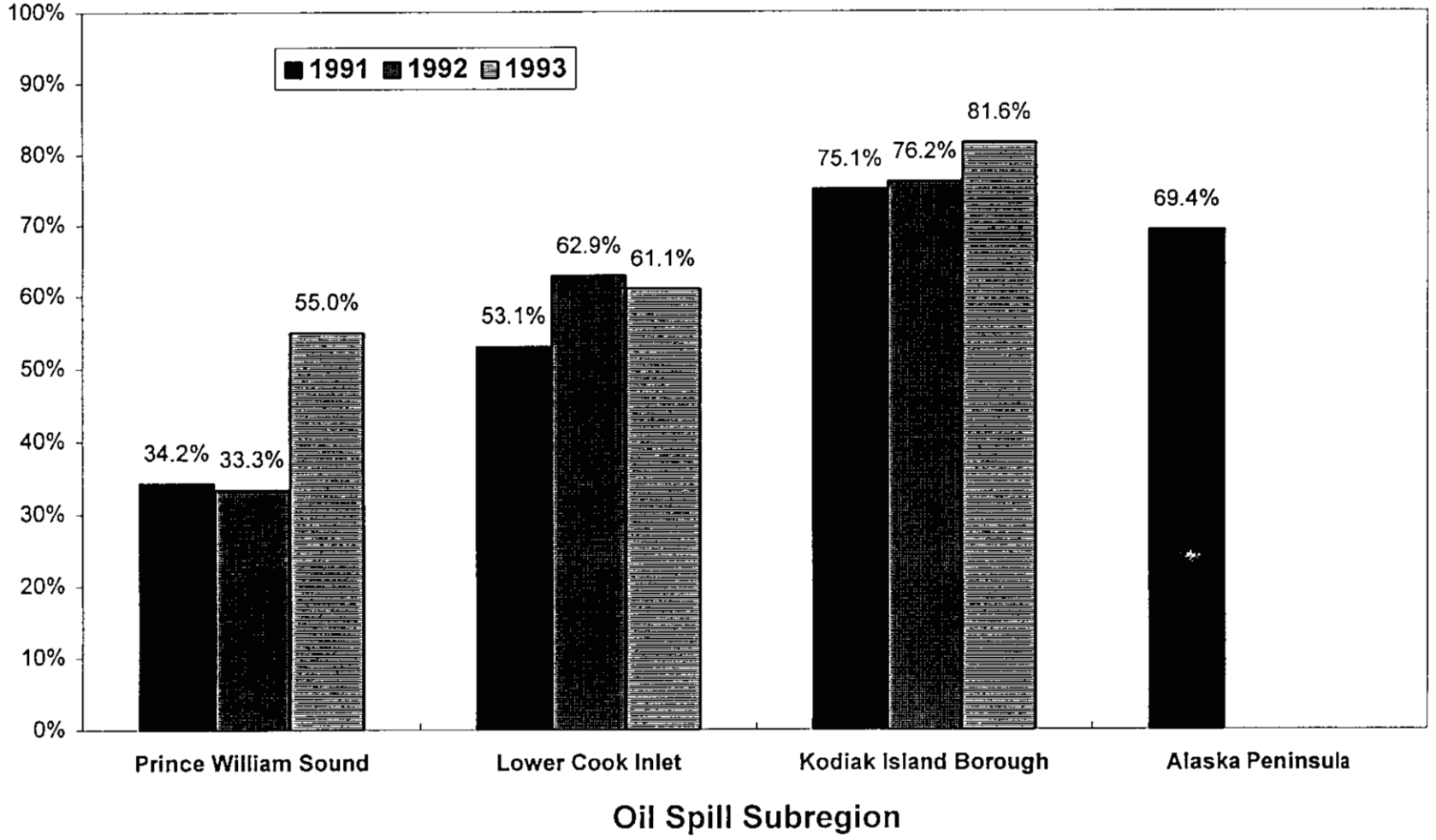
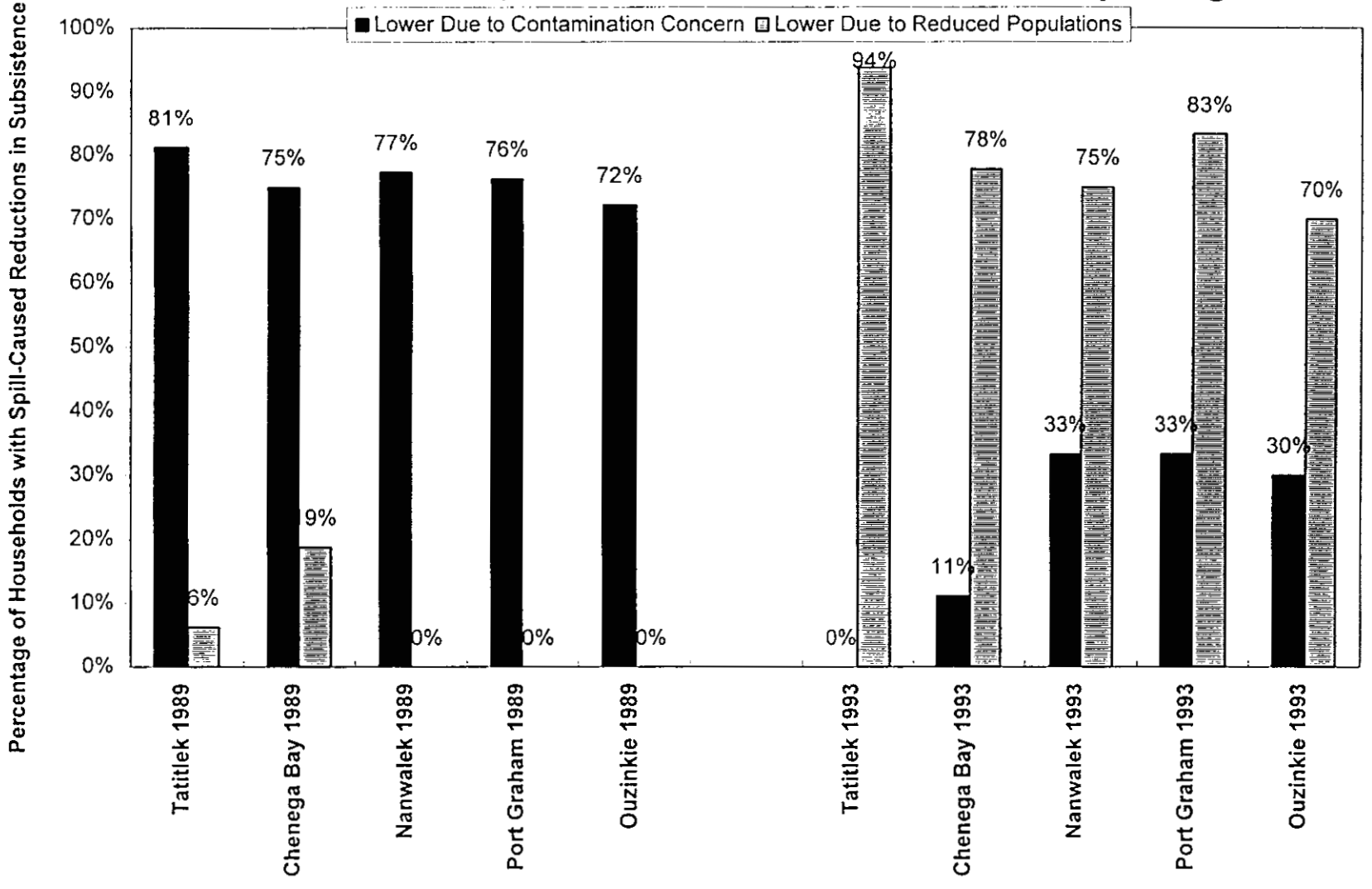


Figure 7. Changes in Oil Spill-Related Reasons for Reduced Subsistence Uses, Selected Communities of the Oil Spill Region



Sources: Fall and Utermohle 1995, Fall et al 1995

Figure 8. Percentage of Respondents Who Believe that the Oil Spill Has Affected Children's Participation in Subsistence Activties

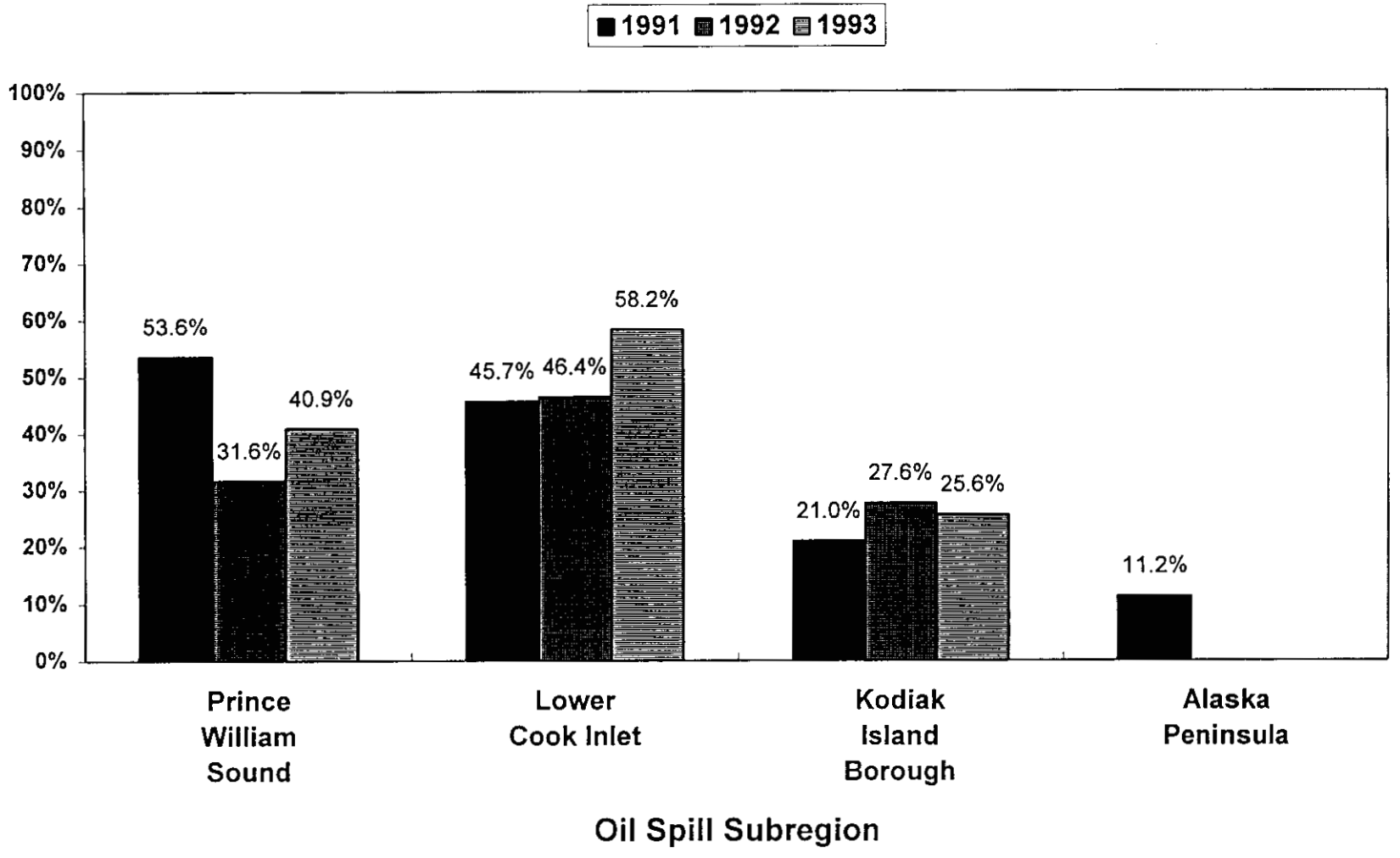
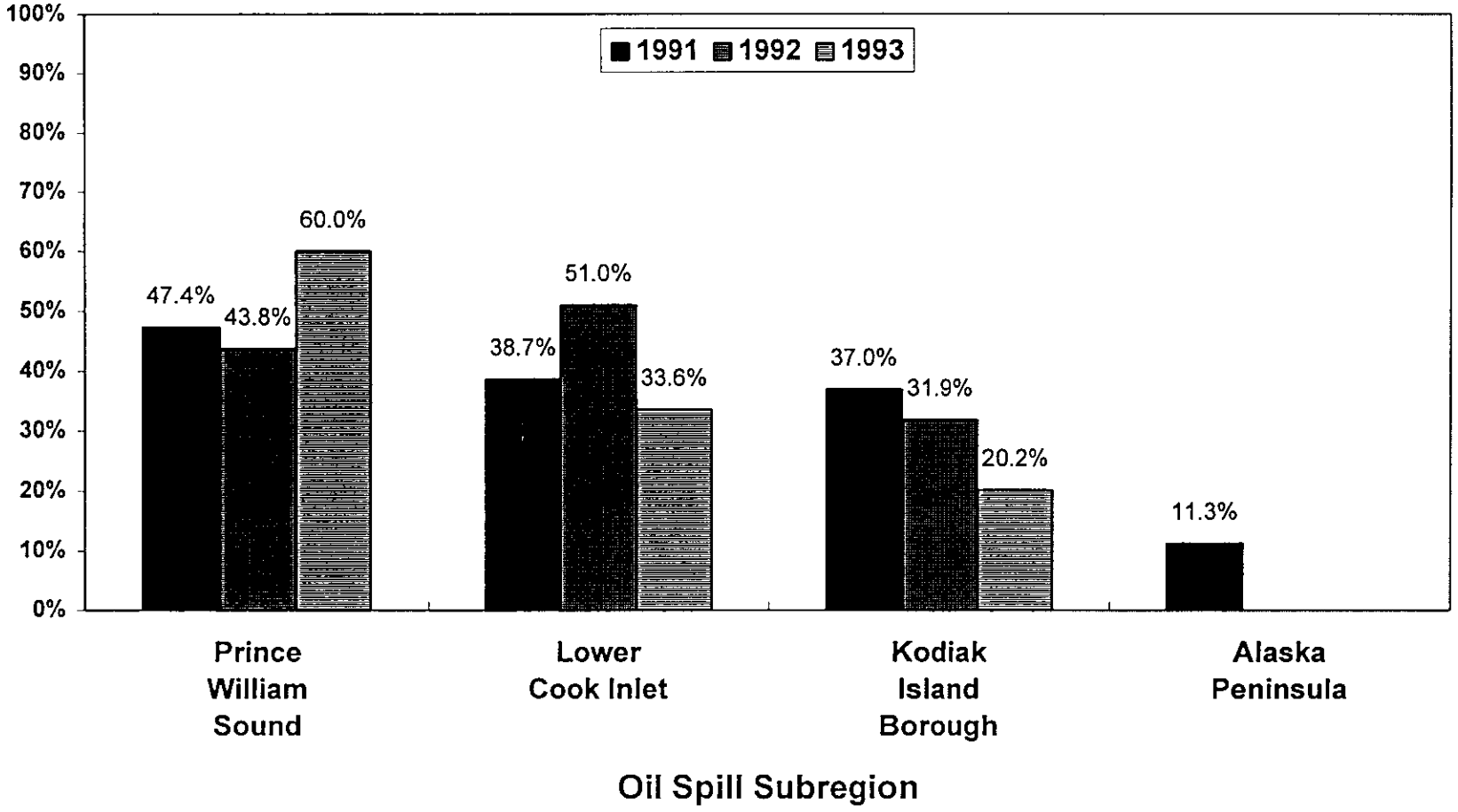


Figure 9. Percentage of Respondents Who Believe that Subsistence Sharing is Lower Than Before the Oil Spill



Source: Fall and Utermohle, 1995

Figure 10. Percentage of Respondents Who Like Living in Their Community Less Since the Oil Spill