Exxon Valdez Oil Spill, Cleanup, and Litigation: A Collection of Social-Impacts Information and Analysis

Final Report, Volume I:
Final Comprehensive Report

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August 2001

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LIST OF ACRONYMS

ADF&G	Alaska Department of Fish and Game
CESD	Center for Epidemiologic Studies of Depression
EVOS	*Exxon Valdez* oil spill event, including the clean up phase
GAD	Generalized Anxiety Disorder
MMS	United States Department of the Interior, Minerals Management Service
PTSD	Post Traumatic Stress Disorder

1.0 INTRODUCTION

An element of the legacy of the *Exxon Valdez* oil spill event (EVOS) is awareness of the risks and costs to human communities of oil transport in Alaska. In the Spring of March 1989, there were a few vigilant fishermen and other Alaskans who understood the potential consequences of a catastrophic oil spill. Many other Alaskans did not expect and could not foresee the effects of a grounded supertanker on Bligh Reef. Fishermen and other residents of Kodiak Island and the Alaska Peninsula were concerned about competition for fish, salmon prices, summer recreation, and the details of life in rural Alaskan fishing communities. In Native villages throughout the region, the concerns were about fishing, hunting, visiting with friends and relatives, and the cycles of life built around harvesting fish, game, plants, and berries. For Natives and non-Natives alike, an oil spill was a distant threat, a relatively unknown risk. An oil spill in Prince William Sound was far away and would likely be someone else's problem.

1.1 PURPOSE OF THE REPORT

The events of March 24, 1989 changed perceptions about who is at risk as well as the costs and consequences to all Alaskans of a major oil spill. What should not have happened, did. What could have been prevented was not. A low probability of occurrence event became a reality. The "big one" happened and set in motion unpredictable events with consequences for human and biological communities in the Alaskan ecosystem. Neither the most vigilant fisherman nor the most concerned stewards of Alaska's resources could predict the range of impacts from nearly 11 million gallons of oil spilled into a complex ecosystem with commercial, spiritual, and cultural importance for Alaska's residents. With hindsight, there are lessons to carry forward about the human and social dimensions of these effects. In this Comprehensive Report we examine some of these lessons as indicated by our analysis of the published literature about the oil spill and its aftermath presented in the Factor by-Factor Analysis. We also develop the implications of these lessons for those who live in Alaska's at risk communities and for those who are the developers, managers, and stewards of Alaska's natural resources.

These "implications" are presented as recommendations to natural resource managers and others who need information about how social factors affect the response of communities to a technological disaster such as the EVOS. To construct these recommendations, we summarize the major analytical points about each social factor (culture, social organization, subsistence, social health, and economics) and then derive "demand conditions. " For our purposes a demand condition is the responses required by social and cultural resources for adaptation to the EVOS event. These demand conditions are simply an intermediate step in deriving recommendations that are based on the nature of the EVOS and the particular characteristics of social factors in Alaskan communities. We then suggest "information" and "action" recommendations based on our assessment of demand conditions and the "lessons learned." Since any future event is likely to have a different context and different characteristics, any set of recommendations we can propose should be more general than specific. That is, in proposing recommendations our intention is to foster a process of how to think about social factors rather than to make highly specific recommendations that may not fit the context or characteristics of any future event. We intend to suggest a "way of thinking" about social effects that can be applied to any future circumstances where agencies must respond to the social as well as the biophysical consequences of a technological disaster event.

1.2 LIMITATIONS OF THE REPORT

Our discussion of "lessons learned" and recommendations in this report expresses the work of western social scientists that conducted studies of the effects of the EVOS on Alaskan communities. Here and in the Factor-by-Factor Analysis Report we have used quotations of persons who participated in these studies that express their experience with the EVOS. However, these limited quotations and even the

more extensive quotations in the sources consulted (e.g., IAI 1990c; Reynolds 1993; Endter-Wada et al. 1993) should not be construed as the whole story of the spill as experienced by those who lived it from March 24, 1989 through the present. This report does express our assessment of the analysis of primarily western social scientists who attempted to understand and characterize the social effects of the EVOS. Those of us who listened to and observed those affected by the EVOS have noted how deeply moved Natives and non-Natives alike were by the oil-fouled birds, seals, otters, shorelines, and the important places in which people live their lives. We do not presume here to tell their story, which should be told in their own narratives and with their own accounts the effects of the EVOS have had on their economic, social, cultural, and spiritual lives. This task is yet to be done.

2.0 BACKGROUND: CONTEXT AND EVENT CHARACTERISTICS

The EVOS occurred within a specific social, cultural, historical, and biophysical context. This context is essential to understanding how social factors interacted with specific event characteristics to result in community impacts. Context illustrates the broader set of connections that assist in interpreting how communities were affected by both the oil spill and cleanup. Another important aspect of background concerns the characteristics of the oil spill as a technological disaster. The structure and process of this particular event, that is its characteristics, interacted with community social factors. Consequently, here we present a brief summary and overview of event characteristics that affected community responses to the EVOS. These are developed in more detail in the factor-by-factor analysis report. Here our intention is to offer a brief summary to serve as background for developing the "lessons learned" and "recommendations" sections that are the substance of this report.

2.1 ESSENTIAL FACTOR: BIOPHYSICAL CONTEXT

Prince William Sound and the Gulf of Alaska are part of a rich and complex coastal marine ecosystem in Alaska. This ecosystem is characterized by rich and diverse marine life and the coastal flora and fauna are varied. Marine mammals (e.g., orcas, harbor seals, sea lions, sea otters, and whales) exist throughout this region. Fish and other marine resources are diverse and generally abundant. These resources include five species of Pacific salmon, halibut, a wide variety of other groundfish (e.g. Pacific Cod, black cod, pollock, sablefish, yellowfin sole, rockfish), steelhead, several varieties of commercially important crabs (e.g., opilio, tanner, king), shrimp and numerous other commercial and non-commercial marine species. Intertidal and subtidal areas are home to a diversity of invertebrates including clams and mussels and other resources that have importance for Native subsistence users. Bird resources are numerous and diverse, including bald and golden eagles, a variety of seabirds (e.g., marbled murrelets, auks, kittiwakes) and shorebirds. In fact, the Copper River Delta in Prince William Sound is home to one of the greatest concentrations of shorebirds in this hemisphere. The land mammals of this region include caribou, brown bears, black bears, moose, deer, wolves, and a variety of small mammal species. The flora of the region is as diverse as its fauna. In some areas there are large stands of spruce, fir, and hardwoods. High grasses, willows, and tundra characterize other areas. South of Bligh Reef, there are several major islands (e.g., Montague, Latouche, Knight) before Prince William Sound opens into the Gulf of Alaska. Deep fjords distinguish the coastal areas in some parts of the region (Prince William Sound, Kenai), but in other areas there are vast stretches of open beaches.

The coastal and open waters of Prince William Sound and the Gulf of Alaska were considered relatively "pristine" before the EVOS (Short and Harris 1996:17). Currents circulate water from the Gulf into the Sound and then back out into the Gulf. These types of ocean currents contribute to the "pristine" character of the ocean waters in this region and also worked to distribute the oil from the EVOS into far distant areas. The beaches and other coastal regions of the Sound and Gulf are also relatively unpolluted. The beaches of this region have some specific characteristics that predispose them to hydrocarbon contamination. Large rocks and gravel over loosely compacted sediment characterize the structure of

these beaches. Underneath these layers there is another layer of densely compacted sediment and then bedrock. The depth of the first three layers varies from beach to beach depending on the nature of the specific beach, the high tide lines, and the depth of the bedrock. Tides mix the cobble rock and gravel as the waters rise and fall. In the intertidal zone these materials can mix with the layer of loosely compacted sediment to depths ranging from several inches to several feet. The surf action also grinds up materials brought in by the tides such as kelp and debris and distributes this throughout the upper and sediment layers. These characteristics of beaches in the spill-affected area were important because they distributed oil from the top layers down through the second and third layers of sediment. The surface rocks and sandy areas of beaches became coated with oil as well and the sediment layers also became contaminated. Furthermore, wave action and tides took surface oil back out to sea where incoming tides redeposit the oil, starting the cycle all over. Importantly, some of these intertidal zones are habitat for clams, mussels, crabs, and other plants and animals used by Alaska Natives for subsistence purposes.

2.2 ESSENTIAL FACTOR: SOCIOCULTURAL CONTEXT

Native and non-Native communities have instrumental, as well as cultural and spiritual, connections to the natural resources of this region. Salmon and other fish have commercial value and are essential to the economics of many communities. Fishing also establishes the routines and practices of much of the social life in coastal communities that depend on these natural resources. Gathering bidarkis, hunting seals, gathering berries, and other subsistence practices are activities that are central to the social life in Native communities. The geophysical features of beaches, coastlines, and vast expanses of water are constituted as "places" that have commercial, cultural, and spiritual values for Natives and non-Natives. These types of connections tie natural resources with the social and cultural life of Alaskan communities. Further, these connections – which establish the sociocultural context of natural resources – makes these resources meaningful for human communities. This context is essential background for assessing community impacts. They provide the means through which social factors and natural resources interact. When these connections are damaged or otherwise impacted, then communities will experience damages. Establishing the social context of natural resources is essential to how to think about not only the EVOS but also any future technological disaster event.

For our purposes, two major types of context connections can be distinguished in the Prince William Sound/Gulf of Alaska region. One is the "Native" context and the other is the "non-Native" context. The Native context is one in which there are multiple and overlapping connections among community social and cultural institutions and the natural resources of the region. These connections are linked with a long historical tradition of dependence upon natural resources as a source of food, materials, and spiritual inspiration. In the Native context, social life is organized around the taking and use of foods and materials that exist in the natural environment. Children learn about their culture through participation in the activities of subsistence harvesting and processing. Social bonds among kinsmen and other community members are reinforced through the sharing of processed resources and, in some instances, through cooperative hunting and fishing. Hunting and fishing for subsistence resources also affects seasonal travel to camps for temporary residence. Some natural resources have spiritual importance, expressing the religious beliefs and providing the substance for rituals and other religious practices. In the Native context, historical, social, cultural, and instrumental ties connect communities with natural resources in complex and overlapping ways. This Native context also has a long and complex historical relationship with non-Native society. This historical context itself is significant for understanding the Native context and its interaction with the EVOS (cf. Wooley 1995).

The "non-Native" pattern lumps together the adaptations and lifestyles of many different types of communities such as Valdez, Whittier, Cordova, Kodiak, and Seward. Each of these communities has distinct sociocultural characteristics, but they share some common features in their attachments to natural resources. These connections with natural resources have a duration that extends from late in the last

(19th) century. Instrumental uses predominate among non-Native attachments to natural resources. Commercial fishing for salmon, groundfish, herring, shellfish, and other species is a major instrumental use of these resources. The economy of these communities is focused around the harvesting, processing, and export of these resources. Similarly, timber harvesting is another major instrumental use of natural resources. Although not as extensive a contribution to local economies as fishing, this use of natural resources further expresses the instrumental uses in the non-Native pattern. However, these instrumental uses also structure social life and the annual round of activity among many groups in these communities. Spiritual attachments to these resources exist in the non-Native pattern, but they are not as extensive nor are they necessarily of the same character as Native attachments. Among non-Natives, these attachments are to specific places, particular wildlife, or the overall "wild" or "pristine" character of the landscape. The natural environment is not attributed with the same type of spiritual presence, although there remains important spiritual value to particular resources. Furthermore, non-Natives in Alaska also practice subsistence hunting and fishing and these activities also are a significant connection to natural resources. However, the practice of subsistence has different cultural meanings for non-Natives in comparison to Natives (cf. Jorgensen 1995a). Overall, the non-Native pattern represents fewer types of attachments between natural resources and community institutions than in Native communities, but these are nonetheless complex. That is, they express multiple types of attachments in the social, cultural, economic, political, and spiritual life of these communities.

In summary, sociocultural context suggests examination of the nature, types, and complexity of ties between community life and natural resources. In the case of the EVOS, both Natives and non-Natives had numerous types of instrumental, spiritual, and cultural connections with natural resources in Prince William Sound and the Gulf of Alaska. An event that damaged these natural resources was therefore likely to affect communities in many different social and cultural dimensions. Appreciation of how the patterning of social factors affected the response of communities to the EVOS is essential for understanding the interaction of specific communities with the EVOS. The oil that covered the beaches in Tatitlek was the same as the oil that washed ashore in Seward, but the meanings of the effects of that oil contamination are determined by configurations of social factors.

2.3 A SUMMARY OF EVENT CHARACTERISTICS

Every disaster event is unique. These unique characteristics provide the particular circumstances that interact with the social factors and their biophysical context. Here we cannot list all of the characteristics of the EVOS, but the following are well reported and capture the uniqueness of this particular event.

- The tanker *Exxon Valdez* grounded on Bligh Reef on March 24, 1989 spilling nearly 11 million gallons of crude oil into Prince William Sound.

- More than 140 miles of beaches had heavy oiling. More than 1,500 miles of shoreline had some oiling. Those areas oiled included National Forest lands, four National Wildlife Refuges, three National Parks, five State Parks, four State Critical Habitat Areas, and a State Game Sanctuary.

- The spilled oil spread south and west from Bligh Reef in Prince William Sound, eventually reaching Kodiak Island and the coast of the Alaska Peninsula. Eventually the oil spread nearly 600 miles from Bligh reef. For comparison purposes, the slick covered an area roughly equivalent to the distance between Cape Cod, Massachusetts and the coast of South Carolina.

- Marine mammals, seabirds, fish, and other elements of the marine ecosystem were killed outright or contaminated by the spilled oil. The causalities included:

- Between 100,000 and 645,000 sea birds are estimated to have died from direct exposure to the oil spill. More than 150 bald eagles carcasses were recovered and it is estimated that nearly 300 bald eagles died.

- About 300 of the 2,200 estimated harbor seals of Prince William Sound were killed outright. About 2,800 to 5,500 of the estimated 10,000 sea otters were also killed. About 22 killer whales "disappeared" in the immediate aftermath of the spill. At least 25 gray whales died from exposure to the crude oil.

- Plankton and other microscopic sea life, that is part of the food chain in this ecosystem, was killed or contaminated

- Intertidal invertebrates, shellfish, and plant life such as seaweed were also killed or contaminated.

- Salmon, herring, and other fish were killed in unknown numbers, but there were no apparent massive deaths from exposure. However, several species show the presence of hydrocarbons in their livers.

• As a result of possible contamination, several fisheries were closed, including shrimp, black cod, herring, and salmon. This disrupted commercial fishing in Prince William Sound and portions of the Gulf of Alaska.

• Layers of sediment on some beaches in Prince William Sound and the Gulf of Alaska were heavily contaminated by the crude oil.

• Chenega Bay, Kodiak, Seward, Nanwalek (previously English Bay), Larsen Bay, Ouzinkie, and other communities were directly oiled. Other areas used for subsistence purposes by Native communities as well as areas used by commercial fishermen in Native and non-Native communities were oiled.

• Exxon assumed responsibility for cleaning up the spill. A privatized cleanup was organized. Valdez was the major center for cleanup operations. Exxon and its contractors administered funds for cleanup.

• Exxon contractors hired individuals from affected Alaskan communities to work on the cleanup. However, the possibility of relatively high paying cleanup work also attracted persons from other Alaskan communities and from the lower 48 states

• Cleanup began in April of 1989. The last major cleanup efforts ceased in 1992. Exxon is said to have spent more than 2 billion dollars on cleanup efforts. Priority for cleanup jobs and contracts was given to Natives, commercial fishermen, and other Alaskans in other communities affected by the spill.

• Several cleanup methods were used: boom was used to contain oil in the open water; skimmers as well as blotters and similar methods were used to collect oil on the water; cold and hot high pressure hoses were used to clean beaches and shorelines. Bioremediation was also used on some beaches. Dispersants had limited use. Arguments existed about the overall effectiveness of some cleanup methods, especially the use of hot water high-pressure hoses on beaches.

- Competition for cleanup work and contracts among commercial fishermen and arguments about participation in what was perceived to be more of a "PR [public relations] effort" than a cleanup resulted in conflicts among individuals and groups in affected communities.

- Some Archaeological resources were damaged or stolen during the cleanup process. Cleanup crews and others violated other sites that have historical and cultural importance for Alaska Natives

In sum, these characteristics indicate a unique event. However, the EVOS is also a classic "technological disaster:" North Slope crude oil – a toxic substance – spilled into an ecosystem and threatened natural resources with sociocultural importance for nearby communities. The EVOS shares some specific characteristics with other technological disasters that assist in interpreting its meaning and effects on affected communities. These characteristics are as follows:

- A preventable accident involving complex technology controlled by private industry and regulated by government agencies.

- Natural resources of importance to nearby communities were contaminated.

- Uncertainty existed about the short and long-term effects on ecosystems and human communities exposed to contaminated resources.

- Publics evaluated the risks and consequences of exposure to the contamination differently than Exxon or government agencies.

- Issues of blame and responsibility were prevalent in public discourse about the event.

- Communities and Exxon differentially evaluated the nature and extent of damages.

- Social conflicts regarding the event and its aftermath resulted in the loosening of community bonds.

- Individuals and groups experienced stress and other psychosocial consequences from the event and its aftermath.

- A weakened "therapeutic community" formed but social conflicts and loosened community bonds diminished the availability of social support.

- The sense of place and evaluations of home as "safe" were threatened if not changed by the circumstances of the event.

- Groups and individuals that were highly dependent on the damaged resources experienced the most distress.

- The cultural values and lifestyles of a minority population were not taken into consideration in formulating response and recovery efforts.

These commonalties with other technological disasters suggest there may be some common processes that occur when failed technology damages resources of importance to human communities. The nature of these processes, their expression in the EVOS, and their implications for future events are the substance for the remainder of this Report.

3.0 COMMUNITY BY COMMUNITY SUMMARY

A significant lesson of the EVOS is that it was not a uniform event for each exposed community. This can be illustrated by describing for each community salient interactions of social factors and the event as reported in the existing scientific literature. This literature gives more descriptive and analytical attention to some communities more than others; and this uneven reporting does not necessarily reflect the degree or intensity of impacts experienced by different communities. Rather it is more an issue of the nature of the research conducted than any other factor. For example, there is relatively limited information available about Whittier, but significant information about Cordova. Similarly, less information exists about Valdez than Cordova or even Kodiak. Overall, there is more information about Native than non-Native communities, although these discussions address a more narrow range of social factors, usually focusing on subsistence issues. Furthermore, much of the research was structured to aggregate information from different communities to make analytical findings. This severely limits our ability to analyze the role of social factors in most exposed communities. However, this community-by-community summary is useful for indicating the range and types of impacts reported in the literature. These summaries are presented by describing some basic background information about geography, demography, economy, and political organization and then presenting a synopsis of the major research literature that addresses social impacts in these communities. Each synopsis addresses the most salient points in the literature. The full text of each source should be consulted for a developed discussion of the impacts indicated in our summary discussion of the source.

3.1 NONNATIVE COMMUNITIES

3.1.1 Valdez

There are several major sources of descriptive information about the interaction of Valdez with the EVOS. These are: the Oiled Mayors Study (Impact Assessment, Inc. [IAI] 1990a-d); the Mineral Management Service (MMS) Social Indicator's Study (TR 155 Volume IV. Post Spill Key Informant Summaries); the MMS subsistence study (TR 160 Chapter III), the Valdez Counseling Center study of psychosocial impacts (Donald et al. 1990); and descriptive information in Davidson (1990) and Keeble (1991).

Geographic Location and Infrastructure. Valdez is located at the northern most end of Prince William Sound and it is well known as the terminus of the Alaska Pipeline. A road connects Anchorage and Valdez and there is also air service and a ferry. The community has primary and secondary schools as well as a Junior College. Other major facilities include a teen center, hospital, and community center.

Demography. In 1989 its population was about 4,000 persons, although there appeared to be considerable seasonal variation with about 3,000 during the winter and more than 4,000 during the summer months (IAI 1990c: 200; Miraglia and Tomrdle 1995: III-3). Approximately 9% of this population are Alaska Native (Miraglia and Tomrdle 1995: III-3)

Economy. Valdez has an industrial economy focused around oil transport. Primary employers are federal, state, and local government and Alyeska (the pipeline company). Commercial fishing and tourism were also other major sources of employment and local income at the time of the EVOS.

Political Structure. Valdez is a home rule city with an elected mayor and city council. A city manager and staff conduct the business of the city. At the time of the spill Valdez did not belong to a borough.

Oiled Mayors Study. The specific discussion of Valdez in the Oiled Mayors Study (IAI 1990c: 200-244) discusses a range of social effects from the EVOS. The most salient issues in this discussion are as follows.

Valdez became the center of cleanup operations for the EVOS. There was an influx of personnel from Exxon, the U.S. Coast Guard, various state and federal agencies, volunteers, and other "outsiders" many of whom were seeking cleanup employment. Estimates were that Valdez had a population of about 11,000-12,000 during the EVOS. These outsiders placed significant demands on community and municipal services. For example, peak water flow increased to 3.6 millions of gallons per day from a previous high of 2.5 million gallons per day, residential and commercial construction permits doubled between 1988 and 1989, civic center events increased by 82%, airport traffic increased 2,400%, camp grounds exceeded capacity by more than 100%. There was substantially more demand for housing than supply. Demands for child-care, related to oil spill employment, also increased significantly. Many community facilities were used for oil spill response activity. It was nearly impossible to escape the reality of the oil spill for Valdez residents because of the intensity of response activity centered in Valdez. However, the only oil from the event to reach Valdez was carried in on the hulls of cleanup vessels.

Public safety and community health resources were strained by increased demands. For example, from the prior year there was a 115% increase in demand for ambulance service; a 50.8 % increase in demand for fire call-outs;124% increase in hospital emergency room visits; 81.7% increase in visits to the Valdez counseling center; and a 118.3% increase in visits to services provided for victims of domestic violence. Police calls increased 63.8% over the pre-spill year and there was an increase of 123.6% in arrests, 44.2% increase in man-days in jail, and statistics regarding specific types of crimes also showed significant increases from the pre-spill year.

The demands of the EVOS disrupted the normal routines of family and community life. Recreational programs were disrupted, day care became problematic, and the usual work routines were disrupted because of the nature of oil spill response activities.

The usual activities of local government were disrupted because of oil spill response activity. The Mayor, City Manager, City Council, and other essential personnel of that ensure operation of the city were consumed by meetings, planning, responding to media, and other oil spill response activities. Disruption of the normal business of local government is evident across all departments.

Social conflicts and divisiveness became salient social issues within the community. The divisiveness developed among those who were oil industry employees and the rest of the community. Some conflicts concerned those local residents and "outsiders."

Economically, some businesses in Valdez experienced a boom because it was the center for response operations. Other businesses had difficulty retaining employees because of competition with high paying oil spill response work. Fish processors in Valdez were among those who experienced adverse economic consequences because of the spill.

Valdez Counseling Center Study. The Valdez Counseling Center (Donald et al. 1990) conducted a three phase mail survey in Cordova and Valdez which started in May of 1989 and was completed about one year later. The study administered self-report measures of depressive symptoms (Center for Epidemiological Studies of Depression [CESD]), a measure of stress (Frederick Reaction Index), and a perceived social support measure. The sampling procedures yielded a total of 93 respondents. Initially 53 Cordova residents were recruited of whom, 43 completed all three phases; and, in Valdez 64 respondents were initially recruited, of whom 50 completed all three surveys (Donald et al. 1990: 16).

The Valdez Counseling Center survey produced the following major findings:

- For residents of Cordova and Valdez, the EVOS was an extreme stressor that caused emotional distress for residents.

- Cordova had a higher intensity and duration of emotional distress than did Valdez.

- Perceived social support was a mediating factor in Valdez, but not in Cordova.

- No relationships were found between emotional distress and occupation, age, gender, and other demographic variables (Donald et al. 1990: 20ff).

In reviewing respondent comments about the nature of the stresses related to the EVOS, Donald et al. note: "In Valdez the most frequently expressed concern (n=11) was convergence related, i.e., crime, transients, crowds, and traffic that al increased as a result of the spill. Concern about the Native impact of the spill on the environment (n=5) was the second most frequent expressed comment. In Cordova concern about the negative impact of the spill on the environment (n=1)) and social disruption caused by perceived greed or jealously as a result of spill related income (n=10) were the most frequent comments. Concern about the future of the fishery was Cordova's second most frequent comment" (Donald et al. 1990: 18-19).

The study also reported on the influx of "outsiders" and its social consequences for Valdez residents as indicated in the following quotation:

> In addition to the influx of oil spill workers, a host of other groups and individuals converged on Valdez, including: the mass media, Exxon bureaucrats, security guards, representatives of state and federal agencies, bird and otter rescue groups, scientists, environmentalists, tourists, street vendors, the unemployed, and the unemployable. This rapid population influx disrupted normal social patterns, as the population of Valdez swelled from 3,500 to an estimated 7,000 in a matter of weeks. Along with this rapid population influx came a variety of social ills: a fourfold increase in crime and consequence increase in fear for personal safety; a critical housing shortage that lead to all manner of unusual living arrangements; traffic congestion; long lines at the post office, stores, and restaurants. City services were overwhelmed. … Media coverage of the spill and clean up effort was intense and video images of dead or dying wildlife, oil blackened sea and shoreline as well as the high impact, labor-intensive invasion of the Sound were a constant reminder to residents that they were suffering a catastrophic event (Donald et al. 1990: 2-3).

MMS Social Indicators Study TR 155. This work is part of a larger study of social indicators in Alaskan communities that includes some selected work on the social effects of the EVOS. TR 155 reports on information developed from key informant interviews in particular communities. There are several key findings about the interaction of the EVOS with this community.

- Social conflicts did not appear to be as intense in Valdez as in other communities such as Cordova. This appears to be related to increase opportunities for spill-related employment, decreased dependence of residents on the use of marine resources (fishing and tourism), and the absence of threats from direct damages from the spilled oil. Conflicts between residents and outsiders were present, but the most animosity was toward the heavy hand of Exxon's actions with the community and its residents.

- Divisiveness among oil industry workers and the rest of the community was present prior to the spill, but the EVOS exacerbated these tensions. Tension and divisiveness also resulted from different opportunities to gain spill-related contracts and employment. Other tensions and divisiveness concerns those who benefitted from the spill and those who lost (e.g., some commercial fishermen and fish processors).

- The conflicts, tensions, and divisiveness that resulted from the spill inhibited participation in public life.

- A sense of alienation resulted from the desire for an effective cleanup, but no control over ensuring that one took place.

- Past experiences with the pipeline construction and prior periods of rapid social change were precursors to the development of stress reactions among residents.

- As a result of the EVOS residents have more ambivalence and distrust about oil transport and Alyeska in particular.

- As a result of the EVOS community residents perceive their community is less cohesive and social bonds are more strained.

MMS/ADF&G Subsistence Study (TR 160). The focus of this work is the effects of the EVOS on subsistence harvests and uses, although there are demographic data that address changes during the study years: 1991, 1992, and 1993. Among all of the communities included in the Social Indicators Study, Valdez shows a unique pattern. In comparison to other study communities, there is less concern about resource contamination of resources from the EVOS, fewer perceptions of decreased resource availability, and more support for future offshore (outer continental shelf) oil development (Miraglia and Tomrdle 1995: III-17). In comparison to other communities, Valdez residents did not identify the EVOS as effect resource harvests, sharing, or quality of life in the community. Further, Valdez residents were also less likely to report post-EVOS dissatisfaction with their community and their desire to live there. During the first year of the study 23.9% of respondents reported contamination fears about wild foods and 29.5% were unsure if these foods were safe to eat (MMS TR 160 III-14). Contamination fears were also related to perceived chronic pollution from operations of the Alyeska pipeline. It is suggested that the context of the Alyeska operations in Valdez is a factor in local attitudes to the EVOS and its effects on local populations.

Descriptive Sources. Several popular accounts report observations of impacts in Valdez (Davidson 1990; Keeble 1991). These include: rapid increase in population related to oil spill response activity; increase used of infrastructure facilities; labor shortages for local businesses; conflicts with outsiders; concerns about public health from the influx of outsiders and their living conditions; fears for public safety related to the volume and character of the outsiders in the community; pervasive presence of Exxon "security guards" and their restriction of access to places and facilities normally used by community members; inflation of costs for lodging, food, and other essentials; increase in stress for families and individuals; and Exxon's "heavy handedness" in relations with individuals, businesses, and local government. Overall, the effect described is a community which lost control of its daily life because of the actions of the Exxon Corporation and the influx of a variety of outsiders. Also, there are descriptions of the disillusion among community residents about the assurances by Alyeska of safe operations of the oil terminal and the concern for community welfare.

3.1.2 Cordova

The sources of information for Cordova are the same as those for Valdez with the addition of other work by the University of Southern Alabama.

Geographic Location and Infrastructure. Cordova is located on the eastern side of Prince William Sound on Orca Inlet. Most of the land around community belongs to the Chugach National Forest or the Eyak Corporation. There is no road connection to Cordova, but there is jet service from Anchorage and it is also accessible by ferry. There are also several charter airplane and boat services. Cordova has a hospital, primary and high schools, and a community center. Both commercial and recreational boaters use the harbor.

Demography. The 1990 population of Cordova is about 2,800, although this community has a highly seasonal population pattern that corresponds with the salience of commercial fishing in the local economy. Some fishermen and other residents reside in Cordova only during fishing season. During the winter it is estimated the population decreases to about 2,000. Approximately 18% of Cordova's population is Alaska Native (Eyak).

Economy. The economy of Cordova is a fishing based economy. At the time of the EVOS there were 634 commercial fishing permits in Cordova as opposed to 85 in Valdez. Salmon is the focus of the Cordova fishery. At the time of the EVOS there were other fishing activities, including shrimp, groundfish, and herring. But the focus of the fishing economy of Cordova is salmon fishing on the Copper River Flats and adjacent waters for wild fish. The Prince William Sound Aquaculture Corporation operates hatcheries for pink salmon. Four major and one smaller fish processors operate in Cordova. More than half the jobs in Cordova are related to the fishing industry. Other major employers are federal, state, and local governments. The retail business in Cordova is oriented to support of the fishing industry.

Political Structure. Cordova is a home rule city with an elected mayor and city council. A city manager and staff implement city government functions. Additionally, the Eyak Native Corporation is centered in Cordova. Although not a political entity, Cordova District Fishermen United (a local union) has been an important organizational and community resource for addressing political and economic concerns of local fishermen.

Alaska Oil Spill Commission/McClintock Report. Cordova has a history of opposing oil development in Prince William Sound. Represents of Cordova District Fishermen United have been active in expressing concerns about the threats of oil transport and development for the Alaska fishing industry. The community was not directly oiled by the spill, but areas used for commercial fishing and subsistence purposes were oiled. The spill also threatened fish hatcheries operated by the Cordova-based Prince William Sound Aquaculture Corporation. Cordova fishermen were among the first to respond to the EVOS. Cordova District Fishermen United played a central role in organizing the Cordova response effort. Initially, this was a volunteer effort that focused on protecting hatcheries and critical habitat and rescuing wildlife. The city supported formation of a community Oil Spill Response Office that produced a "Fact Sheet" that informed residents of EVOS developments. The city also initiated the Disaster Response Committee composed of citizens, the mayor, members of the chamber of commerce, fish processors, the local Native organization, and Cordova District Fishermen United. The community was not satisfied with the initial response of Exxon to community requests for assistance. This resulted in people getting angry with Exxon for its slow and ineffective response to the spilled oil. Some individuals simply took initiative and began collecting oil in 5-gallon buckets.

The usual business of local government was suspended by oil spill response activities. The city also incurred substantial costs in initiating response efforts. Over one million dollars was spent of the four million-dollar city budget. Exxon did not reimburse the city for some expenses and this had adverse

effects on city operations. Municipal services were disrupted between the day of the spill and the end of August of 1989.

Fishermen and other businesses experienced economic gains and losses related to the EVOS. About 60% of the community benefitted and about 40% lost. Fish processors and their employees were among those who lost income. Fishermen and others who lost money because of closed fisheries were unhappy with the claims process offered by Exxon. It did not address the factors that were important for assessing losses and there were feelings that Exxon was being unfair in its dealings with fishermen and businesses. Tourism and local retailers also suffered economically.

Child care services became a problem and there was stress and disruption in family life. The community experienced social disruption and a loss of trust in the parties responsible for protecting them from the threats of oil transport.

Oil Mayor's Study. Cordova experienced no direct oiling from the EVOS. However, there was oiling of areas used for commercial fishing and hatcheries that belong to the Prince William Sound Aquaculture Corporation. Additionally, Cordovans were among the first responders for volunteer cleanup efforts including organizing efforts to rescue injured wildlife. Local government experienced a range of impacts related to the EVOS. These impacts include: (1) the usual business of local government was displaced with oil spill response work; (2) staff workload increased and duties and responsibilities changed; (3) labor shortages related to competition with oil spill cleanup work resulted in some delays and increased costs for municipal projects; and (4) staff as well as other community leaders experienced stress and burnout, ultimately resulting in decreased participation in community activities. The quality of life in Cordova was adversely affected by an in-migration of persons associated with the EVOS cleanup; increased prices for gas, food, and rent; decreased availability of housing; decreased availability of child-care; and, the replacement of the fishing lifestyle with cleanup employment. Additionally, community bonds were loosened among Cordova residents as a result of public disagreements over participation in the cleanup. "Purists" and "Exxon Whores" were groups that became distinguished according to their moral, ethical, and economic arguments for participation or not the cleanup. Social bonds were also affected by evaluations of neighbors and friends as exploiting the cleanup situation and exhibiting "greed" in a time of community need. These loosened community bonds are argued as decreasing the availability of social support. Mental health suffered in Cordova as indicated by data from the Oiled Mayors Household Survey, the Valdez counseling center study, and reports of local mental health counselors.

MMS Social Indicators Study (TR 155). Like non-Native Cordovans, Natives felt as if there concerns and the effects on Native culture, ways of life, and economy were unrecognized by Exxon and state and federal agencies. Natives expressed a range of concerns about the effects of the EVOS, including: safety of subsistence foods exposed to the oil spill; looting and damage to Archaeological sites; adverse health effects from participation in cleanup work; increased costs of living; effects on gathering, sharing, and consumption of subsistence foods; and, the adverse social effects resulting from the overall disruption of the subsistence lifestyle. It is also argued that personal identity was adversely affected because of the disruption of the subsistence lifestyle; and, Eyak spiritual connections with the natural world were damaged when wildlife were killed and natural areas contaminated with oil.

Among non-Natives in Cordova, there was also a range of concerns related to the EVOS. These need to be considered against a history of concern about offshore oil development and oil transport operations among Cordova fishermen. Community members were distressed by the loss of control of the cleanup to Exxon and other agencies outside the community. Similarly, residents were especially concerned about an apparent policy to substitute "spill cleanup costs for spill damage payments" (TR 155 Vol 4: 226). Fishermen and other residents were distressed by Exxon's unwillingness to allow them to engage in early

cleanup activities. Despite being ready and willing to engage in wildlife rescue and oil cleanup activities, Cordovans were held back by Exxon which cited concerns about liability and "amateurs" engaging in oil spill cleanup work. Ultimately, Cordova District Fishermen United worked with Exxon to organize local spill response efforts. Social conflicts were among the most salient social effects of the EVOS. The substance of these conflicts included: money earned from participation in the cleanup; perceived favoritism in awarding contracts for cleanup work; the compromising of moral principles regarding participation in cleanup work; the effectiveness of the cleanup; and, the health consequences of participation in cleanup work.

Fishermen had a specific set of concerns regarding the EVOS. Among the most salient of these concerns were Exxon's voluntary settlement policy that fostered some suspicion and resentment about the equity of the proposed settlements. Specific concerns about these settlements included: prices offered by Exxon were considered considerably lower than expected by fishermen; effects of public perceptions about fish quality after the EVOS and its effects on price and demand; and, assessments of the volume of fish that could have been harvested had the EVOS not occurred. In fact, fishermen expected a banner year for both volume and price and they perceived these expectations were not seriously considered by Exxon.

The non-fishing sectors of the Cordova economy had different issues in negotiating damage claims against Exxon than did fishermen. Exxon had to be convinced that the local economy was fishing-dependent. Businesses experienced uncertainty over the short and long term effects on the fishing industry. Some perceptions existed that Exxon fostered conflict within the business community to delay or avoid paying claims for damages. Conflicts between the Chamber of Commerce and the Cordova Business Owners Association eventually spilled over into political conflicts with the City and a lawsuit by the former Chamber president against the City that had costs for Cordova in excess of $500,000. Additionally, there were shortages of labor, gasoline, housing, and other essentials as well as concerns about timely payments for services rendered to VECO, Exxon's contractor for clean up services.

In addition to incurring costs related to the law suit by the former Chamber of Commerce president, Cordova also experienced lost bond opportunities, breakdowns in normal business operations, lost raw fish taxes, and other operational impacts on city government.

Like their Native counter-parts, Cordovans have spiritual attachments to the natural resources of Prince William Sound. The attachments include the ideas that (1) nature is inspirited; (2) spirits in Nature can be directly sensed; (3) nature is omnipresent; and (4) nature cannot be owned by humans (Endter-Wada et al. 1993 Vol 4: 316). These express aspects of cultural attachments to natural resources that indicate more than

Valdez Counseling Center Study. This study compared Valdez and Cordova. One of the working hypotheses of the study was that Cordova – a fishing-dependent community – would experience more stress than Valdez. Although the numbers and methods of this study may not allow broad generalizations, the findings suggest differences between these two communities and the occurrence of stress related symptoms among Cordova residents. The findings, noted for Valdez, are replicated below.

- For residents of Cordova and Valdez, the EVOS was an extreme stressor that caused emotional distress for residents.
- Cordova had a higher intensity and duration of emotional distress than did Valdez.
- Perceived social support was a mediating factor in Valdez, but not in Cordova.

- No relationships were found between emotional distress and occupation, age, gender, and other demographic variables (Donald et al. 1990: 20ff).

MMS/ADF&G Subsistence Study (TR 160). Alaska Natives in Cordova expressed concern about the safety of subsistence foods that persisted into 1991. Although, these concerns did not have the same intensity in comparison to Chenega Bay or Tatitlek, these were nonetheless salient areas of distress about the EVOS and this Native community. Natives in Cordova expressed less satisfaction with their community after the spill than other Native communities. Stress, financial problems, social disruption, and community violence were contributors to the dissatisfaction residents experienced in the post-spill years. Alaska Natives in Cordova were not as likely as Natives in other communities to attribute to the EVOS declines in subsistence harvests, sharing, and participation of children in subsistence activities.

University of Southern Alabama Studies. Picou and Gill (1997 and 1996) report on essentially similar information about stress among commercial fishermen in Cordova. Picou, Gill, Dyer, and Curry (1992) present information about stress and social disruption in both Cordova and Valdez. The Picou et al. (1992) describes Cordova as an isolated community that is highly dependent on renewable natural resources. Commercial fishing and subsistence lifestyles among Alaska Natives connect the community to natural resources. Indicators of social disruption are assessed for family life, work, personal plans, and assessments of community satisfaction. Data for both 1989 and 1990 indicate that Cordova experienced social disruption in all areas. Furthermore, residents of Cordova also experienced symptoms of stress as measured by the Impacts of Events Scale. A pattern of relationship exists between measures of social disruption and psychological stress. These findings suggest the EVOS has resulted in long-term social disruption and psychological stress in the community. Picou and Gill (1996) examines the relationship among psychological stress, community stress, and occupation. Stress, as measured by the Impacts of Events Scale, showed that residents of Cordova had more stress than residents of Valdez or Petersburg (control community). Further, commercial fishermen showed more indicators of stress than other occupations. Those who live in resource-dependent communities such as Cordova and who practice an occupation dependent on the use of those resources will experience the most stress in an event such as the EVOS. Picou and Gill (1997) examines similar issues regarding occupation, stress, and residence in renewable resource dependent communities.

3.1.3 Whittier

Aside from some incidental comments in newspaper and some of the popular descriptive works (e.g., Davidson 1990) the Alaska Oil Spill Commission (McClintock 1989) and the Oiled Mayors Study are the primary sources of information about their interaction of the EVOS with this community.

Geographic Location and Infrastructure. Located 75 miles southeast of Anchorage on the Kenai Peninsula. There is no direct road to Whittier, although there is ferry service and the Alaska Railroad serves the community from Portage. A small airstrip is not maintained in the winter.

Demography. Whittier had a population of about 200-300 year round residents at the time of the oil spill. Most of this population is non-Native. During the summer months, visitors swell the local population as do some summer residents who live in condominiums and other seasons residences.

Economy. Fishing is the primary economic activity in Whittier. Other major sources of employment are municipal government and the Alaska Railroad.

Political Structure. Whittier is a second class city with an elected mayor and city council. As in many other rural Alaskan communities, a city manager and staff deliver the majority of municipal services to the community.

Alaska Oil Spill Commission/McClintock Report. Whittier residents were ready to respond to the EVOS almost immediately. However, insufficient boom and other materials to implement a response effort frustrated residents. Eventually, VECO appeared in Whittier to hire residents for cleanup operations. The frustration of volunteer and community-initiated efforts frustrated local residents. The City expended funds on response efforts. This resulted in insufficient funds to meet the demands for delivering other City services. Additionally, some staff was lost to oil spill cleanup operations further adding to problems in delivering City services. An influx of "outsiders" was a source of adverse impacts for the community. The boat harbor was filled to capacity and tourism resources were consumed by oil spill response activities. The closure of the fishing season had adverse economic impacts for local government revenues, fish processing plants, and local fishermen.

Oil Mayors Study. Two groups initiated the first response efforts: (1) an Emergency Operations Committee composed of six community volunteers and (2) the Deckhands Association. VECO, some 12 or so days after the spill, arrived to implement response efforts and subsequently subsumed the Emergency Operations Committee and its work. The Deckhands Association was composed primarily of deckhands and fish processing plan workers displaced from their usual work because of fishing season closures. The Deckhands Association provided information about local conditions that was useful for implementing response efforts.

Municipal impacts included increased costs for oil spill response efforts, increased work hours and workload for all municipal staff, loss of opportunities to prepare necessary grants for municipal development and functions, and decreased staffing to perform the necessary work of the City. Local businesses and the City each lost workers to the higher paying VECO cleanup jobs. Public safety/law enforcement services, emergency medical services, mental health services, harbor operations, and other municipal functions all showed increases in demand.

Whittier was not in the main communication loop for information about oil spill activities and status. Residents were concerned about the lack of available information and about their safety from future oil spills.

Although this is a community accustomed to an influx of summer visitors, no one in the community was prepared for the influx of outsiders that invaded Whittier during the summer of 1989. This "overwhelmed" the community. Additionally, the style of Exxon/VECO in their interactions with the community left many perceiving that they had lost control of their daily lives and ownership of their community.

3.1.4 Seward

The Oiled Mayors Study is the primary sources of information about effects of the EVOS on Seward.

Geographic Location and Infrastructure. Seward is situated on Resurrection Bay on the southeast coast of the Kenai Peninsula. It is 80 air miles and 125 highway miles south of Anchorage. The community is also accessible via the Alaska Central Railway. As the gateway to the Kenai Fjords National Park, passenger ships also frequent Seward. There are three schools as well as a vocational/technical college. Other facilities include a hospital, harbor, and offices of the National Park Service that provides oversight of the Kenai Fjords National Park.

Demography. At the time of the oil spill the population of Seward was approximately 2,400, mostly non-Native.

Economy. This is a diversified economy. In addition to some fishing and fish processing, other important economic sectors include tourism, a State Prison, and, port facilities. State, federal, and local government are major employers along with tourism related businesses and the fishing industry.

Political Structure. Seward is a home rule city and its part of the Kenai Peninsula Borough.

As in other community's, the business of local government was disrupted by oil spill response activities. The issues associated with oil spill response included increased work load, budget shortfalls because of expending funds on spill response activities, in the inability to deliver some municipal services because of staff involvement with oil spill response activities. However, Seward fared better than some other communities because it was able to draw resources from the Kenai Peninsula Borough. Also, a Multi-Agency Coordinating Group (locally called the 'MAC group') was formed and this group assumed significant responsibility for oil spill response activities that in other communities were performed by municipal staff. The Multi-Agency Coordinating Group was composed of members from the National Park Service, City of Seward, U.S. Fish and Wildlife Service, Chugach Alaska Corporation, Alaska Department of Fish and Game, Department of Natural Resources, and representatives from commercial fishing groups. The Multi-Agency Coordinating Group offered significant resources to the community and, significantly, its authority to integrate the interests and concerns of multiple interests groups was important for responding to Exxon and VECO. Because of the Multi-Agency Coordinating Group, Seward retained more control over cleanup operations than occurred in communities where such a resource did not exist. Although this community also experienced the sense of being overwhelmed and overrun by outsiders, the Multi-Agency Coordinating Group assisted in allowing the community to retain a sense of control over a threatening event.

Mental health in Seward suffered as a result of the EVOS. Issues included "stress", domestic violence, marital difficulties, and problems among children dealing with the effects of the spill. Demands for mental health services increased and some volunteer staff were unavailable because of oil spill response work.

3.1.5 Seldovia

The major sources of information about the interaction of the EVOS with Seldovia are the Alaska Oil Spill Commission Report and the Oil Mayor's Study.

Geographic Location and Infrastructure. This community is located on the southern Kenai Peninsula on the south shore of Kachemak Bay. It is a 45 minute flight from Anchorage. Totally surrounded by water, Seldovia is also accessible by ferry service of the Alaska Marine Highway.

Population. At the time of the spill the population of Seldovia was between 350 and about 450 persons. In 1997 The Alaska Department of Community and Regional Affairs certified the population as about 239. About 24% of this population is Alaska Native, although the 1990 census estimates indicates 15.2%.

Economy. Seldovia is primarily a fishing community, although logging and tourism-related businesses are also sources of employment.

Political Structure. Seldovia is a first class unincorporated city. It also belongs to the Kenai Peninsula Borough.

Oil Mayor's Study. Seldovia developed a grass-roots response effort that united some of the diverse political and social factions in the community. Response plans were developed and community initiated actions to protect their shorelines and waters. This exemplifies development of a "therapeutic"

community that can provide essential social support during disaster events. However, when VECO crew arrived in Seldovia, they "took over" and in some instances disregarded local knowledge and expertise, including many of the response plans developed locally. Also, whereas local action was perceived as relatively effective and efficient, Seldovian's interpreted VECO's actions as slow and inefficient. The sincerity and effectiveness of VECO cleanup efforts was questioned. These types of actions began to undermine the "therapeutic community" that previously developed. Residents who contracted with VECO were pleased with the money they made, although there were tensions and anger regarding the distribution of cleanup money.

Stress became a factor for individuals and families. Children were among those most affected because parents were often working long hours on the cleanup. Childcare was problematic. Children sometimes went unsupervised. There were limited mental health resources for responding to stress-related problems. Resources usually available for Natives, including a well-utilized alcohol and substance abuse services program for the south Kenai Peninsula area, were unavailable because those staff took cleanup related jobs that paid higher wages than their service provision work.

Seldovian's did not receive the same influx of outsiders experienced by some other communities. However, the oil spill brought the realities of the outside world to community members. This affected world-views of some that lived in the community: notions of living in a place protected from the threats of a technological world were dispelled and technological threats became real. This motivated some to become more politically involved and engaged in activities to prevent future events. Others lost trust and faith in the ability of governments to protect them from these types of events.

Local government operations became focused on spill response activities. Other activities of local government were either postponed or else given to less experienced temporary labor to do. Some criticized the city for not anticipating the approach of the spill since oil actually reached Seldovia's shores. There was also concern that the city had not prepared an adequate response plan whereas local volunteers had. There were also conflicts over the expenditure of cleanup funds. The City Manager became embroiled in these controversies and eventually resigned this position. Other conflicts emerged over the role and actions of a City staff person assigned to the Homer Multi-Agency Coordinating Group. Such conflicts created an atmosphere of divisiveness and further undermined the "therapeutic community" within Seldovia.

Alaska Oil Spill Commission/McClintock Report. Residents knew that the spilled oil would reach their community because of their knowledge of local currents. People were shocked at the initial lack of response by Exxon to the spilled oil and its potential effects on Seldovia. Several areas in and around were heavily oiled. Residents developed a major volunteer effort to protect their community. More than 150 people participated in this work which included developing and deploying log booms and conducting reconnaissance for oil. Early efforts to get Exxon to assist were not successful, and the volunteer effort proceeded with success. VECO arrived in Seldovia April 12, 1989 and began hiring people to work on their cleanup effort. This interrupted the local volunteer effort. The VECO cleanup was not positively evaluated and community spirit plummeted as the volunteer effort diffused.

Income lost because of the closed fishing season was somewhat offset by oil spill cleanup employment. However, there was intense competition for a few jobs and this resulted in some hostility and resentment.

City finances were strained by the cleanup effort and there were also issues with adequate staffing resources to do city work and respond to the spill. The City and residents found that interactions with Exxon/VECO about financial and other operational issues was too bureaucratic to be effective.

Children experienced stress related to the oil spill and their disruption of their families and community. There were insufficient resources to respond to these stresses.

MMS/ADF&G TR 160. In comparison to other communities included in this study, Seldovia showed overall low effects on the disruption of subsistence harvests, sharing of subsistence foods, and effects on the enculturation of (i.e., the transmission of cultural knowledge to) children. Similarly, Seldovia residents did not report perceptions of lowered resource availability for the spill year, but there were reports of perceptions of decreased populations of salmon and seabirds for the second and third study years. In comparison to other study communities there were relatively flow levels of concerns about contamination of subsistence and information available about such contamination.

Residents believed that the small town atmosphere that makes Seldovia an attractive place to live was disrupted during the EVOS. Although it may have brought the community together for a period of time, there was also social conflict over "greed." Economically, there was some disruption of commercial fishing, but there was also the opportunity for oil spill cleanup employment. Other economic effects included competition for labor between local businesses and the cleanup and decreased spending by commercial fishermen on upkeep, repair, and new construction. Salmon prices also declined in 1989.

TR 155 Social Indicators Study of Alaskan Coastal Villages. IV Postspill Key Informant Summaries. Two categories of impacts are identified: (1) immediate disruptions and displacements and (2) subsequent effects that resulted from these disruptions and displacements (McNabb 1993:535). The immediate effects were the mobilization of elements of the community to respond to the impending crisis of possible oil contamination of nearby shorelines and beaches. Other disruptions included the closure of schools so students could assist in cleanup efforts. Subsequently, local officials became concerned about the effects of the EVOS on tourism and the health effects of bioremediation efforts in the cleanup. The EVOS was a source of employment for between 13 and 110 local residents. The type 2 subsequent effects included: (1) disruption of municipal functions and a focus on EVOS issues rather than community issues; and (2) increases in caseloads for domestic abuse and alcohol abuse; domestic dislocations and childcare problems. There were fiscal and economic effects related to deferring municipal and local business. Cleanup employment may have offset losses related to fishing closures, but it does not appear that this employment resulted in any more income than if the spill had not occurred.

Municipal and community affairs were disrupted by the EVOS. Municipal staff became burned out because of long hours and added workload. Additionally, there was nearly a complete turnover in the city council that is attributed to factionalism and social conflict related to the spill.

3.1.6 Homer

The major sources of available information about the effects of the EVOS on Homer are in the Oiled Mayors Study, Gregory Button's Ph.D. Dissertation (1993), and Davidson's 1990 description of the effects of the oil spill on the Kachemak Bay region of Alaska.

Geographic Location and Infrastructure. Homer is located on the terminus of the Sterling Highway some 227 road miles from Anchorage. It is on southwestern end of the Kenai Peninsula and the north shore of Kachemak Bay. It has 8 schools, a hospital, and there is a full range of services including electric power, sewage, and waste disposal. There is an airport as well as a deep water dock in Homer.

Demography. At the time of the EVOS Homer had a population of about 3,500. Between 3.5 and 4% of this population is Alaska Native.

Economy. Commercial fishing, fish processing, and tourism are major economic sectors in Homer. This community also is a regional service center.

Political Structure. Homer is a first class city with an elected mayor and council. It is also part of the Kenai Peninsula Borough.

Oil Mayor's Study. Initially there was some skepticism that oil from the EVOS would threaten Homer, but when oil entered Kachemak Bay, Homer residents became alarmed. Exxon did not initially share the resident's concern that the oil would threaten the city. A Multi-Agency Coordinating Group – similar to the one in Seward – was formed of diverse groups and agencies including: representatives from Port Graham, English Bay, Seldovia, the U.S. Fish and Wildlife Service, Alaska Department of Environmental Conservation, Alaska Department of Natural Resources, Chugach Alaska Corporation, Alaska Department of Emergency Services, and the North Pacific Fisheries Management Council. This group organized response efforts including procuring, manufacturing, and installing boom for oil protection. Efforts were made by the Multi-Agency Coordinating Group and other Homer interests to persuade Exxon that the oil threatened the community, but Exxon paid little attention to requests for assistance. Once Exxon/VECO entered the cleanup, there were perceptions that it was being inefficient if not insincere in its cleanup efforts. There was some open public hostility and anger toward Exxon/VECO officials, including some threats to execute a citizen's arrest at a Multi-Agency Coordinating Group meeting. Some volunteer organizations were funded by Exxon to aid in animal recovery and other cleanup activities.

Local government experienced increased demands for service, disruption of normal business operations, increased use of municipal facilities, and increased costs associated with response activities. Associated with an influx of outsiders, there were increases in crime, traffic, and requests for emergency services. Police and court services experienced high demands for their services. VECO, Exxon, the Multi-Agency Coordinating Group, and other response organizations used schools and other municipal facilities. The city experienced some coordination problems with the Alaska Department of Environmental Conservation, the U.S. Coast Guard, Exxon, and other entities in the response effort. Jurisdiction and communication issues predominate these types of problems.

Exxon/VECO hired local persons to work on the cleanup. There were divisions within the community about the moral acceptability of working on the cleanup. Some argued it was necessary to replace lost income, others argued that it was wrong to make money off the spill, especially with an insincere cleanup effort. Those who "profited" from the cleanup were said to have "sold out" to Exxon. These individuals used their cleanup income to buy new boats and fishing gear and this gave some a competitive advantage. Those who did not work on the cleanup resented those who did. Divisiveness and conflict was created and this undermined community bonds and solidarity that developed during the initial community responses to the EVOS.

A changed sense of place existed after the EVOS. Some residents perceived their community had been "raped" and "violated" whereas others experienced Homer and its environs as a "spoiled" place. For others the EVOS resulted in an increase in political activity and awareness about oil transport and other environmental issues. Others lost trust and faith in government oversight agencies and in the oil transport industry.

Social and economic life was disrupted by the EVOS. Recreational activities, normal seasonal fishing cycles, and the usual routines of daily life were disrupted. Small businesses incurred increased costs and fishermen could not fish. The "artificial economy" created by cleanup work also resulted in competition for labor that became scarce. Some businesses closed as a result of the EVOS.

The EVOS and its effects on social disruption in Homer resulted in various mental health problems. These included domestic violence, substance abuse, family problems, anger, grief, frustration, and stress. There were increased demands for mental health services, but there was not enough staff to respond to these demands. Other individuals with existing mental health problems appeared to experience an increase in the severity of their symptoms during the EVOS.

Button (1993). Based on research in Homer, Alaska, this dissertation addresses the topics of social cohesion and conflict, and the formation of emergent groups. The dissertation disputes the idea proposed by some researchers that, while natural disasters promote social cohesion and thereby contribute to the formation of emergent groups, there is social conflict in the aftermath of technological disasters which limits the formation of emergent groups. The research finds that while there was considerable social conflict in Homer, there was also social cohesion sufficient to facilitate the formation of emergent groups. Certain factors contributed to both social conflict and the formation of emergent groups, including a widely experienced sense of "loss of control" and uncertainty about significant facts surrounding the oil spill and cleanup, including uncertainty about who was ultimately in control of the cleanup, and which cleanup technologies were most effective and most necessary. The dissertation argues that the formation of emergent groups is inevitable in circumstances in which there is a sense of urgency and the common perception that authorities were unwilling and unable to respond. The report concludes that local and disaster-response authorities should recognize the constructive role that emergent groups fill in the aftermath of disasters.

In the Wake of the *Exxon Valdez* (Davidson 1990). Davidson provides a descriptive account of community response and resident reactions to the EVOS. He notes that initially Exxon was slow to respond to community concern that the oil was going to foul local shores. The Multi-Agency Coordinating Group was formed and responded to local concerns, organizing efforts to deploy boom to protect critical habitat and major salmon streams. The Multi-Agency Coordinating Group worked to get funds to implement the response effort with the aid of the Kenai Peninsula Borough. Exxon did provide some initial funds, but their overall response was not timely and its form and character angered local residents who perceived they were threatened and Exxon did not care. Local effort and not Exxon's response provided the most important initial response to the spill. Eventually oil found its way to local beaches, including the famous Homer Spit. Exxon claimed 500 feet of beach was oiled while the Homer Center for Disaster Assistance said about 2 miles of beach were oiled. These types of disparities resulted in substantial anger toward and distrust of Exxon. This anger and distrust increased when Exxon failed to keep its promise to cleanup beaches on Gore Point. Eventually, Exxon was forced into a major cleanup effort by the ongoing complaints and the intervention of government officials. Anger and distrust also resulted from Exxon scaling back on cleanup efforts because, some argued, they did not have the capacity to dispose of the oil being collected. Replacing shovels with trowels to decrease the amount of oil collected incensed residents who saw beaches fouled and wildlife killed because of the volume of oil in the area.

Residents experienced a range of emotions and reactions to the EVOS. People were frustrated by the insincerity of the cleanup and they felt betrayed and dismayed by the damage done to resources they love and value. There was exhaustion from long hours of cleanup work and the intense focus on what was happening to their landscape. People experienced a sense of "loss of control" over their environment and their lives. Betrayals, anger, the loss of valued places, and stress were other emotions experienced. Some also felt devalued because Exxon and VECO rejected their experience and expertise in their response efforts. Others were stressed by the nature of their cleanup employment, including one man who was hired to shoot oiled seals and sea otters while still in the ocean.

Despite the Exxon/VECO cleanup, some volunteer efforts remained in tact in Homer. Rather than cede responsibility to Exxon for all cleanup, some individuals began cleaning up oiled beaches near Gore

Point. Eventually, Exxon joined in this volunteer cleanup effort, but residents later became disenchanted with the quality and character of this participation. Volunteers kept working on valued areas long after the paid Exxon cleanup crews had gone home.

3.1.7 Kenai

The major sources regarding the EVOS and Kenai are the Oiled Mayors Study and the MMS Social Indicators Study (TR 155).

Geographic Location and Infrastructure. Kenai is located on the western side of the Kenai Peninsula on Cook Inlet. It is some 150 road miles from Anchorage via the Sterling and Kenai Spur Highways. There is an airport with direct air service to Anchorage, some 65 air miles distant. There is a city dock and boat ramp located on the Kenai River. Hospital facilities are in Soldotna. Four schools serve the community.

Demography. At the time of the oil spill the population of Kenai City was about 6,500 of which about 8.5% are Alaska Natives.

Economy. Kenai has an industrial economy based on oil extraction and refining. Other important economic sectors include tourism, sport and commercial fishing, fish processing, timber, construction, and transportation. However, Kenai serves as the center for the oil and gas industry in this region of Alaska.

Political Structure. Kenai is a home rule city with an elected mayor and city council. The community is part of the Kenai Peninsula Borough, which has offices in the city of Soldotna.

Oiled Mayors Study. Kenai and nearby Soldotna experienced limited effects from the EVOS. Fishermen were affected by the closure of the drift-net fishery, but local fish processors were able to remain open by processing fish from Bristol Bay. Some argued that closure of the commercial salmon fishery resulted in increased salmon in the Kenai River. This attracted more sports fishermen to the region. Some increases in municipal services and increases in park usage are attributed to more sports fishermen rather than direct EVOS cleanup operations. The only direct effect of the EVOS on municipal services was in the operation of the City dock. Closure of the drift net fishery resulted in about $40,000 worth of losses of which about $32,000 was recovered in a claim to Exxon.

The Kenai Peninsula Borough did experience some direct impacts, primarily in its role in support of more directly impacted communities. The Borough dispensed funds to communities such as Seward, Homer, English Bay (Nanwalek), and Port Graham. A liaison position was created to respond directly to Exxon and VECO and to work for affected communities. Borough staff worked on the Multi-Agency Coordinating Groups and other EVOS response projects. Some Borough work was delayed or did not get accomplished because of staff involvement with the EVOS. Public works, emergency management, finance, and personnel were among the most affected departments of the Borough.

MMS Social Indicators Study (TR 155). Kenai residents reported different types of impacts. Decreases in crime because transients and others were working on the cleanup. There were also fewer in-migrants during the summer seeking work in the oil and gas industry because of the opportunity for oil spill employment work. Otherwise, the EVOS is said to have “hurt the peninsula’s image” and there was some increase in awareness about environmental issues and specifically the potential effects of future oil spills. Community responses to the EVOS also resulted in the need for all levels of government to coordinate and communicate and this had beneficial consequences for local and Borough governments. The major effects on businesses and households resulted from closure of the drift-net fishery because of the EVOS. Businesses that depended on this fishery lost income. Still other businesses were affected by the

competition for labor with the Exxon/VECO cleanup. Jobs paying more than $16.00/hour attracted labor away from other local businesses especially in the fish processing, fast-food, and other businesses that paid lower wages. Much of this competition for labor dissipated by 1990 and 1991.

As a result of the discovery of oil in Cook Inlet, ADF&G closed the drift-net fishery and about 700 commercial set-net fishermen south of Anchor Point were also affected by the fishery closure. However, the set-net fishery in Kenai still resulted in a catch of about 5 million salmon in 1989. Fishermen affected by this closure experienced some family stress and lost opportunities for enculturation into the fishing lifestyle as a result of the EVOS. The unequal opportunities for fishing among drift and set netters resulted in some animosity and hard feelings. There were also some hard feelings among those that did and did not work on the cleanup. These sentiments mirror those in other communities where the moral character of participation in the cleanup was a point of public debate and a source of divisiveness.

Commercial fishermen and fish processors were generally pleased with the settlements. Exxon offered for damages related to the event. Payments were generally timely and met expectations of those affected.

3.1.8 Kodiak

There are multiple sources of information regarding the interaction of the EVOS with the community of Kodiak. The major sources are: the MMS Social Indicators Study (TR 155); the MMS ADF&G (TR 160); the Oiled Mayors Study; and Davidson (1990).

Geographic Location and Infrastructure. Kodiak Island is located in the Gulf of Alaska. It is the largest island in Alaska. About 1.9 million acres of Kodiak and nearby Afognak are part of the Kodiak National Wildlife Refuge. Kodiak City is the largest municipality on the island. It is located near the eastern end of the Island. Kodiak City is 250 air miles from Anchorage. Kodiak has a jet airport that is served by several different air carriers. It is also served by Ferry via a 12-hour trip from either Seward or Homer. The Harbor is home to major fishing fleets for the Gulf of Alaska and the Bering Sea. Kodiak is also home to the largest U.S. Coast Guard base in North America.

Demography. At the time of the oil spill the population of Kodiak Island was approximately 13,300 persons. Kodiak City had a population of about 6,300. Fourteen percent of this population was Alaska Native. Filipinos, Hispanics, and Samoans are also important ethic groups that reside in Kodiak City. A characteristic of Kodiak's demography is transience related to seasonal residence among fishermen and fish processors, personnel rotation at the U.S. Coast Guard base, and seasonal residence among those who live in out-lying villages.

Economy. Kodiak has a diverse fishing economy. Groundfish, salmon, crab, cod, halibut and other species form the basis for a diverse fish processing and harvesting industry. In the past, Kodiak has been the highest port for volume of seafood and among the highest for the value of products produced. Local government, the federal government, and state government are other major employers in Kodiak.

Political Structure. Kodiak City is a home rule city with an elected mayor and city council. The Kodiak Island Borough offices are located within Kodiak City boundaries.

MMS Social Indicators Study (TR 155). The oil spilled in Prince William Sound moved south through the Shelikof Straights that separate Kodiak Island from the Alaska mainland. This is also an important fishing area for the Kodiak based fishing fleet. Kodiak was exposed to the oil and its effects on the Alaska fishing industry. Although Kodiak experienced prior disasters (e.g., the 1964 earthquake), the uncertainty of the effects of the EVOS was a new experience. The effects of the spill in Kodiak are also

related to the timing of when oil reached Kodiak shores, some 3 weeks after the *Exxon Valdez* grounded on Bligh Reef.

The nature of Exxon's response in Kodiak affected resulted in differential impacts on individuals, increased frustrations, and hindered community involvement in response efforts. However, Kodiak's response efforts began by invoking its disaster plan and implementing a Emergency Services Council composed of the Borough Mayor, City Mayor, and the commander of the local U.S. Coast Guard installation. An important activity of the Emergency Services Council was holding daily meetings for the community to both gather input and dispense information about spill-response issues. As in other communities, when Exxon arrived in Kodiak they assumed responsibility for cleanup activity. However, the Emergency Services Council remained active in dealing with Exxon and in providing information to Kodiak Island residents.

Local government experienced fiscal and operational impacts as well as psychological effects on staff. The Kodiak Island Borough as well as the city lost staff to higher paying cleanup work and some staff left their job because of the strain of excessive work. Response to the EVOS resulted in time and effort diverted from other work. Fish tax, income tax shares, and property tax revenues decreased because of the spill. Other fiscal impacts resulted from lost opportunities, using reserves and investments to pay cleanup costs and unreimbursed costs related to increased service delivery. Infrastructure projects were put on hold or delayed resulting in some increased costs. Staff and elected officials worked long hours on both cleanup and municipal/borough resulting in personal strains and stress.

Differences in culture and expectations affected municipal/borough interactions with Exxon and VECO. Local officials tried to be proactive and anticipate the arrival and effects of the oil, but Exxon delayed some response efforts because it did not believe Kodiak would be affected. Furthermore, Exxon continually underestimate the extent and effects of the EVOS on Kodiak, resulting in tensions and conflicts between local governments and the responsible parties. Timeliness of payments, arguing about what constituted reimbursable expenses for cleanup, and the sincerity of the cleanup effort were also areas of conflict between local officials and Exxon. Exxon also made attempts to circumvent environmental regulation further exacerbating tensions with local government.

Another major source of tensions was perceptions of unequal treatment of communities and individuals by Exxon. Kenai Peninsula Borough received $2 million dollars for response efforts where as the Kodiak Emergency Services Council received only $500,000 despite arguments that Kodiak was more affected. Exxon also restricted hiring local fishermen and others for cleanup work whereas in Prince William Sound there were no such restrictions. There were also perceptions that Native communities received less attention than non-Native communities. Some argued that Exxon deliberately established a policy of different treatment to promote conflict among communities and to offer support to those who responded favorably to Exxon. A major source of perceptions of inequity was boat contracts in Kodiak. Chignik fishermen were offered lesser rates than Kodiak fishermen were; and there were also other individual inequities.

Economic impacts were felt most directly in the fishing and fish processing sectors of the Kodiak economy. Closure of the salmon fishery, which constituted more than 50% of the value of the Kodiak fishery, was a substantial blow, but this was mitigated some by the diversity of the Kodiak fishing economy. Cleanup work offset some of the losses for fishermen and cannery workers, but not everyone received cleanup work sufficient to offset losses. Tourism experienced some decline because of unavailable rooms and services that were consumed by oil spill response work. The service and support sectors of the economy associated with the fish and fish processing sectors lost income. Some of this lost income was offset by oil spill response work. Inflation related to cleanup work had a more widespread and short-lived effect on the local economy.

Cooperation among community members for response work was undermined by conflicts generated by Exxon's divisive policies. These same policies resulted in tensions between out-lying villages and Kodiak. Perceived unfairness by Exxon in dealing with residents and local government was an important source of tension that resulted in loosened community bonds. These loosened community bonds occurred simultaneously with increased stress-related problems. Demand for services for alcohol, drug, and domestic violence as well as mental health services increased. Families experienced stress-related problems. Crime increased along with other types of social disturbances.

The emotional stress of the spill is related to various factors. These include: uncertainty about the immediate and future effects of the EVOS; loss of usual and customary routines and activities; the death and pollution that resulted from the spilled oil; perceptions of a changed and spoiled place; feelings of helplessness to cleanup or prevent future spills; and rage against a preventable accident. Another significant source of stress was the process of dealing with Exxon. Exxon devalued local knowledge and expertise. Exxon did not appear to be involved in a sincere cleanup, rather image and public relations appeared to be more important. Exxon violated local expectations about fairness and responsibility. Exxon's arrogance and its complicated claims process further alienated local residents and government officials. Exxon's overall control of the process also promoted a sense of "loss of control" among residents and others involved in the process.

Follow-up work conducted in 1991 indicates several types of short- and long-term impacts to individuals and institutions. By the spring of 1991, the EVOS was experienced as a historical event. Short-term memories of anger, hostility, divisiveness, moral compromises, greed and excessive spending, selected economic losses, and the insincerity of Exxon's cleanup predominate among individuals. Businesses lost employees to the cleanup and some lost income. Longer term there were some individuals who reaped substantial benefits from the EVOS whereas most did not. Some conflicts among fishermen remain, but overall bonds among community members are more or less the same as before the spill. There has been some increase in participation in community leadership as well as an increase in environmental awareness and activism. Some concerns about the effects of oil on subsistence foods remained. In some villages and in Kodiak there was also increased disaster planning and preparedness.

MMS/ADF&G Subsistence Study (TR 160). For the three years of this study the participation rates in subsistence activities for Kodiak City residents is in excess of 90%. Salmon, halibut, invertebrates, sea mammals, bird eggs, and land mammals (primarily deer) are the major types of subsistence foods. Year three results typify the nature of subsistence activity in Kodiak:

Participation continued to be high. In 1993 an estimated 99.1% of all Kodiak City households used at least one wild resource, 90.5% attempted to harvest at least one resource, and 87.6% succeeded in harvesting at least one resource. About 97.1% reported receiving at least one resource, and 83.8% reported giving away at least one resource. The mean number of resources received per household was 7.0, and the mean number of resources given away was 4.5. Both of these numbers represent slight increases over Year Two. In 1993 Kodiak City households used an average of 11.8 resources and harvested an average of 7.4 resources out of the 26 reported (Mishler, Mason, and Barnhart 1995:15). Importantly, a significant number of study participants perceive sports harvesting and subsistence activity as synonymous.

Few residents indicate any concerns about food safety associated with the EVOS. This may be a result of the structure of study participants, many of whom have moved to the area since 1989. However, 33% of participants felt that clams were not safe to eat and another 15% were unsure (Mishler, Mason, and Barnhart 1995: 22). Perceptions about resource abundance, assessments of leadership, evaluations of food safety, and other measures of social effects in this study appear to show minimal effects of the

EVOS and subsistence in this community. Again, this may be a function of sampling or other intervening variables.

Oiled Mayors Study. The Emergency Services Council, part of Kodiak's disaster response plan, was activated before oil reached Kodiak shores. The Emergency Services Council convened daily public meeting to keep citizens informed about EVOS issues. A community-wide volunteer also began in concert with Emergency Services Council activities. The Emergency Services Council was able to get timely reports about oil movement because of U.S. Coast Guard overflights of the Gulf of Alaska and contacts of the local U.S. Coast Guard base commander who also sat on the Emergency Services Council. Exxon did not respond to initial assessments of Kodiak that the oil would reach their shores. Exxon arrived in Kodiak only after the local response effort was underway and then they largely ignored the local volunteer efforts. Exxon/VECO's cleanup effort frustrated locals because people did not believe it was sincere or effective. The loss of control over the cleanup effort and perceptions that Exxon was inhibiting local efforts for cleanup further added to frustrations and mistrust of Exxon.

Both Kodiak City and the Kodiak Island Borough were consumed by oil spill response activity. The Kodiak Island Borough assisted the city by providing funds for response work that the city could not replace. There were increases in demands for most city and Kodiak Island Borough services. Staff did not have the time to conduct their usual work plus spill response work. Staff and elected officials became burned out because of excessive work loads and time away from their families.

Animosity was created within the community and especially among fishermen because of what appeared to be random or unfair hiring for cleanup work. Some fishermen who did not necessarily need the cleanup work received lucrative boat contracts whereas other who could not fish and needed the income did not receive boat contracts. Boat owners and crew also experienced some conflicts because crewmen did not always receive consideration in settlements or cleanup hiring. Divisiveness and conflict characterized many social relationships in Kodiak. These were primarily related to how VECO and Exxon instituted its cleanup operations. Some local groups formed as a result of the EVOS. The "crude women" exemplifies of developing social solidarity just as the conflicts among fishermen illustrate the loosening of social solidarity.

Life routines, especially those in the fishing industry changed because of fisheries closures and oil spill response work.

Economically, the lost of fishing income had wide spread effects among fishermen and supporting businesses. Service oriented businesses in Kodiak lost employees to the cleanup. Local government incurred significant costs that were not reimbursed. The loss of subsistence opportunities resulted in expenditures for groceries that were already in short supply or suffering from spill-related inflation. Other goods and services also showed spill-related inflationary costs.

Mental health and family problems increased because of the EVOS. Family routines were disrupted with many males at home whereas they would usually be fishing. Day care presented a problem for some families and other families experienced stress because of the parents working long hours on the cleanup. Children encountered dead or dying wildlife. Some children experienced behavioral problems. Some mental health resources experienced significant increases in demands for services, however the Kodiak Women's Resource Center showed a decrease in clients. This decrease may be related to oil spill employment. There were increased calls to the Women's Resource Center crisis line, especially from outlying rural communities. Programs of the Kodiak Council on Alcoholism were compromised because staff left for cleanup work. The Kodiak Island Borough mental health center reported increased clients served, more emergency visits, and increases in group counseling. Crisis interventions and incidents of substance abuse also increased. Uncertainty and frustration were argued as possible causes for the

increased stress experienced by some community members. The Kodiak Area Native Association mental health and health services experienced increases in demands for services and increased workloads among staff. Children and families had special needs, especially those families with members working on the cleanup.

Overall, the lifestyle of Kodiak residents was disrupted. The realities of the threats of technology were made apparent to Kodiak residents. This disturbed residents who moved to the Island to be away from modern society and the "outside" world.

Alaska Oil Spill Commission Oiled Communities Response Investigation Report (McClintock 1989). Kodiak's prior experience with the 1964 earthquake and the tsunami that damaged Kodiak resulted in preparedness plans for future disasters. Kodiak had in place a disaster plan and was prepared to respond to the EVOS, although this proved to be more of an ongoing disaster than a time-limited single event natural disaster.

Initially Kodiak residents did not believe they would be affected by 'the Prince William Sound' spill. However, the oil did reach local shores and caused pollution, the killing of vast numbers of wildlife, and closing fishing seasons. The impact on the fishing economy was significant. More than 300 boats were unable to fish and other set-net fishermen also lost income because they could not fish. Local businesses that provided goods and services to fishermen lost income. Many also lost workers to the cleanup that paid more than businesses could afford to match to keep their workers. Service businesses did better than their normal income, but labor shortages were a wide-spread issue. The cleanup resulted in higher than normal incomes for some wage earners, but lower incomes for some fishermen and those in the fish processing industry that did not work on the cleanup. The claims process for those who lost money because of the spill was confusing and inadequate. There were inequities in the payment and processing of claims. Negotiations between the Oiled Mayors and Exxon for reasonable and uniform settlement of claims failed. This resulted in a loss of faith regarding equitable and fair settlement of claims against Exxon.

Food shortages resulted because local stores were emptied to supply the cleanup. Subsistence foods were in short supply because of concerns about contamination. Housing and workspace, already in limited quantities in Kodiak, became scarce. Domestic violence, increased stress, reports of suicide, high demands for mental health services, and other social disruptions were attributed to the EVOS.

The Emergency Services Council performed an important role for the community. It provided information about the status of the spilled oil in relationship to Kodiak and it provided a channel for publics to ask questions and receive information about topics of concern. The Emergency Services Council also provided a link between the outlying Native communities and Kodiak regarding EVOS information. Subsequently, the Emergency Services Council was effective in organizing community response efforts. The local Native Corporation assisted in bringing Native issues to the attention of Exxon and the Emergency Services Council.

In the Wake of the *Exxon Valdez*, Davidson (1990). Oil hit the shores of Kodiak Island some three weeks and 400 miles after it was spilled in Prince William Sound. Exxon failed to mobilize any response efforts in Kodiak until oil actually came ashore. Before that time community members and local governments organized and implemented a response effort. The locally instituted cleanup response was derailed when Exxon arrived in Kodiak. Community members and local government officials felt as if they had lost control over the cleanup process. Furthermore, there was considerable skepticism about the sincerity and effectiveness of Exxon's cleanup effort. People's individual experiences of seeing otters swimming in oil and observing other dead and dying wildlife contrasted with statements from Exxon about minimal to no effects from the oil for Kodiak.

As Exxon implemented its cleanup, fishermen became conflicted over participation in the cleanup or remaining independent of Exxon but financially broke. Others wanted to participate in the cleanup, but Exxon did not hire all who wanted to participate and the criteria for hiring boats and cleanup workers seemed arbitrary or influenced by other factors. The spill was a large payday for many fishermen who participated in the cleanup, but for others it resulted in lost income because of closed fisheries. These disparities resulted in divisiveness and hostility among some fishermen. In fact, there was strong suspicion that Exxon employed a "divide and conquer" strategy in order to deflect criticism away from them.

Fishermen lost faith and trust in the oil industry and government oversight agencies. For some, grass-roots environmentalist organizations became attractive because of their concern for the environment.

Those who did work on the cleanup experienced frustrating delays in receiving payment for their services, materials, and labor. Cannery workers, fishermen, and businesspersons made claims to Exxon for lost income or wages. There was little faith that Exxon would be fair in its dealings with Kodiak residents with claims against the company.

Residents experienced a range of social effects including fear, jealousy, selfishness, uncertainty, helplessness, and disillusionment. Anger and tensions over money and boat contracts created divisiveness.

A "false economy" was created by the employment of persons for cleanup work. Many people left their jobs to work for higher cleanup wages. This affected many small businesses in the community.

A legacy of the EVOS for Kodiak is awareness that oil transport has costs even for those who are distant from the oil fields and transport lanes.

3.2 NATIVE COMMUNITIES

This section presents a summary of information about the interaction of the EVOS and Alaska Native communities. The major sources that provide scientific information regarding the EVOS and Alaska Natives are used to construct these summaries. Not necessarily every source that may mention a particular community is included in these summaries. Also, we have not included some of the sources that aggregated data from various communities to make generalizations about the impacts of the EVOS on Alaska Natives. Again, we focus solely on specific communities and how impacts to these communities are presented in selected sources that focus on describing particular communities.

What these summaries indicate is both commonalties and differences in the interaction of communities with the EVOS. Many of the dimensions of difference and similarity are those Braund & Associates and Usher (1993) succinctly summarize in their analysis of the impacts of the EVOS on Alutiiq peoples and their culture. These major dimensions of similarity and difference are as follows:

- decline in the quality of the environment and the quality and quantity of subsistence resources;
- uncertainty about the safety of consuming subsistence resources;
- invalidation of traditional knowledge regarding the environment;
- uncertainty about the future of subsistence resources and community ways of life based on subsistence;
- declines in subsistence harvests, sharing of subsistence resources, and the enculturation of children into a subsistence lifestyle;

- declines in the integrity of place and community;
- changes in the sense of personal and community autonomy; and
- changes in personal and cultural identity (Braund & Associates and Usher 1993:68-109).

Other significant areas indicated in other collective analyses are:

- social disruption of community activities and processes;
- disruption of the functions and activities of governance institutions and processes;
- fiscal damages to individuals and institutions;
- loss of valued communal solidarity;
- alienation of the cultural values and social processes that make Native lifestyles meaningful; and
- changes in sharing and visiting that reinforce social bonds (cf. IAI 1990d; Russell et al. 1996; Picou, Gill, and Cohen 1997; Jorgensen 1995b; Wooley 1995).

These areas suggest the categories of social and cultural impacts experienced by Native communities.

In presenting these community summaries three major groupings are distinguished: Kodiak Island Native communities; Kenai Peninsula Native communities; and Prince William Sound Native communities.

3.2.1 Kodiak Island Native Communities

The major settlements of Kodiak Island and vicinity are primarily Native communities. The major settlements are Ouzinkie, Larsen Bay, Port Lions, Larsen Bay, Karluk, Akhiok, and Old Harbor. As with the non-Native municipalities, the coverage of these communities in the literature is variable, but in general, there are more sources for these communities than for non-Native communities. Below we present these communities according to their geographic location, starting with Old Harbor and then proceeding "clockwise" around Kodiak.

3.2.1.1 Old Harbor

The major sources of information about this community are: the Alaska Oil Spill Commission/McClintock 1989 study; the MMS Social Indicators Study (TR 155); the MMS/ADF&G Subsistence Study (TR 160); and Davidson's descriptive account that contains some limited information about Native villages that applies across all Kodiak Native villages. Although Old Harbor is not specifically mentioned.

Geographic Location and Infrastructure. Old Harbor is located on the southeastern coast of Kodiak Island. There are no roads to Old Harbor, but there is a gravel airstrip. The community is some 70 air miles southwest from Kodiak and about 320 miles from Anchorage. There is a boat harbor that serves the local fishing fleet.

Demography. At the time of the oil spill the population of Old Harbor was about 280 persons. There is some seasonal residence in Old Harbor with residents traveling to Kodiak, Anchorage, or other areas during winter months. About 90% of the community population is Alaska Native.

Economy. At the time of the oil spill Old Harbor was primarily a fishing village that coexists with a Native subsistence economy. Tourism is a developing sector of the economy.

Political Structure. The community is a second class city that exists within the Kodiak Island Borough. There is also a village council and the Old Harbor Village Corporation.

Alaska Oil Spill Commission/McClintock Study. This report contains only two brief paragraphs regarding Old Harbor. This work reports that Natives directly observed dead bear and deer that ingested oil polluted kelp. During July of 1989, mousse and oil was observed in the bays and inlets around Old Harbor. The Village Council had developed a cleanup proposal that entailed more work hours than the cleanup activity that was eventually implemented by Exxon/VECO. Their cleanup effort was observed to accomplish little and resulted in only ¼ the hours of actual work than proposed by the Village council plan.

MMS Social Indicators Study (TR 155). Three "levels" of effect are identified. The first is related to those that occurred during the oil spill and cleanup. The second level effects are those that emerged after the EVOS. The third level effects are those that were directly related to the first level effects. For individuals and families the first level effects were primarily financial and emotional/spiritual. The financial effects were related to closure of the fisheries because of the EVOS. Some Old Harbor fishermen who fish for Herring in Bristol Bay Sea did not experience the same effects as those who fished locally. A portion of local fishermen, primarily the "smaller" operators, accepted a $30,000 settlement from Exxon with the understanding that this would be "partial" payment for loses. The "emotional/spiritual" first level impacts for individuals and houses focus on subsistence food safety. Individuals became concerned about the effects of oiling of foods used for subsistence purposes, especially among older residents. Residents were unsure about what foods were and were not safe to eat. Second level effects concern perceptions among children that traditional foods were not desirable. This is said to have adverse effects for enculturation of children into Native culture. Other effects include "tensions" among family members and community members. Some of these tensions were related to waiting for cleanup employment and uncertainty regarding the possibility of replacing lost income. Depression and anxiety is said to have increased among adults. Normal routines and life activities "did not happen" and the usual patterns of activity and interaction were lost in family relationships and in relationships among community members.

Non-fishermen who worked on the cleanup perceived this opportunity as an "economic boom." Fishermen viewed their cleanup work as necessary for replacing lost fishing income. Fishermen and non-fishermen perceived the event differently and this resulted in tensions and conflicts. Some local businesses may have received increased earnings related to EVOS cleanup work. Second level effects for fishermen and others concern the loss of fishing opportunity, lost fishing income, and the disruption of normal routines which led to some disrepair of fishing equipment, especially among older fishermen. Ultimately this resulted in loss of boats and lost income. For some who received the $30,000 payments, they had later tax difficulties because they did not understand the tax implications of these settlements. Small fishing operators who did not receive payments are among the most damaged group of Old Harbor fishermen. A "third-level" effect was increased competition on fishing grounds resulting from Kodiak fishermen. Those who worked on the cleanup and invested the income in capital expenditures were more effective fishermen and this caused increased competition. Old Harbor fishermen lost to these newly capitalized Kodiak vessels.

Village institutions experienced the following types of first level effects: (1) village officials were overwhelmed by the work load of responding to the EVOS; (2) the city lost money to cleanup operations; (3) rumors and social conflicts occupied city officials and this displaced their usual work tasks; (4) grants opportunities were missed because of spill response activities; and (5) village council operations were shut down because of EVOS response activities. Second level effects include the "potential loss of revenue" resulting from closed fishing seasons. A third level effect on the city was the was costs associated with delays in housing projects and loss of face by the Village Council and the people of Old Harbor.

MMS/ADF&G Subsistence Study (TR 160). Old Harbor has one of the highest levels of subsistence participation on Kodiak. Residents report a decline in subsistence harvest for the year of the spill, but by the 1991 and 1992 years of the study, harvests returned to near pre-spill levels. A "relatively large percentage" of study participants (social effects) indicated they perceived lower populations of some resources (clams and sea ducks) whereas others perceived that subsistence resources were about the same as before the spill. Some respondents (38.5%) indicate a decrease in sharing of resources in the year of the spill whereas about 49% indicate no change. There was some increase (~26%) in sharing of money and about 45% report sharing money about the same. A relatively low percentage of residents expressed concerns about oil contamination of subsistence foods. Similarly, perceptions of children's participation in subsistence activity indicate relatively low concern in comparison to Ouzinkie and other villages in Prince William Sound. Residents did predict that Offshore oil development would result in decreased populations of marine mammals, birds, invertebrates, and fish. Some also said that lower land mammals would result from Offshore oil development. A majority of residents did not believe that another major oil spill could be successfully cleaned up.

3.2.1.2 Akhiok

The major sources of information regarding Akhiok are MMS/ADF&G Subsistence Study (TR 160); Alaska Oil Spill Commission/McClintock (1989); and the Oiled Mayors Study (IAI 1990c).

Geographic Location and Infrastructure. Akhiok is located on the southern end of Kodiak Island at Alitak Bay. There is a dirt air strip which is the only access to the community other than skiff or boat travel from Kodiak City.

Demography. The population of Akhiok at the time of the oil spill was between 56 and 93 persons most of whom are Alaska Natives.

Economy. Akhiok has a subsistence economy, although there are a few commercial fishermen and there is some public employment.

Political Structure. Akhiok is a second class city within the Kodiak Island Borough. There is also a Village Council and a Village Corporation.

MMS/ADF&G Subsistence Study (TR 160). Akhiok is a community that appears to be highly dependent on subsistence harvests. There appears to have been some "slight" effect on subsistence production in 1989 resulting from the EVOS. Average household incomes in the 1992/93 years of the study are less than half of the 1989 average incomes which suggests that Akhiok residents earned a substantial amount from cleanup employment as compared to other sources of employment and income.

Oiled Mayors Study. There was some direct oiling of the shorelines around Akhiok, but not as much as some of the northern and eastern Villages on Kodiak. VECO implemented a cleanup effort in Akhiok. Not everyone who wanted to work on the cleanup was hired. Some animosity and social conflict resulted because of accusations of unfair hiring for lucrative cleanup jobs in a community with limited wage earning opportunities. Local government business was put aside while the cleanup became the focus of efforts. Some of the mostly part-time staff for the city took cleanup employment that increased the workload of others. The regular daily business of local government stopped to respond to the oil spill. Other local projects such as board walks for fuel delivery, erosion control, and buildings improvements were delayed or canceled because of problems in getting labor and the community to focus on these projects rather than oil spill response. Although there was some social disruption related to conflict, a major social impact of the spill was the disruption of the community sobriety movement. Some residents returned to drinking and this caused conflicts with those who maintained sobriety. These types of

conflicts and the disruption of a movement that had united the community resulted in feelings of alienation among community members.

Cleanup employment compensated some for the closed fishing season in Akhiok. The Borough and Exxon also provided some food to the community. However, subsistence harvests were disrupted and the cultural activities and meanings that accompany them were not addressed by the food provided to the community. Parents spent less time with children as a result of EVOS cleanup employment. Child abuse, domestic violence, domestic disturbances, and family conflict occurred and indicate social disruption in Akhiok related to the EVOS.

Alaska Oil Spill Commission/McClintock Report. At first residents were unsure the oil would reach their shores, but during April 1989 tar balls and dead birds began washing up on local beaches. People were emotionally affected by the death of wildlife they observed, especially the community elders. Residents viewed the disruption of subsistence activity as one of the most adverse outcomes of the EVOS.

About 15 residents were employed on the initial cleanup that began in mid May of 1989. Not everyone who wanted to work was hired. This resulted in some conflicts and hard feelings among those who did and did not get cleanup employment. Those who did work earned about $25,000 in four months, a substantial sum for a community with limited wage earning opportunities. Most of the city staff took cleanup employment. City business became focused on oil spill response issues and the usual business of government was delayed.

Spring and summer subsistence activities in Akhiok were severely limited. Residents were afraid consuming subsistence foods because of conflicting reports about food safety. Exxon and the Borough did provide some canned foods to residents who were unable to gather subsistence foods.

Prior to the spill 85% of Akhiok residents were involved in a community sobriety movement. After the summer cleanup, the participation rate dropped to 55%. The increased drinking resulted in the need for hiring a Village Public Safety Officer and it also caused some social conflicts within the community. The routines of daily life were disrupted, especially those subsistence activities that organize life in Native communities. Parents who worked on the cleanup left their children home since childcare was in short supply. There was concern that children would experience the most effects from the EVOS.

The social conflict and disruption of daily life was addressed by a healing workshop sponsored by the Kodiak Area Native Association. Some felt this happened too late. Others believed that many that needed to be there were not. Although problems in the community were identified early, the healing workshop was not initiated until after the problems became worse.

3.2.1.3 Karluk

The major sources of information regarding the EVOS and Karluk are the Alaska Oil Spill Commission/McClintock Report; MMS/ADF&G Subsistence Study (TR 160); MMS Social Indicators Study (TR 155); and, the Oiled Mayors Study.

Geographic Location and Infrastructure. Karluk is located on the west side of Kodiak Island near the mouth of the Karluk River. The community has a paved air strip.

Demography. At the time of the oil spill the population of Karluk was about 90 persons. This is primarily a Native community.

Economy. Subsistence is the basis for Karluk's economy. There is some limited commercial fishing and public employment.

Political Structure. Karluk was not an incorporated city at the time of the spill. There is a Village Council and Village Corporation.

Alaska Oil Spill Commission/McClintock Report. About 19 Karluk residents were hired by VECO for cleanup employment. Not everyone who wanted to work was hired and this created some conflict and divisiveness within the community. About 1/3 of the village population "left in disgust" over the perceived favoritism and preferential hirings.

Karluk did not receive the same treatment as other communities. Contracts for boats were less, monies paid for cleanup work were less, and training for the cleanup was late or inadequate. Overall, there was some distrust of Exxon and VECO because promises were not kept and people were not treated respectfully.

M**MS/ADF&G Subsistence Study (TR 160)**. Historically, Karluk appears to have had a high level of participation in subsistence activities. Fish and invertebrates harvests are the most common subsistence foods while marine mammal harvests are relatively low in comparison to other Native villages in this study. During the year of the spill subsistence harvests declined substantially, but by 1991 harvests were near pre-spill levels. There were limited concerns about contamination and food safety among Karluk residents. Overall, there appear to be very limited effects on subsistence harvests and practices among Karluk residents who participated in this study.

3.2.1.4 Larsen Bay

The major sources of information regarding the EVOS and Larsen Bay are the Alaska Oil Spill Commission/McClintock Report; MMS/ADF&G Subsistence Study (TR 160); and the Oiled Mayors Study.

Geographic Location and Infrastructure. Larsen Bay is located on the northwestern side of Kodiak Island. It is 60 miles southwest of the City of Kodiak and 283 miles southwest of Anchorage. The community has a gravel air strip and a boat dock. Regular air service is available to Larsen Bay and a cargo vessel from Seattle, Washington docks about every 5-6 weeks.

Population. At the time of the oil spill the population of Larsen Bay was about 160 persons. About 85 % of the population is Alaska Native.

Economy. There is a salmon packing plant in Larsen Bay that provides some wage employment, although most jobs are taken by students from outside the area. Government wages, commercial fishing and some tourism related facilities are the major sources of cash income. Otherwise Larsen Bay has a subsistence economy.

Political Structure. The community is a second class city and part of the Kodiak Island Borough. There is also a Village Council and a Village Corporation.

MMS/ADF&G Subsistence Study (TR 160). During the first two study years (1991/92) 100% of the households surveyed used subsistence resources. This is a community with a high degree of participation in the subsistence activities. Salmon, halibut, invertebrates (clams, octopus, bidarkies, crab), sea mammals (seals and sea lions), deer, bird eggs, plans and berries are the primary subsistence foods. Subsistence practices were adversely affected by the EVOS, but in the study years there was a strong

increase in harvesting and subsistence participation. There is some concern expressed about abnormalities in natural resources related to the EVOS, although little expressed concern regarding oil contamination. In general, questions regarding the social effects of the EVOS indicate minimal consequences for subsistence practices (harvesting, participation, sharing, enculturation) for this community.

Alaska Oil Spill Commission/McClintock Report. Oil came down the Shelikof Straight and into Uyak Bay and in the immediate vicinity of Larsen Bay. Residents directly observed the oil on their shores and in the clam beds where subsistence harvesting takes place. People were shocked and upset by the appearance of the oil. Residents wished to cleanup the oil whatever the circumstances and mounted their own beach cleanup effort. However, Exxon/VECO instituted cleanup, but initially offered residents only 10.00/hour rather than the 16.69/hour paid in other communities.

Most functions of local government were disrupted by the cleanup. Construction of a hydroelectric plant was delayed, an erosion control project was put on hold, and road repair work all went uncompleted because of EVOS response activity. Freight supplies to the community did not happen because vessels were involved in cleanup activities. Larsen Bay residents lost income from commercial fishing that was not replaced by cleanup work. The influx of cleanup wages resulted in some increase in alcohol and drug use. Social disruption related to this abuse increased. Residents were also disheartened by what was perceived to be an inadequate if not insincere cleanup effort by VECO of shorelines they highly valued. Residents had a difficult time acquiring necessary equipment for their own volunteer cleanup efforts as well as those of the VECO cleanup.

Oiled Mayors Study. This was the most heavily oiled Village area on Kodiak. Soon after the oil appeared a local volunteer cleanup effort was initiated. Community representatives had difficulty reaching and convincing Exxon officials that oil was on their shores and in their waters. Almost all city employees left their positions to work on the cleanup. The Mayor was involved in response activities as well as activities with the Oiled Mayors. The usual business of city government was displaced by oil spill response work. Project suffered as a result. Several important projects were delayed. Both the Tribal government and the City government were involved in negotiations with Exxon. This created some confusion and tensions among village members and governments.

Divisiveness developed in the community regarding hiring of boats, oil spill cleanup employment, the respective authority and responsibility of Tribal and municipal governments in dealings with VECO, and the presence of outsiders who took cleanup work in the village. Commercial fishing was disrupted and the activities associated with subsistence were curtailed. Subsistence and commercial fishermen were uncertain about the future of fish populations in the region. Oil spill employment resulted in some residents having income to make capital purchases or to develop new tourism facilities that otherwise would not have happened. Children had less parental supervision and family roles were sometimes strained because of cleanup employment.

There were increases in domestic violence, substance abuse, and overall domestic stress related to the EVOS. Local resources usually available to respond to mental health needs were unavailable because they took cleanup employment. Meetings of Alcoholics Anonymous were suspended and other support resources, including medical care, were unavailable during the summer of 1989. Some residents, especially younger persons, who worked on the cleanup and made more money than usual, had raised expectations about acceptable wages for future employment.

3.2.1.5 Port Lions

The two major sources of information about Port Lions are the Oiled Mayors Study and the MMS/ADF&G Subsistence Study (TR 160).

Geographic Location and Infrastructure. Port Lions is located on the North Coast of Kodiak Island about 20 miles northwest of Kodiak 250 air miles southwest from Anchorage. There is a gravel air strip and a boat dock. The community is only accessible via air and boat. A ferry stops in Port Lions from May to October.

Demography. At the time of the EVOS there were about 220 persons residing in Port Lions. About 67% of this population is Alaska Native.

Economy. Commercial fishing, tourism, and government employment are the major sources of cash wages in Port Lions.

Political Structure. This is a second class city that is also a member of the Kodiak Island Borough. There is also a Village Council and a Village Corporation.

MMS/ADF&G Subsistence Study (TR 160). This is a community that has a high degree of subsistence participation. In years after the EVOS there was a decline in the use of subsistence resources associated with contamination fears and time lost to cleanup activities. By 1993, the only study year for this community, subsistence use had rebounded to almost pre-spill levels.

Oiled Mayors Study. Oil reached the shores of Port Lions and its effects were directly visible to community residents. A local volunteer effort coordinated by the Village Council and the Corporation used local resources for cleanup operations. Exxon/VECO operations later came to the community, but there were problems coordinating the volunteer effort with the Exxon/VECO operation. Residents felt as if they lost control of cleanup operations to Exxon/VECO. There was animosity about VECO hiring practices and frustrations in dealing with what was perceived to be an overly bureaucratic and inefficient cleanup operation. Residents believed that local knowledge and expertise was under-valued if not ignored.

Local government operations were completely disrupted by cleanup activities. The Village Council and City Council did not meet regularly, projects were put on hold because of insufficient labor, municipal resources were used for the cleanup but not always compensated, maintenance was neglected, and the city dump was overused. Grants were not written and the Tribal Council required technical assistance that was not received because of EVOS activity.

Social disruption was common in the community. This was associated with conflicts about cleanup employment, long hours of work on the cleanup, and changes in roles (younger people assuming leadership roles on the VECO cleanup and telling older people what to do). Some people left the community because of ongoing tensions and conflicts.

The community also showed solidarity in opposing an incinerator to burn cleanup waste. There was collective and cooperative action by residents who received help from the Kodiak Island Borough staff to stop the building and operation of this incinerator.

Commercial fishing and subsistence activity was suspended as a result of the EVOS. Subsistence use was interrupted by concerns about the safety of subsistence foods. The presence of oil in the water and on nearby beaches raised concern about the possible short- and long-term effects of consuming foods exposed to oil. There was some increased consumption of store-bought foods and increased cash expenditures to pay for this food. The usual routines of community life were disrupted by the EVOS

incident, including changes in family roles and routines, and there were also problems with childcare. The overall loss of control of their community and way of life was stressful for Port Lions residents.

3.2.1.6 Ouzinkie

The major sources of information about this community are the Oiled Mayors Study and the MMS/ADF&G Subsistence Study (TR 160).

Geographic Location and Infrastructure. This village is located on Spruce Island northeast of Kodiak Island and some 10 miles from Kodiak City. There is a gravel air strip and boat dock. The community is serviced by two air carriers from Kodiak, a 7 minute plane ride away.

Demography. At the time of the EVOS there were about 200 persons residing in Ouzinkie. The majority of this population is Alaska Native.

Economy. Commercial fishing, government or Village Corporation/Council, and dividends from Corporation profits represent the major sources of cash income in Ouzinkie. Otherwise, this community has a subsistence economy.

Political Structure. This community is a second class city within the Kodiak Island Borough. There is also a Village Council and Village Corporation.

Oiled Mayors Study. The Village Council and Village Corporation had leadership that developed a strong volunteer response effort. Contacts were made with outside resources that assisted the community in assessing threats and developing cleanup procedures. Logs owned by the Village Corporation were used to build booms to stop the oil from invading critical habitat and prime subsistence areas. Exxon/VECO set up a command center in Ouzinkie and there was cooperation with the local cleanup effort. Exxon/VECO did not overwhelm the strength and organization of the local cleanup effort. Local government operations continued without a major loss of employees to cleanup operations. Some worked part-time on the cleanup, but overall municipal operations did not suffer because of labor problems. Close cooperation between Tribal government and City government ensured that Ouzinkie had an efficient cleanup operation that maintained local control.

A lottery was used to select local persons for participation in the Exxon/VECO cleanup. Although there was some dissension about selection for cleanup employment, the lottery system appears to have minimized conflicts. However, Exxon settlements with crews on fishing vessels that could not fish because of closed seasons did generate some hard feelings. Moreover, there was some friction when younger persons or friends were hired as supervisors over cleanup crews.

The solidarity of the Village Corporation, Village Council, and municipal government assisted Ouzinkie to maintain a sense of control during the cleanup operation. Its ability to garner outside resources to implement a locally initiated cleanup effort also assisted in residents maintaining a greater sense of control than existed in other communities.

Subsistence activities were curtailed in the summer and fall of 1989 because of the EVOS. Residents expressed some concern about the multiple studies asking questions regarding subsistence practices and the EVOS. Others were concerned about the short and long term effects of oil on subsistence resources and the health implications of consuming resources exposed to oil.

Domestic violence increased some during the EVOS and there was also some concern about increased alcohol use. Senior meal programs were suspended because of cleanup operations, although these

returned to normal during the fall of 1989. Working long hours and the changes in normal routines in combination with concerns about subsistence issues resulted in some increased stress in Ouzinkie. Local resources were available to respond to those in need of mental health services.

MMS/ADF&G Subsistence Study (TR 160). Ouzinkie residents have high rates of participation in the subsistence lifestyle. Salmon, halibut, deer, invertebrates, sea mammals, bird eggs, and plants and berries are among the most important subsistence resources. Abnormalities were observed in wild resources, but there was no clear consensus about their cause. However, residents had strong concerns about the safety of consuming subsistence resources exposed to oil contamination. The report makes the following observation about the effects of the EVOS on subsistence:

> Of all the villages affected by the 1989 *Exxon Valdez* oil spill, Ouzinkie showed the most dramatic decline in subsistence harvests; Ouzinkie's harvest in 1989 was 76.6% less than its average in previous study years (Fall 1991). The spill clearly devastated Ouzinkie's subsistence-based economy for that year. In 1990/91 there was a hopeful sign of recovery when per capita harvests of wild resources climbed up to 205.2 pounds, but in 1991/92 the harvest remained nearly static and averaged 209.3 pounds per capita (Mishler, Mason, and Vanek1995: 15).

Post-spill residents perceived a decline in seals, butter clams, and sea urchins. Other aspects of subsistence practices (e.g., sharing and enculturation) do not appear to have had effects beyond the first summer/fall of 1989. Residents primary concerns are about food safety.

3.2.2 Alaska Peninsula Communities

3.2.2.1 Chignik

There are three major sources of information regarding the interaction of the EVOS with the community of Chignik (Chignik Bay). These are the Oiled Mayors Study; the MMS/ADF&G Subsistence Study (TR 160); and, the MMS Social Indicators Study (TR 155).

Geographic Location and Infrastructure. This community is located on Anchorage Bay on the southern side of the Alaska Peninsula. It is about 450 miles southwest of Anchorage and 260 miles southwest of Kodiak. There is a gravel runway and small boat harbor. The community can only be reached via air and sea. There is no regular ferry service to Chignik.

Demography. At the time of the oil spill the population of this community was about 120 persons, although during fishing season this population can increase to more than 1,000. Alaska Native comprises about 42% of the population.

Economy. Commercial fishing and fish processing are the major source of cash income in this community. Otherwise subsistence is an essential part of the way of life of local residents.

Political Structure. This is a second class city and currently a member of the Lake and Peninsula Borough. There is also a Village Council and Village Corporation.

Oiled Mayors Study. Initially residents were not concerned about the oil reaching their vicinity, but when it became apparent that such oiling was possible the Village Public Safety Officer began monitoring Kodiak Emergency Services Council meetings. These meetings were rebroadcast to the community. The Village Public Safety Officer became the community coordinator for EVOS response activities. A local volunteer effort was initiated, but two months after the EVOS Exxon/VECO established a presence in

Chignik to assume control of the cleanup. As in other communities, there was resentment and concern that this operation "took over the community." Residents were dissatisfied with the sincerity of the cleanup, the number of vessels and individuals hired for cleanup work, the flow of information about the oil and its effects on wildlife, and their overall loss of control over a process that was essential to their current and future economic survival. Residents successfully used contacts with the U.S. Fish and Wildlife Service, the Bristol Bay Coastal Resources, the Alaska Department of Community and Regional Affairs, and the media.

Local government was not as disrupted in some other communities. However, the focus of local government became oil spill response activity, especially gathering and distributing information to community members. The remoteness of the community made this an important task. The demands for information from local government about the spill put a large workload on local government staff. This resulted in increased costs to acquire information about the progress of the spill. Other increased costs included lost of fish tax because of closed fisheries and lost opportunities to apply for grants because some staff took cleanup employment.

The community segmented into factions during the EVOS. Some tensions existed prior to the EVOS, especially between one local church group and other members of the community. These existing tensions were exacerbated as a result of the EVOS. Another source of tension was the seasonal and year-round resident status. This was also a pre-existing tension that was aggravated by the EVOS.

The closure of the fishing season had the greatest impact on the community. Although tar balls and oil sheen appeared in nearby waters and on local beaches, some fishermen believed the closure of salmon fishing in certain areas was premature if not unnecessary. There was skepticism and resentment about the "experts" who initiated that closure. The only area where fishing was allowed was in Chignik Lagoon. Crowding in the lagoon was a problem. The decreased production of fish resulted in economic losses for fishermen and fish processors.

Residents became concerned about their future and the possible long- and short-term health effects of oil in the environment. Feelings of loss of control, concern about non-participation in subsistence, and uncertainty contributed to stress in this community.

MMS Social Indicators Study (TR 155). Tar balls and oil sheen reached Chignik Bay. This resulted in the closure of the salmon fishery. Some fishermen were concerned that this was unnecessary since they previously observed barges discharging oil. Closure of the fisheries had impacts directly related to the scale of the fishing operations. The smallest operators suffered the most, the larger operators the least. Smaller operators did not have the range to fish elsewhere nor were their vessels always the most desirable for work on the cleanup. Larger operators could travel elsewhere for fishing or they could work on the VECO cleanup and they received some settlements for their lost fishing opportunities. Smaller operators did not always possess the documentation demanded by Exxon for compensation for lost fishing. The only area open to fishing was Chignik Lagoon. The number of boats fishing there thus dramatically increased. Conflicts among operators, large and small, increased and caused tensions among fishermen.

Small Native fishing operators incurred the greatest losses from the closed seasons. These fishermen felt wronged by this situation. These smaller operators also received less in compensation from Exxon than larger operators, in part because they were less experienced at dealing with corporate bureaucracy and because they did not necessarily keep the records demanded by Exxon for proof of losses. However, large and small operators, as well as the fish processing plants and workers, lost money because of the EVOS.

Tensions within the community were generated by the EVOS. Individuals argued about the amount and extent of financial losses and harm incurred by others. Children were drawn into these arguments. Large and small fishing operators argued about a range of issues, but they did present solidarity when dealing with Exxon. This solidarity resulted in negotiating prices for cleanup employment above the rates initially offered but comparable to Kodiak.

Local government experienced losses from decreased fish tax. The city also incurred costs related to the activities of staff in the cleanup, especially increased workload, longer hours, and related administrative responsibilities. Local businesses suffered because of the limited fishing season and the local fish processors also incurred financial losses.

This community experienced increased interpersonal tensions and conflicts among friends and kinsmen. This loosened the bonds that integrate the community.

MMS/ADF&G Subsistence Study (TR 160). Subsistence is an essential characteristic of the way of life in this community. Participation in harvesting, processing, and sharing of subsistence resources among households is high. Residents were concerned about the safety of wild resources. However, consumption and sharing of wild resources did not appear to be a major effect of the EVOS for Chignik. Residents were concerned about the social tensions generated by the spill, including "greed" displayed by neighbors and kinsmen. Children were also not as well supervised because of parental employment on the cleanup. Other effects of the EVOS were anger, confusion, stress, and community disruption. Residents show a high degree of concern that future oil development will have adverse effects on subsistence resources and practices.

3.2.2.2 Chignik Lagoon

The primary sources of information about Chignik Lagoon is the Oiled Mayors Study, although the MMS Social Indicators Study and the MMS/ADF&G Subsistence Study contain information for Chignik Bay gathered from the other "Chignik communities."

Geographic Location and Infrastructure. This community is also located on the south shore of the Alaska Peninsula. It is slightly more than five miles west of the community of Chignik. There is a gravel airstrip but no boat dock or harbor facilities.

Demography. At the time of the EVOS the population was about 40 persons. This increases several times that number during fishing season. About 57% of this population is Alaska Native.

Economy. Commercial fishing and subsistence.

Political Structure. Unincorporated community currently within the Lake and Peninsula Borough. There is also a Village Council and Village Corporation.

This community had limited involvement in the cleanup effort. There was some problems in acquiring information from Chignik Bay regarding public meetings about the EVOS. There was some distrust of VECO concerning deliberately not informing residents about EVOS issues. Residents experienced conflicts with other fishing vessels that do not normally fish the Lagoon but did the spill year because those were the only waters open to fishing. There were some reports of fights, quarrels, and bickering about crowded fishing conditions. This stressed some residents and there was some reported increase in alcohol use and overall community disruption. Residents were especially concerned about food safety given their dependence on wild foods. There was also concern about the long-term effects of the spill on the environment. Uncertainty associated with the effects of the EVOS unsettled residents.

3.2.2.3 Chignik Lake

Geographic Location and Infrastructure. Chignik Lake is located on the south side of the Alaska Peninsula next to the body of water of the same name. It is some 265 miles southwest of Kodiak and 565 air miles southwest of Anchorage.

Demography. The population is about 130 persons of whom more than 90% are Alaska Natives.

Economy. The major economic activity in Chignik Lake is commercial fishing. Otherwise this is a subsistence economy.

Political Structure. Unincorporated within Lake and Peninsula Borough. There is also Village Council and Village Corporation.

MMS/ADF&G Subsistence Study (TR 160). This community is not on the coast exposed to the EVOS, but residents depend on subsistence resources that use or inhabit the coast. There appear to have been no major changes in subsistence practices associated with the EVOS. However, residents did express concerns about food safety and the future effects of oil contamination on subsistence resources. Residents experienced economic losses because of the closed commercial fishing season, but were perhaps the hardest hit of the three Chignik communities because they have the smallest incomes. Wild foods were used in place of foods that might have been purchased with income from commercial fishing.

Oiled Mayors Study. Most residents of this community did not participate in the cleanup effort. They also suffered the worst economic losses of the Chignik communities because they have smaller boats that were not desirable for cleanup work and they could not travel elsewhere for fishing. The loss of income from fishing and tensions associated with increased fishing pressure in Chignik Lagoon was a source of stress for fishermen and their families. Residents also expressed fears about consuming subsistence foods such as clams and halibut. The suspension of traditions associated with the lifestyle was also a great concern to residents who feared the effects on community bonds and their children. Overall, fishermen were among the most affected because of closed fishing seasons, concerns over the future of fishing operations, and the effects on fishing resources.

3.2.3 Kenai Peninsula Native Communities

The two Native communities of this region are Nanwalek, previously known as English Bay, and Port Graham. Each of these communities was oiled by the EVOS.

3.2.3.1 Port Graham

The major sources of information about the interaction of Port Graham with the EVOS are: the Alaska Oil Spill Commission/McClintock Report; the Oiled Mayors Study; and the MMS/ADF&G Subsistence Study (TR 160).

Geographic Location and Infrastructure. This community is located on the southern end of the Kenai Peninsula. It is approximately four miles southwest of Homer on Cook Inlet. The community is accessible via air and boat.

Demography. The population of this community at the time of the EVOS was about 195 persons. The majority of these residents (about 84%) are Alaska Native.

Economy. Cash income in Port Graham comes from commercial fishing, a cannery (since closed), and various small businesses. Subsistence is a major factor in the economy and culture of this community.

Political Structure. There is a Village Corporation and Village Council in Port Graham. This community also belongs to the Kenai Peninsula Borough.

Alaska Oil Spill Commission/McClintock Report. Areas in and around Port Graham were directly oiled. Dead and oiled birds, otters, and other wildlife were directly observable. Areas used for subsistence were oiled. Residents were concerned about the effects on food safety and the long- and short-term effects on the natural environment and its resources. The effects on the environment were particularly devastating to a people who revere and invest spiritual importance in the fouled and dead resources. Exxon/VECO initiated a cleanup in this community, renting local resources and hiring local persons, including most of the Village Council staff. This resulted in the loss of usual services to the community, including the Health Aide and the Village Public Safety Officer. Residents experienced a loss of control of their community to the outsiders who took over the cleanup.

Subsistence activities were suspended in favor of cleanup employment. Many in the community, especially elders, felt helpless. There was concern that traditional subsistence practices and activities were not being taught to children because of the EVOS. Uncertainty about the future of subsistence resources and the safety of consuming these resources was pervasive. A large amount of cash income resulted for many people in this economy which does not usually have such large amounts of cash. The community was "shocked" by the amount of money and it caused some tensions and frustrations. Many social relationships were damaged because of arguments related to community tensions. Social bonds were loosened and cultural values damaged.

Oiled Mayors Study. VECO hired most of the leadership in the community including the Health Aide, Village Public Safety Officer, Village Administrator, and Village Corporation president. Local facilities were rented by VECO for cleanup operations. By June of 1989, cleanup of the outer coast was winding down, but community members felt as if there was more than 200 miles of coastline to be cleaned. Distrust and anger against Exxon/VECO resulted in accusations that there was systematic attempt to limit cleanup of the outer coast region. Residents were frustrated that their only channel of communication with Exxon/VECO was through the Homer Multi-Agency Coordinating Group. They were also not pleased with their representation in this group. There were demands for a direct channel of communication with Exxon. Outsiders came into the village with the cleanup crews. Many of these "outsiders" were relatives of villagers who were seeking cleanup employment. Housing shortages and some social tensions resulted from the influx of outsiders.

Local government operations were essentially suspended because of the absence of staff to do the work and the pressure of oil spill response activities. Projects such as gathering firewood and water for the elderly, preparing grant applications, and other normal activities of government, including providing health care services.

Residents felt as if they lost control of their community when VECO come into the community. They were resentful of the character and channel of communication with Exxon/VECO. There were accusations of racist and sexist attitudes by Exxon/VECO toward Native men and women. This demeaned Native identity. Residents also felt as if , in their area, they were among the most heavily affected by the EVOS, but they had trouble getting money from the Kenai Peninsula Borough's Exxon fund for the community. Lesser-affected communities received money from the fund, but pleas by Port Graham and Nanwalek (English Bay) for these funds went unacknowledged.

Community solidarity suffered as a result of wide-spread conflicts among residents, problems with younger persons having positions in the cleanup where they gave orders to older persons (thereby undermining traditional social hierarchies), money earned in the cleanup gave more status to some than others, and traditional subsistence activities and practices were suspended. Family life was also undermined by the long cleanup work hours of parents. Some children expressed feelings of insecurity. Elders felt as if they were not contributing to the cleanup and this resulted in some feelings of alienation. Overall, the routines and structures of community life were affected such that social solidarity was undermined.

Residents expressed specific concerns about the safety of subsistence foods. They were also concerned about the long- and short-term effects on natural resources from the spilled oil. Uncertainty about the safety and future of subsistence resources was a commonly felt sentiment during the year following the EVOS. Residents were also concerned about the cultural loss that accompanied the suspension of subsistence activity, especially the effects on children of lost opportunities to engage in subsistence activities with elders and other family members.

Prior to the oil spill the community had made strides in improving problems with substance abuse, domestic violence, and sexual abuse. However, the social disruptions related to the EVOS appeared to exacerbate these problems. There were also diminished resources to respond to these problems. Stress resulting from long hours of cleanup work, social disruption, the demoralization associated with the damage to the subsistence lifestyle, feelings of helplessness and loss of control, sadness, and anger also had adverse effects on the mental health of adults and children in the community.

MMS/ADF&G Subsistence Study (TR 160). Port Graham shows a high degree of involvement in the subsistence lifestyle. Harvesting, processing, use, and sharing of wild resources is pervasive. During and after the EVOS, the use of wild resources dropped by half, but by 1991 use had returned to at, or above, pre-spill levels. For all of the study years, this community shows consistency and steady increases in post-spill use of subsistence resources. This is in part related to cultural preferences, nearness to subsistence resources, resource abundance, and attachments to the traditions of harvesting these types of foods. Residents did express ongoing concerns about the safety of subsistence resources, the post-spill abundance of resources, but not abnormalities in wild resource populations. This is some tendency to view sharing of resources as less than before the spill, but the majority of study participants perceive sharing as about the same as pre-spill times.

3.2.3.2 Nanwalek (English Bay)

The major sources of information about Nanwalek are as follows: the Alaska Oil Spill Commission/McClintock Report; the Oiled Mayors Study; and, the MMS/ADF&G Subsistence Study (TR 160).

Geographic Location and Infrastructure. This community is located on the southwestern end of the Kenai Peninsula. It is connected to Port Graham via a four mile trail. It is about 24 miles from Homer. There is a gravel air strip and a harbor. This community can only be reached via air or boat.

Demography. At the time of the oil spill this community had a population of about 200 persons. The majority of these are Alaska Native.

Economy. Although there is some commercial fishing and assorted small businesses and government employment, this is primarily a subsistence economy.

Political Structure. There is a Village Council and Village Corporation. This community also belongs to the Kenai Peninsula Borough.

Alaska Oil Spill Commission/McClintock Report. By early April oil had impacted areas used for subsistence purposes by Nanwalek residents. As in other communities, when tides receded and then came in again, the beaches were continually oiled. Dead and dying wildlife and fouled shorelines and beaches were a part of the experience of the EVOS for this community. Residents experienced depression, anger, helplessness, hopelessness, and hurt in reaction to the effects of the spilled oil on their home and subsistence areas. Residents also experienced the oil spill as having changed their view of the viability of their environment for future subsistence purposes.

The disruption of subsistence harvests and practices was a major impact on the lifestyle of this community. Cultural preferences and desires could not be exercised because of the disruption of subsistence. Residents from other nearby Native communities sent fish, game, and other subsistence food to the village in recognition of the loss Nanwalek residents experienced.

The VECO cleanup employed about 70 residents. The income from this employment provided the income to purchase goods that residents might not otherwise have the means to acquire. Some monies were also used to purchase alcohol. There was some increase in alcohol abuse. The community sobriety movement also suffered because of increased alcohol use. There was some loosening of social bonds related to alcohol and social disruption. The community also gained some income through the rental of buildings and equipment to the VECO cleanup.

Most of the staff of local government was hired for the cleanup. This resulted in a lack of village services, especially those provided by village leadership, health clinic staff, and the Village Public Safety Officer. The community also experienced an influx of outsiders such as VECO staff, media, various government officials, and people seeking cleanup employment.

Social relationships within the community were changed by an influx of outsiders, the loss of subsistence harvests, and changes in the usual routines and patterns of daily life. Money gained from the cleanup was not necessarily shared in the same way as other resources and there was an overall increase in stress experienced by village residents.

Residents were unhappy with the planning, execution, and sincerity of the VECO cleanup. There was also a feeling that the community was not a priority in the cleanup despite the oiling of local shorelines and beaches. Local expertise was not used and not valued. Many felt as if they could have organized a more efficient and effective cleanup if allowed to, but VECO exercised strict control and, in fact, took initiative away from any locally inspired cleanup efforts. This further demoralized residents.

Oiled Mayors Study. When residents realized that oil would eventually hit their shorelines, they gathered clams before these resources could be contaminated. Otherwise there was some ambivalence in the community about what actions to take in response to impending threat. When the oil hit, local subsistence areas were not protected and the result was heavy contamination of areas used for subsistence purposes, including lands directly in front of the village. About the second week of April, VECO came to the village and announced they would hire every adult male in the village for cleanup work. Materials to implement cleanup activities were promised, but they were not delivered in a timely manner. Other communities received such materials before Nanwalek and there was some feeling that this was because other communities had more power in the Homer Multi-Agency Coordinating Group. Residents attempted to construct boom and otherwise prepared cleanup operations, but they perceived that VECO constrained their efforts and exercised too much control. Local expertise was not valued and there were hard feelings among residents about the reaction of Exxon/VECO to local response efforts. Poor

communication with agencies outside the community also hindered locally inspired cleanup efforts. A demand for information from outsiders, especially media, was a source of frustration for residents. Residents also felt that once VECO arrived in the community they "took over" and residents lost a sense of control over their lives.

Local government officials worked on the cleanup consequently much of the business of local government was suspended. Projects were delayed, services not delivered, and children were displaced from their school that was used as a VECO command center. There was some dissension over the employment of the Village Council president who retained work with VECO after the initial cleanup ended. Charges of conflict of interests undermined community solidarity. The Village Public Safety Officer also took cleanup employment with the cleanup and the community was without his services. There were reports of increases in family violence and alcohol use within the community during his absence and afterwards.

Stress and tensions increased in the village. The wages people made on the cleanup provided an unexpected windfall of cash that some found stressful. Some of these monies were used to purchase alcohol and drugs. Others productively used their wages to purchase larger boats, to pay off bills, or to assist other family members. However, the unused surplus of cash was a source of stress for some that were not used to having the amount of discretionary money that resulted from cleanup employment. Stress also resulted from younger persons being placed into positions of authority over older persons during cleanup work. This change in social roles caused tension and stress. Interactions with outsiders that included some racial prejudice also added to the stress that villagers experienced during the EVOS. There were also concerns that the closure of commercial fishing would have adverse affects on families and the whole village. Fishing provides the major source of cash income and its loss was a source of tension and stress for villagers.

Another major source of stress and social disruption was the interruption of subsistence activities. Village routines and lifestyles are organized around subsistence practices. The disruption of subsistence was itself stressful because the social activities of sharing, enculturation of children, interactions of children with their elders in camp life, and other social interactions around subsistence (e.g., hunting, fishing, etc.) were disrupted. Similarly, there was concern among villagers about the safety of subsistence foods and worry about the future of natural resources upon which people depend for their lifestyle. The uncertainty about food safety and the future of their lifestyle was stressful. Some interpreted the EVOS as another example of actions by non-Natives that have consequences for the survival of Native culture and ways of life.

Stress was manifested in increased drinking, substance abuse, domestic violence, and symptoms of depression and anxiety. Uncertainty about food safety and the future of commercial fishing and subsistence activities compounded the problems villagers experienced.

Although stress and social disruptions loosened social bonds, the community also experienced solidarity during the event. People worked together on the cleanup and experienced closeness in their efforts to cleanup the spilled oil. Villagers also realized the need to assist each other to endure the challenges confronting them as the oil threatened their lifestyle and the natural resources they depend on for subsistence purposes. Sharing and the imperative for mutual support were reinforced by their collective experiences working on the cleanup.

3.2.4 Prince William Sound Native Communities

There are three Native communities of Prince William Sound that receive some focused attention in the literature regarding the EVOS. These are Chenega Bay, Tatitlek, and to some extent the Eyak community in Cordova.

3.2.4.1 Chenega Bay

The major sources of information about this community are the Alaska Oil Spill/McClintock Report, the Oiled Mayors Study.

Geographic Location and Infrastructure. This community is located on Evans Island in Prince William Sound, about thirty miles south of Bligh Reef where the *Exxon Valdez* ran aground. This community was reconstituted on this site in 1984 after the 1964 earthquake destroyed the previous village. The community is located about 100 air miles southeast of Anchorage. There is a boat dock and a new gravel runway and floatplane landing area. At the time of the oil spill there was no gravel runway and the only air service was via floatplane. The community is only accessible via boat and airplane.

Demography. At the time of the oil spill this community had about 80 residents. Alaska Natives comprise the majority of the population.

Economy. This is a mixed cash-subsistence economy. Cash sources are commercial fishing, local government employment, transfer payments, and some local business employment. Otherwise, subsistence characterizes the economy of this community.

Political Structure. This is an unincorporated community. There is a Village Council and Village Corporation.

Alaska Oil Spill Commission/McClintock Report. Initially residents did not believe the spill, which they learned of via radio, would not affect them. Within four days of the spill media and people from Cordova came to the community. The Cordova-based Prince William Sound Aquaculture Corporation Sawmill Bay Hatchery is located in the same bay (Crab Bay) as the village. Oil inundated the lands and water around the village of Chenega Bay. The devastation of wildlife and the pollution of shorelines and beaches distressed villagers. Some perceived an immediate decline in wildlife populations. There were "mixed signals" from outside sources about the safety of eating traditional subsistence foods. Commercial fishing was closed, but residents were most distressed by the effects on subsistence foods.

Initially, the community was considered a "low priority" for cleanup. However, shortly after the spill there was an influx of outsiders primarily from state and federal agencies who came to "coordinate" cleanup activities. Residents from Cordova came to protect the Sawmill Bay Hatchery and their assistance was appreciated. VECO arrived in the community and distributed applications for employment and they eventually hired 20 people for the cleanup. Some who wanted to work did not get hired. The hiring process was also considered too bureaucratic and demeaning to Natives. While VECO went through its laborious and bureaucratic hiring process, residents observed continued oiling of beaches and wildlife. By day 25 there was still no cleanup activity in the vicinity of Chenega Bay by the Exxon/VECO cleanup. By the time the cleanup was initiated, there were doubts about its effectiveness and concern about the number of "bosses" relative to workers. Some observed the activities of bosses and surmised that they were inept in the use of technology for cleaning up the oil. This raised further concerns about the safety of their village from pollution and contamination.

People experienced the oil spill as a very painful and depressing event. Pending litigation by Natives against Exxon limited what people were willing to say about their feelings and reactions to the spill because they were afraid any statements could be used against them in court. The increase in village

population, the strain on village resources, frustrations with timely implementation of cleanup operations, the effects on subsistence, and the spiritual damage resulting from contamination of village lands and resources collectively stressed the individuals of this community and adversely affected social bonds.

Oiled Mayors Study. This was the first community oiled by the spill. Residents first learned of the threat through television and radio news programs. As the oil neared the community, boats from Cordova came to protect the Sawmill Hatchery. Other boats arrived to participate in the cleanup, but some villagers were upset because other boats were being hired to cleanup and they were not. They were also distressed by what they perceived to be more interest in protecting the PSWAC fish hatchery rather than the village and its subsistence lands. However, overall residents were grateful for the assistance to the village provided by the Cordova boats.

Initially, cleanup operations for the village were assigned a low priority, but the Regional Native Corporation intervened to raise the priority status for the village. VECO arrived in the community nearly three weeks after the spill. They "took over" the community and instituted a "bureaucratic" process for implementing the cleanup of resources people highly valued. People were hired for cleanup, placed on standby and prevented from participating in other cleanup efforts until called for VECO work. Some dissension developed over hiring and the leasing of boats for cleanup work. Everyone who wanted to work was not hired and there were accusations of nepotism between those who received work and those who did not. There was also resentment over the hiring of "outsiders" for cleanup while locally affected persons did not have jobs. Community leaders were generally excluded from the decision making process for cleanup operations in their vicinity. Local knowledge and expertise were dismissed. The looting of archaeological sites and other areas of historical importance for the village distressed residents. VECO did not cooperate with village leadership to protect these historical and archaeological resources or in respecting Native lands and property.

The EVOS disrupted local government, social relationships, routines and ways of life, and especially subsistence activities. Local government operations were disrupted by oil spill response activities. Projects were delayed, the local dump was over-used, and other business was essentially stopped by response operations. Community leadership believed that they lost control over decisions that were essential for their future. The influx of outsiders into the community disrupted usual routines and there was some friction between outsiders and residents. Families were disrupted by long hours of employment of the cleanup and by the disruption of subsistence activities. Children were sometimes without supervision while parents worked on the cleanup. Friendship and relationships among neighbors were also stressed and some perceived that overall social bonds were loosened by turmoil in the village. Subsistence activities, the core of community life and culture, were suspended. People were disheartened by the loss of subsistence foods and the cultural practices that accompany subsistence activity. The contamination of their lands and the possible effect on the future of the newly reconstituted village and a Native way of life distressed elders and others in the community.

MMS/ADF&G Subsistence Study (TR 160). Chenega Bay residents worked with Cordovans and the Alaska Department of Environmental Conservation to protect the Armin F. Koernig Hatchery in Sawmill Bay from oil pollution from the EVOS. The essential subsistence areas of the village were not as well-protected and indeed suffered substantial damage from both the spill and cleanup activities. This is a community that is heavily dependent on subsistence resources and the majority of residents practice a subsistence lifestyle. In the years since the spill, subsistence harvests have changes substantially both in volume and in the composition of harvests. Overall volumes of subsistence harvests have showed a decline in all years of the study (1991-1994). Harvests of marine mammals and invertebrates shows the most dramatic decrease from pre-spill years. Harvests of deer are also down. However, residents do travel outside their traditional hunting/fishing areas to pursue these species. The overall composition of harvests has changed to favor salmon and other fish with much lower consumption of deer, invertebrates,

and marine mammals (seals and sea lions). These changes appear to be related to the EVOS, specifically concerns about the safety of consuming potentially contaminated resources and also to perceived declines in population of these desired species. Residents have particular concerns about the safety of clams, seals, and sea lions. Children's participation in subsistence and sharing of harvested resources in less than in the years before the spill, although the trend line in the study is for increasing participation and sharing for the study time period. There are ongoing concerns about the safety of food. Some resources have been discarded and others are not hunted because of concerns about contamination. Some residents attribute perceived declines in populations of resources to oil contamination. In 1991 half of residents liked living in their community less because of oil contamination and by 1993 this declined to about 30%. Residents of this community continue to practice subsistence but at increased costs and with ongoing concerns about contaminated resources and declining populations perceived to be associated with the EVOS.

3.2.4.2 Tatitlek

The major sources of information regarding this community are the MMS/ADF&G Subsistence Study (TR 160); the Oiled Mayors Study; the MMS Social Indicators Study (TR 155); and the University of Southern Alabama Study.

Geographic Location and Infrastructure. Tatitlek is located in northeastern Prince William Sound. It is 25 miles southwest from Valdez and forty miles northwest from Cordova. Bligh Reef is just south of the village. This is the closest community to the EVOS. There is a gravel air strip and a boat dock in Tatitlek.

Demography. The population of this community at the time of the EVOS was about 120 persons. Alaska Natives are the majority (~87%) of the population in this community.

Economy. This is a mixed cash-subsistence economy. Commercial fishing, government employment, and timber harvesting are major sources of cash. Otherwise, this is primarily a subsistence economy.

Political Structure. This is an unincorporated community with a Village Council and Village Corporation.

Oiled Mayors Study. Six miles away from Bligh Reef across a straight separating Tatitlek from Bligh Island, the *Exxon Valdez* ran aground. Residents became aware of the spill from media sources although shortly after dawn fumes from the spilled oil filled the air in the village. Residents volunteered to apply their knowledge of tides and conditions in the region for initial response efforts. Oil sheen was visible in the waters around Tatitlek early the first day of the spill and on subsequent days villagers were disturbed by a cloud of black smoke from Exxon attempts to burn the spilled oil. No one in the village was notified of the burning. Similarly, there were attempts to use dispersants to control the oil, but residents were also not notified of these efforts. Villagers had concerns about the health effects of each of these response activities.

Cleanup employment was offered to all adult residents of the village, but for more than a month they did no work. Concerns about racism, devaluing of local knowledge, and support roles in the cleanup (e.g., hauling garbage) promoted feelings that villagers were not meaningfully engaged in protecting their community and the resources they use for subsistence purposes. Lawyers, media, and other outsiders invaded the village. Privacy was lost. Some outsiders were relatives who came to the village seeking cleanup employment.

The village experienced a range of social and economic effects. Local government operations were essentially suspended. The community expended monies in response efforts, but because they did not have the manpower or procedures to document these in a manner that satisfied Exxon, these claims were denied. This further fostered feelings that the community was the object of discrimination. The spill and the presence of outsiders in the community disrupted the usual patterns of social interaction and subsistence activity. There was sentiment that the suspension of the subsistence lifestyle and the threat to natural resources was another example of the attempts of non-Native society to deprive Alaska Natives of their culture and lifestyle. The loss of subsistence foods was also a concern because of its significance in local diets and the perceived health benefits. People began to rely on store-bought foods which increased substantially in price due to EVOS related inflation. Sharing of resources declined and this became a problem for the elderly who depend on others sharing subsistence resources. Children were among those who suffered the most in the village. Parents working long hours on the cleanup were not as available for their children. Families were stressed because of long hours of cleanup work and this had adverse affects on children. Some teenagers began drinking and there were divorces that were attributed to spill-related stress. There were also reports of domestic violence, increases in substance abuse, and some sexual abuse. Exxon provided some monies for childcare, but residents were disheartened by Exxon's willingness to spend "eighty thousand dollars to save an otter" but less than half that amount for village child care.

Residents were very concerned about the contamination of subsistence resources and the future effect of this contamination on their lifestyle. There was some distrust of state and other agencies that performed food-safety tests and accusations that these agencies were in collusion with Exxon to hide the truth about food safety. Distrust of outsiders and in the ability of government and Exxon became pervasive. Social disruption associated with loss of lifestyle, concerns about food safety, and disruption of family and community life became major sources of stress.

MMS/ADF&G Subsistence Study (TR 160). Tatitlek is a village with a high degree of participation in subsistence practices. Post-spill there were changes in harvest volumes and composition. There were declines in the harvest and use of marine mammals, deer, and invertebrates. Villagers also perceived declines in these populations, which partially accounts for changing use and harvest patterns, although there are ongoing concerns about food safety related to oil contamination. By two years after the spill there was a 60% decline in harvests in comparison to pre-spill levels. This is the highest rate of decline among all Native villages with the exception of Chenega Bay. By the third year post-spill, resources used had returned to almost pre-spill levels, but the harvest levels were still below pre-spill years. The composition of harvests changes so that there is a predominance of fish and lesser amounts of marine mammals and invertebrates. These changes are related to both food safety concerns and perceptions of declines in population of seals, sea lions and invertebrates. Subsistence hunters reported discarding some animals taken because of abnormalities attributed to the EVOS. Residents also expressed concern about the safety of Herring stocks that were oiled by the EVOS. Herring stocks were also observed that had apparently been exposed to viral infection. Villagers as indicating oil contamination interpreted the resulting behavior and appearance of these stocks. Residents were assured that this was not necessarily the case. Furthermore, their interpretations were extended to indicate more widespread environmental problems related to the EVOS. There was some distrust of "expert" sources that suggested that the Herring stocks could be consumed despite the viral problems. Children's participation in subsistence harvests and sharing of subsistence resources declined. The cultural identity of "subsistence hunter" that provides for family and village was undermined. Traditional knowledge about food safety and the relationships between animal behavior and abnormalities and the environment was also undermined. The disruption of subsistence activities had pervasive social and cultural effects.

MMS Social Indicators Study (TR 155). Research was interrupted in Tatitlek because attorneys representing villagers in litigation against Exxon did not wish data collected that were not under their

control. Consequently, there is limited information regarding the interaction of the EVOS and the village of Tatitlek.

Outsiders were a major source of disruption in the community. Media persons were invasive and demeaning to residents. Researchers conducting social and biological research asked questions that were perceived as benefitting agendas and purposes that could not be discerned by villagers. Individuals seeking cleanup employment also camped out nearby the village looking for cleanup work. Residents were distressed that no one was addressing the problems caused by the "human spill" into their village.

As with Chenega Bay, this community suffered extensive damage from the 1964 earthquake. People believed their lifestyle and the resources upon which they depend were only just starting to recover when the EVOS occurred. Residents were concerned about harvesting resources exposed to the EVOS, despite some assurances by outside "experts." This community showed the greatest declines in subsistence use and harvest of all communities exposed to the EVOS. Widespread health concerns about subsistence foods were a source of stress for residents.

Economic hardships and social disruptions related to the EVOS and subsistence use resulted in some increase in tensions among neighbors and kinsmen. However, strong solidarity beliefs and overlapping social ties appear to have mitigated the effects of these tensions. Reliance on community solidarity was important for villagers during the EVOS.

The Chief of the Village Council was the mediator between the community and dealings with Exxon. Exxon/VECO and other outside agencies appeared to be confused about how to deal with the village government.

3.2.4.3 Eyaks in Cordova

The major sources of information about Eyak are the MMS Social Indicators Study (TR 155) and, the University of Southern Alabama studies. Each of these directly address Native populations in Cordova that we assume are mostly Eyaks. At the time of the EVOS, Eyak Natives lived within the community of Cordova or near its boundaries.

Geographic Location and Infrastructure. Eyak village is about 6 miles along the Copper River highway from the community of Cordova. The village is not necessarily the place of residence for most Eyaks (cf. Reynolds 1993). Eyaks are defined more by their cultural identity and ways of life than by residence in the Village (cf. Reynolds 1993).

Demography. According to Reynolds (1993) the Native population of Eyak is "heterogeneous" consisting of Eyaks, Aleuts, Eskimos, and other non-Alaska Native populations. The majority of the Native population is Eyak. Reynolds cites a population of 397 in 1985 and 265 in 1991. (The population estimates for Eyak are difficult to construct. Alaska Natives from other nearby communities (e.g., Tatitlek and Chenega Bay) and other Native Americans live in the environs of Cordova and may contribute to confusion about population estimates. The population Reynolds (1993) reports indicates a decline between 1985 and 1991. This could be the result of numerous factors, including counting errors, out-migration of non-Eyaks to their own villages post-spill, or seasonal residence patterns. Any interpretation of this population decline as related to the EVOS would require further investigation.)

Economy. This is a mixed cash and subsistence economy. The Eyak Corporation develops resources that provide an important source of cash income. Other sources are commercial fishing and non-fishing employment.

Political Structure. There is a Village Corporation and a Village Council for Eyak.

MMS Social Indicators Study (TR 155). Data could only be collected about social and cultural concerns of Eyaks because of pending litigation against Exxon. Exxon did not recognize Eyaks as a Native entity. Services and resources provided to other villages such as Tatitlek and Chenega Bay were not provided to Eyak. Villagers also felt slighted by the limited attention given them by the Federal Government during the oil spill.

Exxon/VECO overwhelmed the Eyaks. Office space was consumed and the Eyak offices had to be relocated because they could not find other affordable space. Eyaks were especially concerned about the safety of subsistence foods, the loss of subsistence practices, adverse health effects from working on the cleanup, and the trespass of cleanup workers on sites with cultural, historical, and archaeological importance to the tribe.

Subsistence is an essential part of Eyak cultural identity. Subsistence practices reinforce social bonds, express Native values and beliefs, and organize many aspects of social life for Natives. Subsistence resources were damaged by the spill and despite assurances from state, federal, and Exxon sources, Natives were unsure about the safety of eating resources exposed to oil contamination. Oiling of resources also disrupted sharing with other villages, especially Tatitlek and Chenega Bay. Overall sharing of resources declined as a result of the EVOS. The disruption of sharing had adverse effects on social relationships with family and neighbors. Social bonds were loosened as a result of the lack of sharing. Damages to subsistence practices and the harvesting of subsistence foods had adverse effects on the cultural identity of villagers. The spiritual values associated with these resources were damaged and along with it the identity of villagers. The interconnections among subsistence resources, social life, community, and the environment were damaged in a way that harmed the Eyak way of life. People also lost confidence in the future of the environment to recover from the effects of the spilled oil.

University of Southern Alabama. Dyer, Gill, and Picou (1992) and Gill and Picou (1997) are the major sources that report on Natives in the community of Cordova that we assume are Eyak or other Alaska Natives. Dyer, Gill, and Picou (1992) report on a sub-sample of 31 Natives from their Cordova survey. Three areas are examined. The first, "perceptions and behaviors of disruption" (1993: 115) indicates that the majority of respondents were upset and distressed by the EVOS and uncertain about its current and future effects. The second area measured natural resource disruptions (1993:117), indicates that the majority of respondents (58%) were concerned about the disruption of children's opportunities to participate in and learn subsistence skills. A majority of respondents (61%) were also not satisfied with their children's opportunities to continue their cultural traditions after the EVOS. Similarly, the majority of respondents (61%) were not hopeful that subsistence fishing would return to pre-spill levels and (61%) agreed that the EVOS would interfere with teaching subsistence skills to children. For the third area, perceptions of social disruption (1993:118), 1989 and 1990 responses to questions were compared. Responses suggest that between 1989 and 1990 respondents changed perceptions about family disruption with more agreeing that 1989 was worse than 1990. Similarly, in 1989 more agreed that their plans for the future had changed than in 1990. Work life plans showed that 50% agreed that their work life changed in 1989 but only 3% in 1990. However, 3% believed Cordova had changed in 1989 whereas 75% believed it had changed by 1990. Results are interpreted as suggesting social disruption and a disruption of the traditional lifestyles among Cordova Natives.

Gill and Picou (1997) summarize some of the findings from MMS/ADF&G (TR 160), the Oiled Mayors Study, and the MMS Social Indicators Study (TR 155), studies regarding impacts to Native populations. They report on measurements of chronic stress using the Impacts of Events Scale (Gill and Picou 1997:180) administered during 1991 and 1992. In comparison to commercial fishers, Alaska Natives show higher measures of "intrusive recollections" and "avoidance behavior" in 1991, but only higher

"intrusive recollections" in 1992. They also report on findings regarding social disruption for 1989-1992 that suggests a pattern of social disruption among Alaska Natives in Cordova. They also report that claims against Exxon for damages to Native culture and lifestyle were reject I litigation because of the specifics of maritime law that govern these types of torts. This rejection was a further adverse impact of the EVOS on Alaska Natives.

4.0 COMMUNITIES AND CONFIGURATIONS OF SOCIAL FACTORS

This study examined specific social factors: social organization, culture, social health, economics, and subsistence. These represent a basic and usable set of variables for understanding Alaskan communities exposed to the EVOS. Which one is the most important social factor? That depends on the exposure conditions, event characteristics and how they interact with the patterning of social factors within particular communities. An important lesson about social factors is that understanding which is the most important requires attention to how these vary across communities and how social factors have different configurations. In this section we draw on the community by community summaries and discussions presented in the Factor-by-Factor Analysis to describe patterns or configurations of social factors. These "configurations" suggest different distributions of social impacts and particular resources for responding to them. These configurations are relevant because they are a means to think about the relationship between EVOS demands and community resources to respond to those demands. It is the configuration or pattern of social factors that makes the most difference rather than anyone particular factor. The implication of this is straightforward: it is necessary to understand the basic configuration of social factors for each community, although there will be a range of variation on any one variable. There are four major configurations of social factors that interacted with the EVOS. We briefly describe each of these factors in the discussion below.

4.1 NATIVE PATTERN

Native culture has subsistence as a core institution that integrates social actions, cultural meanings, and individual and group identities. All social factors considered in this analysis (culture, social organization, social health, economy, and subsistence) are interconnected with the subsistence lifestyle of Native communities, and there are multiple types of connections. For example, the sharing of subsistence resources has economic implications for families and well as the reinforcement of social bonds and the validation of the cultural identities of those who give and receive the shared foods. These multiple connections between natural resources and the ways of life characterize the Native pattern. The damage of natural resources used for subsistence purposes resulted in disrupting connections between social actions related to harvesting, processing, and sharing subsistence resources and the cultural values and meanings about those resources. These resources also had some economic value for villagers resulting in a need to replace that loss. Further, these communities had vulnerabilities to social health based in history, acculturation, and other social and culture change issues. In this configuration, damage to subsistence resources resulted in disrupting essential connections among all the social factors considered. There is an alienation of the connections among individual identity, social group, culture, and nature that resulted from the effects of the EVOS on Native communities. This alienation is fundamental to the social and psychological impacts experienced by these communities. Importantly, Native communities share many characteristics with the second configuration described below, fishing dependent communities, but they differ in important cultural characteristics. In Native communities the multiple connections to natural resource and the spiritual, instrumental, and social values accorded these resources integrates the social and natural in a unique way. Disruption of this connection alienated individual from their culture. This alienation was a source of stress that had adverse consequences for individual health as well as the social health of exposed communities.

4.2 FISHING DEPENDENT ECONOMY PATTERN

In this pattern, the relationship between natural resources and the social and cultural institutions of communities is focused around the instrumental use of resources, especially their economic importance. While there are important spiritual and other cultural values about natural resources in this pattern, the instrumental value of fish resources organizes social institutions and ways of life in these communities. This pattern characterizes Cordova and Kodiak and other communities where dependence on commercial fishing is the basis for local economies. Diversification of the fishing economy is a central issue that divides this pattern into two sub-types. In communities such as Cordova, where there is limited diversification, there is more vulnerability to social impacts than in communities such as Kodiak where there is a much more diversified fishing industry. However, within each of these sub-types, patterns of activity and association are centered on the structure of the fishing fleet and support sectors. Social institutions and activities also express the importance of the fishing sector. Damage to natural resources thus disrupts social institutions, patterns of life, as well as the economic viability of that lifestyle. Social health issues emerge because of the stresses related to these disruptions. That is, the EVOS was itself a stressor, but the disruption of community institutions related to the contaminated resource also was a source of stress for individuals. Social bonds also became loosened because of the conflicts that resulted from lifestyle disruption. Subsistence may have important social and economic functions in these communities, but it does not have the same meanings as in Native communities. Culture is a significant factor, but primarily in terms of how it express values about natural resources, ways of life, and the assessments of risk and threat associated with the event. In this configuration, the disruption of the economic and instrumental connections to natural resources affected other social institutions interconnected with community economy. The EVOS disrupted social institutions and ways of life and raised concerns about continuing a valued lifestyle.

4.3 DIVERSIFIED COMMUNITY ECONOMY PATTERN

This configuration identifies communities where natural resources harvests are part of a larger mix of economic activity. Fishing is an important but not necessarily a dominant factor in local economies. Seward and Homer represent this configuration of social factors. In these communities there also tends to be a variety of social groups and institutions that are resources for residents. To the extent that economic connections among sectors are affected by resource damages, then disruption of social institutions and economic activities will result. Moreover, as with the fishing economy configuration, social health will be a factor if damages to resources and social/economic institutions become stressful. The more that the social equilibrium of these communities is disturbed, the more likely social health will suffer. The instrumental, spiritual, and intrinsic values accorded the damaged resources are significant for how residents assess the significance of effects and the long-term consequences of these events. Otherwise, culture plays an important role in threat assessment and risk perception.

4.4 INDUSTRIAL COMMUNITY PATTERN

The configuration of social factors in this pattern is less focused on natural resources as central to instrumental values and cultural meanings. Communities such as Kenai and Valdez represent this pattern of social factors. Economies tend to be diversified and less dependent on commercial fishing. There are even more social resources in these communities than in the diversified economies discussed previously; and, these resources are significant for responding to the demands of the disaster event. Social activities and institutions are less affected by the direct damage to natural resources. Culture remains an important factor in how it defines threats and risks and the nature of the event. This configuration of social factors provides communities with a "buffer" against major economic effects and communities also have multiple resources to draw on for response to an event. These communities experienced social impacts

related to the EVOS, but they tend to be those associated with "secondary" effects such as social disruptions related to in-migration or other social impacts not directly related to the spilled oil.

4.5 SUMMARY OF SOCIAL FACTOR CONFIGURATIONS

These configurations affected how communities experienced the oil spill and cleanup. The more communities were resource dependent the more they tended to be disrupted and affected by the event. Other factors such as geographical isolation (e.g., Cordova, Seldovia, Chenega Bay), response operations (e.g., Valdez), the existence of disaster plans, variability in the ability to muster external resources, and the breadth and quality of leadership also made significant differences in the capabilities of communities to respond to the demands of the spill and cleanup. However, these types of configurations illustrate that there are different relationships between the social characteristics of communities and the natural resources that were affected by the EVOS. These relationships contributed to how communities experienced impacts from both thespill and the cleanup.

5.0 LESSONS LEARNED, EVENT DEMANDS, AND RECOMMENDATIONS

The next sections of this report examine each social factor individually. We develop for each the "lessons learned" that are generalizations describing the essential issues about the relationship between the EVOS and each social factor. These generalizations are based in the analysis presented in the Factor-by-Factor Analysis Report. They describe the legacy of each social factor that can be carried forward to construct recommendations for natural resource managers. These lessons learned are intended to be a condensed summary of the essential issues for each social factor. As such they do not fully portray all issues discussed in the factor-by-factor analysis. The complete analysis should be consulted for a full development of the relationship between the EVOS and a particular social factor. Nonetheless, these "lessons learned" extract from the full analysis a summary accounting of the interaction of each social factor with the EVOS.

We also develop for each social factor event demands and specific recommendations. The event demands are derived from the lessons learned. They imply capabilities or requirements for response for each social factor. These event demands are summarized in bullet form. Next, the discussion presents recommendations for each social factor. These are constructed to address two questions. First, "what information is needed by natural resource managers and communities? Second, "what processes or actions are required by natural resource managers and communities to respond to any future events with sensitivity to the social component of an environmental disaster?" The recommendations proposed are necessarily general because any future event will be different from the EVOS. Consequently, these recommendations have the format of hindsight and what could be done differently in the case of an event very similar to the EVOS. These recommendations are of two types: information and action recommendations. The information recommendations indicate what useful data should exist to assist natural resource managers to effective respond with social sensitivity. Second, the action recommendations suggest plans and responses for natural resource managers to respond with social sensitivity to Native and non-Native communities. Each social factor may have either information or action recommendations or both. We also have developed some more general recommendations that apply across a range of social factors. These are described in the final section of this report.

5.1 COMMUNITY CULTURE

Culture is a system of beliefs, values, world views, and adaptations which allows groups to interpret and assign meaning to objects, events, relationships, and social conditions. The elements of culture are developed through historical experiences and passed on to members of a social group through formal and informal learning usually termed "enculturation." The elements of culture embody the shared experiences

of a social group, that is they contain and express the history, values, beliefs, and other cognitive propositions about the world and man for a particular social group (Spiro 1984: 323). Cultural analysis usually focuses on the traditions, propositions, and ways of life of particular social groups, including: (1) the structure and content of norms, belief systems, values, attributions of meaning, and other cognitions (Shweder and Levine 1985); (2) the relationships between cultural beliefs and propositions and human behavior (D'Andrade and Strauss 1992); and (3) the influence of cultural propositions and beliefs on human adaptations to different ecological niches – cultural ecology – (cf. Jorgensen 1990). Cultural analysis also often calls attention to the distribution of cultural elements within and among social groups. That is, cultural analysis discusses culture with a "big C" (different "ways of life" among diverse social groups) and a "little c" (differences in values, beliefs, knowledge, etc… within a particular social group.) Each of these meanings of culture has significance for understanding how culture affected community responses to the EVOS. Culture with a "big C" is necessary to assess the differences in impacts and experiences between Natives and non-Natives. Culture with a "little c" is essential to understanding variations in response within Native and non-Native communities.

5.1.1 Differences Between Native and Non-Native Culture Resulted in Different Assessments of the Event and Its Impacts

Native and non-Native cultures are distinct in Alaska. While there are similarities in the form and content of culture for both each group, there are significant differences that affected the response to the event and its impacts. For each group, culture constructs the meaning of damaged resources, perceptions about threat and consequences, signals and signs about threats and risks, the process and future for recovery, perceptions about the risks from contamination, and a definition of the event.

The Cultural *Constructs*. The categories are comparable across Native and non-Native groups, but the content is significantly different. The content of the similar categories is a significant, but not the only factor, that influenced how the event impacted individuals and social bonds within communities. It is also the connections between social organization and culture that define differences between Native and non-Native communities.

In Native communities research focused on the "culture of subsistence" as a defining characteristic that distinguished Native from non-Native communities. Many government agencies as well as Exxon did not appreciate the importance and especially the meaning of subsistence as a core element of Native culture. The significance of subsistence as a core institution in Native communities resulted in not only the loss of the economic value of the resource but also alienation of individuals from the social and cultural values associated with subsistence practices. Damage to natural resources used for subsistence purposes thus affected the interaction of cultural values and beliefs, social interactions and bonds (e.g., sharing and visiting, hunting and fishing), and the economic place of subsistence resources in Native economies. Disruption of these connections had the effect of alienating individuals from their community and its culture. This alienation was itself a source of stress within Native communities.

The history of interaction between non-Native and Native cultures contributed to interpreting the EVOS as a threat to the traditions, values, and ways of life in Native communities. The interpretation of the EVOS as a trauma to Native traditions and values compounded the effects of the event. That is, the EVOS was more than a coating of oil on subsistence resources and a disruption of usual life routines: it also had the weight of recalling past traumas to Native ways of life in interactions with non-Natives. However, the tradition of resiliency of Native communities in interactions with non-Natives also gave this event a different meaning. The response to the EVOS became a further validation of the strength of Native culture and its ability to adapt to traumatic circumstances and survive. As others have argued, Native culture is adapted to responding to harsh and changing environmental conditions (cf. Wooley

1995). The EVOS was interpreted as another example of the ability of a people to survive a trauma to essential institutions in their way of life.

Within both Native and non-Native communities, research developed only selected elements of culture. In Native communities the focus was on subsistence. Other elements that were potentially important for assessing community-event interaction were not as well developed. There were also important differences in what other elements of culture were developed. For example, Jorgensen (1995b) developed some "traditional ecological knowledge" for both Natives and non-Natives, but cultural propositions about relationships among resources and ecological processes are not developed in the literature. Within Native communities, research focused on specific aspects of subsistence practices and this provides essential and important data (cf. ADF&G 1995). However, the cultural meanings of many practices and their connections with other aspects of social organization are not well developed. Within non-Native communities, research focused primarily on the instrumental and economic connections without fully developing the interactions and interdependencies of culture with other social institutions. That is, it seems that culture as a variable is applied to understanding Native society but only incidentally applied to non-Native society.

In non-Native communities, the culture of independence and competition within fishing communities interacted with Exxon/VECO's bureaucratic culture to create frustration, confusion, and hostility regarding oil spill cleanup employment. Expectations and values about fairness, equity, and rewards for expertise and hard work were violated by how cleanup employment was allocated.

5.1.2 Differences in Organizational and Community Culture Complicated Response Efforts

Culture was also a factor in interactions among Exxon, government agencies, and communities. The "organization and corporate culture" of Exxon and government agencies resulted in different understandings and meanings about the event than the understandings and meanings of "community culture." These cultural differences created misunderstandings, hostility, mistrust, and in some instances inefficient response efforts. Native communities and smaller non-Native communities had particular difficulties interacting with the bureaucratic cultures of Exxon/VECO and government agencies. The interactions of both Native and non-Native cultures with Exxon bureaucratic culture exemplify "cross-cultural" differences in values, style, and expectations that resulted in frustrations, conflicts, and social disruptions. The effects were to complicate the response to the EVOS and for communities to question the effectiveness and sincerity of the response effort.

5.1.3 Values About Place and Natural Resources Contributed to How Communities Perceived and Experienced Impacts

Within Native communities there are spiritual, cultural, social, intrinsic, as well as instrumental values about natural resources. These multiple values construct a complex relationship between natural resources and Native communities. Damages to valued resources contributed to an alienation of Natives from their relationship with valued resource. This alienation had individual and communal consequences, resulting in social disruption of social bonds that reinforce community integration. Outside agencies and Exxon/VECO did not appear to understand the multiple values and their meanings for Native communities. These misunderstandings created different assessments of the significance and meaning of contaminated resources. For example, Exxon's replacement of subsistence salmon with canned salmon addressed the economic value of salmon in Native economies, but it did not address the cultural meanings of harvesting, processing, and sharing subsistence salmon.

Within non-Native communities natural resources tend to have important instrumental values. There are also important aesthetic and spiritual values about natural resources, but the instrumental values appear to

be more salient. These spiritual, aesthetic, and other non-instrumental values were not well developed in research among non-Natives. However, these values appear to have affected changes in the sense of place and the "enjoyment" that individuals and communities derived from an environment they perceived to be generally removed from the threats of industrial society. Damage to natural resources (e.g., shorelines, otters, sea birds, marine mammals) from the EVOS was also alienating for those who invest instrumental and spiritual or aesthetic value to these resources.

Values about home, traditions, and place were important contributors to how the event was perceived and assessed. These values were investigated more in Native than non-Native communities, but they appear to be important for understanding impacts for all communities. Native attachments to place are such that relocating because of the spill is not an option. Native values about home express and continuity between place, natural resources, and communal identity. Damage to place damages those relationships. Among non-Natives the value of home and place has a core instrumental value, but the spiritual values about place also make it meaningful. Damage to the natural resources that are valued results in an alienation of individuals from these values and changes, however temporarily, the experience of place.

The diverse values, beliefs, and types of cultures involved in the event virtually assured that there would be misunderstandings based on cross-cultural and intra-cultural differences. These misunderstandings included issues regarding the identification of threats and risks, the assessment of damage and recovery, and acceptable actions in organizing and implementing response efforts. Attachments to place among Natives and non-Natives motivated actions to protect their home and environment. Bureaucratic responses in the privatized cleanup did not address the motivations of those exposed to the spill to protect their community and lifestyle. This alienated individuals from the cleanup process and resulted in distrust and dissatisfaction with the cleanup effort.

Research is parse about natural resource values and the sense of place and its relationship to motivations to live certain lifestyles in Alaskan communities. These data are noticeably underdeveloped in the EVOS literature, although the topic appears to have significant importance for understanding culturally based reactions to events such as the EVOS.

5.1.4 Community/Traditional Ecological Knowledge Implied Different Outcomes Than Those Assessed by Government and Exxon

Traditional ecological knowledge among Natives and non-Natives was important in how the event was defined, perceived, and recovery potential assessed. However, responding agencies generally ignored this knowledge. This practice resulted in misunderstandings about the threats, risks, and processes for recovery between affected communities and responding agencies. Natives perceived potential threats where outside agencies perceived no threat existed. Non-Natives expressed uncertainty about the future of the ecosystems upon which their lifestyle depends, but expert opinions were conflicting about both short- and long-term effects. Traditional knowledge became an important basis for understanding the environmental effects of the EVOS.

Within Native communities, traditional knowledge about the environment was essential to Native interpretations of the short- and long-term effects of oil contamination. Assessments of natural resource populations and their availability for harvest after the spill was determined by traditional knowledge. Similarly, assessments of food safety were informed by traditional knowledge.

5.1.5 Traditional and "Expert" Cultural Constructs Determined Explanations of the Environmental and Health Effects of the EVOS

Native traditional knowledge and practices were not always consistent with expert opinion about environmental or health effects of the EVOS. Resource contamination was not within the usual experience of Natives. Traditional knowledge about its effects appears to be limited, but Natives used cultural knowledge and experience to assess environmental and health effects of contaminated resources. Expert opinions also formulated assessments of these effects. These two different types of explanations and assessments of implications sometimes conflicted and resulted in misunderstandings and miscommunication about EVOS effects.

5.1.6 Culture Was Not "Lost" or "Damaged"

Some literature regarding the effects of the EVOS on Alaskan communities presents the EVOS as resulting in culture "loss" or "damage" (cf. Braund & Associated and Usher 1993). Jorgensen (1995a) has criticized this characterization as incorrect. Characterizations of culture as "lost" or "damaged" are logically incorrect. However, the underlying data that inform these characterizations describe the disruption of connections between individual experience, cultural values and beliefs, social interactions, and social expectations. These are significant disruptions, even if only temporary. When viewed in historical and social context, such disruptions can result in a range of social, psychological, and cultural effects. The effects should not be overlooked in critiques of the logic of the characterization of culture and "lost" or "damaged." Care should be used when operationalizing the concept of culture and reifying the concept is logically incorrect.

5.1.7 "Culture" is a Better Explanation of Different Responses to the EVOS than Either Ethnicity or Class

Some social scientists involved in the litigation of Native claims against Exxon suggest that class and ethnicity better describe differences between Natives and non-Natives than does culture (1995a). However, Jorgensen (1995a) presents data that refutes this claim. Cultural differences between Natives and non-Natives in Alaska describe some of the most salient differences in impacts to communities. The meaning of subsistence practices for Natives illustrates how culture distinguishes the effects of the EVOS on Native and non-Native communities.

5.1.8 Archaeological and Historical Resources Were Vulnerable to Loss or Damage

Bittner (1996) presents data that show archaeological and historical resources were damaged during the cleanup. Cleanup crews and others sometimes looted sites and other sites were damaged as a result of cleanup actions. Natives were especially upset by the damages and looting of these sites (cf. IAI 1990d; Endter-Wada et al 1993; Davidson 1990).

5.1.9 Demands on Community Culture

The following are the demand conditions that exist for community culture:

- Identify any "cultures" involved among the parties affected by the event.

- Explain What Happened. When an unusual or novel event such as a technological disaster occurs, a primary demand on culture is to explain the causes, course, and resolution of an event. Therefore we can argue that a significant demand condition is to identify the explanations of what happened and why.

- Assess the risks and threats posed by the event. Culture assists in the formulation of propositions about what is risky and the degree of risk that exists and culture also influences the

assessment of the threat posed by the risks. This is a well-documented characteristic of risk assessment. However, culturally determined community based risk assessments may conflict with risk and threat assessments posed by government or other entities. An important demand condition is to identify the different assessments of risk and threat.

- Adapting to the uncertainty of the effects of oil contamination for the environment, communities, and individual lifestyles. Technological disasters are often characterized by uncertainty regarding the effects of toxic substances on environments and human health. These conditions place demands on culture for responding to uncertainty about these effects. Cultural propositions can be more or less adapted to resolving this uncertainty. This demand condition addresses the tolerance and adaptive capacity for uncertainty about event effects and outcomes.

- Resolve different values about resources and their contamination. Values about natural resources are likely to be culturally determined. Events such as the EVOS create demands to identify the types of values placed on resources by different parties and the effects on values of resource contamination.

- Communicate across cultures about the event and its effects. Culturally based assumptions, values, explanations, and assessments of an event and its effects are likely to differ across cultures and within cultures. This creates a demand condition to effectively communicate across these cultures about the event and its effects.

5.1.10 Recommendations Regarding Culture

- Develop a sociocultural profile of at-risk communities. This profile should identify the cultures and ethnic groups within communities and the major styles of adaptation and connections of individuals and groups to natural resources.

- Develop traditional knowledge about community relationships with natural resources. All communities have traditional or local knowledge about natural resources. Information about traditional knowledge can assist in assessing which resources are important to communities and how these resources are connected to community ways of life.

- Identify key values and belief systems about natural resources and their place in local culture. A value profile can assist in determining the place of particular resources in the value system of community residents. This can assist in assessing and interpreting responses to resource contamination.

- Develop knowledge and propositions about local "space and place" including places of historic, cultural, and archaeological significance. A "cultural map" of local spaces helps to determine the "cultural boundaries" of communities as well as their geographic boundaries. That is, community cultural space may be different that community geographic space. Similarly, identification of special places and important cultural resources within community space and place can assist in organizing and prioritizing response efforts.

- Identify local assessments of risk to natural resources and community culture. Communities and specific cultural groups usually develop culturally influenced assessments of risk associated with contamination events. These community-based risk assessments are often different than those of other participants in an event (e.g., government or in the case of the EVOS). Knowledge of locally based risk assessments can assist in developing culturally-sensitive risk communication and other information programs.

- Develop a process for cross-cultural communication with affected groups, including the identification of a "culture broker" who can intervene to facilitate resolution of cross-cultural or intra-cultural communication issues.

- Develop culturally-sensitive plans for assistance to Native communities, including acknowledging traditional political structures and cultural beliefs. These plans should include intervention programs for psychosocial issues.

- Develop culturally-sensitive plans for risk communication about contaminated resources or other threats posed by an oil spill event.

- Develop plans and procedures to protect important archaeological and historical resources.

5.2 LESSONS LEARNED: SUBSISTENCE

Subsistence is a term with multiple meanings. It can be used to describe the activities of harvesting wild foods. It can also refer to food preferences, dietary habits, and the economic and social importance of these types of foods. It can also be used to identify culturally significant beliefs and values about wild foods and their use. These topic areas can be applied to both Native and non-Native Alaskan communities (cf. Jorgensen 1995b). We use a narrow definition of subsistence as a social factor to focus on how specific practices and cultural values of Alaskan Native communities were affected by the EVOS. For our purposes subsistence expresses the traditions, values, and beliefs of Native Alaskans about relationships of humans and natural resources that affect the socially organized activities of harvesting, processing, and sharing of those resources among kinsmen, neighbors, and others. As an element of Native culture, subsistence activities, traditions, values, and beliefs have multiple linkages to other social and cultural institutions such as social organization and religion.

5.2.1 Native and Non-Native patterns of subsistence are different in Alaskan communities

Subsistence is more than a marker of ethnic differences; it reflects different values, behaviors, beliefs, and connections with the natural and social worlds of individuals and communities. This focus on Native subsistence practices and the EVOS does not mean that subsistence is not an element of non-Native culture. Nor does it imply that subsistence activities among non-Natives were unaffected by the EVOS. Rather, subsistence is a significant aspect of Native communities in a way that it is not in non-Native communities and thus it warrants attention as a social factor because of its place in Native social and cultural life. Difference is subsistence among Natives and non-Natives are more than ones of degree. Natives and non-Natives take and share subsistence resources. Further, Natives and non-Natives teach their children values and traditions through hunting, fishing, and gathering activities. However, it is more than the degree of differences in these activities that warrants a focus on only Native subsistence. The meaning of subsistence and the connections of this institution to other aspects of community life are importantly different in Native and non-Native communities (cf. Jorgensen 1995b).

Some specific differences in subsistence activities are as follows:

- Subsistence hunting, fishing, and gathering occurs within a "nexus" (Jorgensen 1995b:33) of other social and cultural activities such as sharing, visiting, and communal processing that distinguish it as different from the "sport" tradition that occurs in non-Native communities.

- Wild foods are a more significant part of Native diets.
- Natives share resources with a wider range of persons within their social networks.
- Sharing links kinsmen, neighbors, and villages in a pattern of reciprocity that does not show the same pattern among non-Natives.
- The items shared are more varied among Natives than non-Natives (Jorgensen 1995b:33-38).

5.2.2 Subsistence as an institution in Native communities has multiple overlapping connections with other cultural, social, and economic institutions

Subsistence has economic, cultural, and social importance. Subsistence embodies the traditions of Native culture. It emphasizes values about natural resources and the connections between these values and Native ways of life. Subsistence harvesting, processing, sharing, and consumption entail communal activities that reinforce social bonds and express Native social values. Subsistence also has economic significance for villagers because these resources are an important food source. Natives and non-Natives assessments of their relationship to the environment also indicates the multiple values and connections of Native subsistence to other social values and knowledge. For example, some of the differences between Natives and non-Natives are as follows:

- Natives have a wider range of knowledge about natural resources and their interconnections.
- Knowledge about the environment is organized differently, it has different symbolic meanings, and there are differences in the perceptions of man's place in the environment.
- The environment possesses an intrinsic spiritual value for Natives beyond its instrumental and economic value.
- Intrinsic spiritual value of the environment is also connected to the communal ethics of social life in Native communities.
- Among Natives, resource sharing has a different ethic and set of responsibilities that extend beyond the nuclear family to friends, neighbors, elders, and other significant statuses within a community (Jorgensen 1995b: 25-32).

5.2.3 The Contamination of Natural Resources Disrupts the Pattern of Subsistence in Native Communities

Shellfish, invertebrates, marine mammals, plants, and other subsistence resources were directly oiled by the EVOS. Other resources such as deer and bear were observed eating oiled resources such as kelp (cf. IAI 1990d; Fall and Field 1996; ADF&G 1995).

Oil spilled from the *Exxon Valdez* disrupted the pattern of harvesting, the types and amounts of resources used, participation in hunting and fishing, and the sharing of subsistence resources (Fall and Field 1996: 823).

- Subsistence harvests declined in all ten study communities (Chenega Bay, Tatitlek, Nanwalek, Port Graham, Akhiok, Karluk, Larsen Bay, Old Harbor, Ouzinkie, Port Lions) compared to pre-spill years. The most substantial declines occurred in those communities most

exposed to the oil spill (e.g., Chenega Bay, Tatitle, Nanwalek, Port Graham, Ouzinkie, Karluk) and these declines were in all resources categories except wild plants (Fall and Field 1996:823-824).

- Households used a more narrow range of resources post-spill. Fall and Field present data that indicate for almost all 10 Native communities the average number of resources used declined substantially. Again, those communities most exposed to the EVOS showed the greatest changes in resources used (Fall and Field 1996:824).

- Households in communities most exposed to the spill showed the most declines in time spent hunting and fishing (Fall and Field 1996: 825).

- Sharing of resources declined in comparison to post-spill years (Fall and Field 1996:826).

- During the first two years post-spill, Natives attributed these changes to various sources including: concerns about resource contamination from the EVOS; participation in the cleanup; and, perceived reduction in resources and, hence, decreased opportunities take resources (Fall and Field 1996:826-827).

- Post-Spill, patterns of resource use shifted toward more fish and fewer marine and land mammals. This represents an adaptation to the contamination fears and assessments of reduced availability of preferred resources (ADF&G 1995).

- The culturally influenced preferences and satisfactions derived from consuming subsistence foods (Braund & Associates and Usher 1993:91).

- The spiritual connections Natives have to natural resources (Braund & Associates and Usher 1993:91).

- Cooperative hunting, fishing, and gathering reinforces social bonds among community members (Braund & Associates and Usher 1993:91).

- The expression of autonomy results from participating in subsistence as a lifestyle (Braund & Associates and Usher 1993:91).

5.2.4 Disruption of Subsistence Raises Concerns about the Effects on Transmission of Cultural Knowledge to Children

In almost all Native communities at various points in time concerns were expressed that the EVOS would interrupt the transmission of cultural knowledge about subsistence to children (cf. IAI 1990c; Braund & Associates and Usher 1993; Dyer, Gill, and Picou 1992; Russell et al. 1996; ADF&G 1995; Fall and Field 1996; Jorgensen 1995b). The transmission of cultural knowledge about subsistence is in part a significant symbolic expression of the survival of Native way's of life and cultural traditions (cf. Braund & Associates and Usher 1993: 49-51).

There is an apparent contradiction in this "lesson learned" with the argument presented in section 5.1.1 regarding the resiliency of Native culture and other arguments by Wooley (1995) about the same topic. How could an event such as the EVOS that temporarily disrupts subsistence practices threaten centuries old subsistence traditions? These concerns were expressed by Natives and reported in the research about the effects of the EVOS. In part these findings are related to the early phases of the oil spill when social disruption of all community life and uncertainty existed about the long-term effects on natural resources.

We interpret these findings and this "lesson learned" as an expression in symbolic terms of the alienation people experienced about their identity and their relationship with their community. That is, transmission of subsistence knowledge is itself symbolic of the continuation of Native culture. The disruption of cultural transmission symbolized past threats and future potential loss of their cultural identity. This resulted in feelings of alienation from their own identity and Natives and the potential of passing this identity on to their children. The expression of this concern thus indicates the fears and anxiety that accompany the alienation of Native communities from the experience and transmission of cultural practices and beliefs.

5.2.5 Contamination of Resources Created Unfamiliar Conditions for Subsistence Hunters and Fishers

ADF&G (1995), Fall and Field (1996) and Braund & Associates and Usher (1993) each describe the undermining of traditional knowledge that resulted from the contamination of subsistence resources. Fall and Field (1996:827) suggest that the contamination of resources created an unfamiliar situation for Natives. The usual skills and knowledge that apply to assessing resources did not apply for the contaminated resources and the result was uncertainty. This resulted in extreme caution about the harvesting and especially the consumption of potentially contaminated subsistence resources. The overall effect was to undermine Native's trust in their traditional knowledge about their environment. Braund & Associates and Usher (1993:73-75) argue that nothing in past Native experience or traditions prepared them for the contamination of subsistence resources. Reliance on experts outside their community for advice about contaminated resources was unsatisfactory, in part because this information was often contradictory or the results of their work was otherwise questionable. The experience of turning of outside experts for information about an intimate part of their own traditional knowledge had the effect of calling into question traditional knowledge (Braund & Associates and Usher 1993:75).

The lesson that emerges from these types of findings is that Native communities as well as most non-Native communities have limited experience and traditional knowledge about resource contamination event. This is one of the characteristics of the "new species of trouble" about which Erikson (1991) writes: communities are unsure about the nature of these types of events and their effects. Moreover, there is often limited cultural knowledge about the effects of toxic substances. Consequently, it is often adaptive to turn to "expert" knowledge when other traditional knowledge is limited. However, in the case of the EVOS expert knowledge was questionable because it was perceived to be: (1) biased; (2) contradictory among different experts; and (3) it contradicted common sense experience and caution among Natives about consuming tainted, deformed, or otherwise questionable resources. If traditional knowledge is not applicable to contamination events and expert opinion is for various reasons not believable or untrustworthy, then a rational response seems to be the caution that then developed in Native communities about consumption of wild resources. As Fall and Field report,

> … the oil spill had created conditions that were completely unfamiliar to the hunters and fishers of these villages. Their skills in understanding their environment and making informed decisions had been undermined. Consequently, subsistence harvesters acted in a culturally appropriate manner, with caution. In many cases, they refrained from harvesting or using traditional foods for fear that the resources had been poisoned (Fall and Field 1996:827).

The context of this caution – questionable expert opinion – indicates adaptative behavior within Native communities. However, this also established the conditions for conflicts between traditional knowledge and expert advice about responses to contamination conditions. Native cultural propositions about the contamination of subsistence resources were formed. These were based on traditional knowledge and informed by the uncertainty and caution. There are direct implications for risk communication and the

assessment of food safety that we discuss in more detail in Section 5.2.8 regarding the assessments of the health effects of consuming subsistence resources.

5.2.6 Cultural Imperatives Exist for Consumption of Wild Foods in Native Diets

Several studies (e.g., ADF&G 1995; Fall and Field 1996; Braund & Associates and Usher 1993; and IAI 1990c) indicate that Natives have strong desires and preferences to consume wild foods. Study participants sometime speak of "cravings" and "desires" for "Native foods." For example, " . . . When you're used to eating those foods and you go without them, your body just *craves* them" (Reynolds 1993: 215). And, "Food from the land is like medicine to me . . . I crave it so much it affects my health. So, whenever I can get a piece of *real* meat it is like medicine" (Braund & Associates and Usher 1993:43). There is also a strong belief that these foods confer health benefits that purchased foods do not (IAI 1990d; ADF&G 1995; Reynolds 1993). It is also likely that the shift away from marine mammals and some shellfish and toward more fish in some subsistence diets means that valued foods such as seal and clams were less prevalent than before the spill (cf. Fall and Field 1996; ADF&G 1995). It also suggests that where these foods remain a part of Native diets, there may be a lingering uncertainty about the long-term health effects of eating foods that traditional beliefs suggest are beneficial.

The "cravings" or "desires" to eat subsistence foods are culturally motivated. By "culturally motivated" we mean that the cultural preferences for wild foods and the social experiences of individuals and groups around the harvesting, sharing, and consumption of these foods results in personal motivations to desire or crave these foods. These are thus culturally motivated "cravings" that express cultural imperatives in Native village life. The more "traditional" a person the more likely he or she is to exhibit such cravings.

Where these types of culturally motivated dietary preferences exist, canned salmon cannot replace the cultural meanings associated with subsistence salmon. That is, canned salmon may fulfill the caloric needs of Natives but it does not fulfill the culturally motivated craving that Natives describe when discussing wild foods. Those types of foods have a cultural meaning that cannot be replaced by non-subsistence resources. The food and economic value may be replaced, but the cultural value resides in similar wild foods.

These dietary issues are important because they express the further alienation of Natives from the individual and communal aspects of their cultural values, beliefs, and traditions. Not every person experienced these culturally motivated cravings and desires for wild foods, but the reports in the literature indicate that these are important issues within Native communities. The absence of particular subsistence foods because of the EVOS contributed to the alienation experienced by Natives because they either could not have or were ambivalent about consuming wild foods. Where Native foods could not be obtained, people experienced a sense of estrangement from cultural motivations for those foods. Where these foods were available, but there were concerns about contamination, then the "cravings" motivated consumption of these resources despite concerns about their possible adverse health effects. The interaction of cultural motivations and concerns about contamination resulted in ambivalence; and, this ambivalence also resulted in estrangement from a valued aspect of Native ways of life.

5.2.7 The Contamination of Subsistence Resources Results in Concerns about Food Safety

Several sources investing Native responses to the EVOS report concerns among Natives regarding food safety (Fall and Field 1996; ADF&G 1995; Jorgensen 1995b; Braund & Associates and Usher 1993; Russell et al. 1996; IAI 1990d). Partially in response to Native concerns regarding the short and long-term health effects of resource contamination, the Alaska Oil Spill Health Task Force was formed. The Oil Spill Health Task Force conducted sampling and assessment to determine the contamination of

resources and then to formulate risk communications to Native communities about findings. Task Force risk assessments were different than those of Native communities: the Oil Spill Health Task Force work indicated low risks associated with food safety whereas Natives felt as if any level of contamination was unsafe (Fall and Field 1996:830-831). While it may be too strong to suggest that villagers scoffed at the organoleptic test – if it does not look, smell, or taste contaminated, then it probably is not – Natives did express skepticism about food safety. Indeed, uncertainty about food safety was pervasive in many communities where there was direct oiling of resources. For example, a Larsen Bay Native on Kodiak Island observed:

> There's never been anything else that happened around here to cause the salmon or seafood not to be eaten. There's no substitute for salmon. The fear is always going to be in people's minds. There is so much uncertainty as to what it (oil) can and can't do (Braund & Associates and Usher 1993: 73).

This same sentiment is reported in other research (Reynolds 1993; Palinkas et al. 1993; ADF&G 1995; IAI 1990d).

Although subsistence harvests show steady increases in most communities in years after the EVOS (Fall and Field 1996: 835) there continues to be concern about food safety, regardless of expert opinions and assurances by the Alaska Oil Spill Health Task Force. These concerns are phenomena similar to fears about the health effects of toxic contamination in other technological disasters (Erikson 1994). They also express the cultural imperative in Native communities regarding consumption of subsistence foods: despite contamination concerns, Natives will consume traditional foods because of the culturally motivated desires for these foods. Higher levels of consumption do not necessarily imply a decline in food safety concern.

5.2.8 Damage to Subsistence Resources Results in Economic Costs to Native Communities

Research by ADF&G (1995) suggests that there are certain increases in costs for the taking of subsistence resources in some Native communities. To take valued species that have reduced populations, Natives have expended extra gas and incurred other costs to travel to locations where these resources existed. In other instances Natives purchased foods to replace subsistence foods (cf. IAI 1990c). To some extent these economic costs were mitigated by cleanup employment. However, in the years after spill employment ended, increased travel costs and increased effort to harvest substitute resources has resulted in extra costs.

5.2.9 EVOS Damages to Subsistence Resources Alienated Natives From Connections with other Social, Cultural, and Psychological Elements of Native Life

The cumulative effects of the disruption of the social and cultural institutions of Native communities had adverse consequences for Native communities. From the most basic biological concerns about diet to the complex nexus of social activities and cultural beliefs that are part of harvesting, processing, and sharing subsistence resources, Natives experienced the disruption of subsistence as a threat to their ways of life. The effect was to alienate individuals from their cultural identity, from key social practices and interactions, spiritual and other values about natural resources, and traditional knowledge about the biophysical environment. This notion of alienation can be applied to explaining the meaning of EVOS effects on subsistence in Native communities.

For our purposes, alienation is about the disruption of connections between individual, social, and cultural elements of community life. Social life is in part made meaningful and valid by the experience of continuity between individual experience, social activity and institutions, and cultural values and beliefs.

That is, the conditions for individual well-being exist when individuals are motivated to engage in social activities and participate in social institutions that are supported by cultural values, belief, and knowledge. This, in part, explains how we function as social beings. Our psychological life is related to its social and cultural setting. Disruption of this continuity can cause alienation and the experience of being disconnected from essential aspects of psychological and social life. When the oil spill fouled subsistence resources and reduced subsistence activities and the social activities associated with it, then individuals became alienated from an activity that is the core of Native identity. Participation in the visiting and sharing associated with the distribution of subsistence resources also was diminished as was the socialization of children that occurs during subsistence harvesting. The result is that individuals and families became disconnected from key social activities that usually promote community integration and the continuity of individual and community identity. Furthermore, individuals also experienced alienation from the very items that have immense cultural value, the natural resources they harvest and incorporate into their daily lives. The result is a type of alienation that itself predisposes individuals and their social groups to adverse psychological impacts (Mirowsky and Ross 1986; Davidson and Baum 1991). Shkilnyk, in reporting on the effects of Mercury poisoning in an Ojibawa community, makes an observation that is relevant to interpreting the effects of alienation among Native Alaskan communities exposed to the EVOS:

> . . . one can find the symptoms of psychic trauma whenever people feel abandoned, separated from the life around them, or unable to contribute anything of value to the rest of the community; when they are forced to grapple with conditions over which they have no control; when cultural orientations that they have been brought up with no longer serve to interpret reality; when habitual actions no longer have the same meaning or effect; when psychological cues no longer serve to guide experience; and when social and moral values are rendered impotent in organizing work or sustaining human relationships. All incentives to maintain cultural precepts, values, and beliefs is lost if these things no longer work to structure reality (Shkilnyk 1985: 233).

Not all these conditions apply to Alaskan Natives and the EVOS, but many do. The analytical point we wish to make is that one significant effect of the disruption of subsistence was the alienation of individuals from their culture and its social context.

Jorgensen argues that the effects of subsistence disruption and other effects of the EVOS on Native communities is "relative deprivation" (Jorgensen 1995a:7-8). He describes this as follows "… a negative discrepancy between legitimate expectation and actuality" (1995a:8). He goes on to argue:

> If culturally defined expectations were negatively affected by the spill, personal responses of grief, dismay, anger, dysphoria, and the like are not only evidence of deprivation but effects of deprivation. Expectations are, to a considerable degree, culturally established. People suffer when their cultural expectations are not met (1995:8).

Our purpose here is not to resolve the theoretical differences between "alienation" and "relative deprivation." These two concepts each describe aspects of experiences of persons in the literature about EVOS social effects. Alienation focuses on the connections and experiences among individual psychological experiences, communal social life, and cultural values and beliefs. Relative deprivation focuses on how the EVOS resulted in a difference between expectations and experience. Each of these is a useful approach to consideration of the meaning of the EVOS for Native communities.

Native culture will persist. Subsistence participation is increasing. Preferred resources are being sought out, harvested, processed, and shared, just as they have been for centuries. Yet, a return to pre-spill levels

of subsistence activities does not negate the damage incurred, just as the persistence of Native villages today does not negate past injustices and encroachments on Native culture. Natives continue to tell stories about being punished for engaging in the essence of their culture, speaking their language (Reynolds 1993). The encroachment on Native culture from the EVOS is also likely to be incorporated as yet one more assault in an attempt to put the last nail in the coffin for Native Alaskan culture. Native culture is resilient. It has survived and communities are working through the effects of the EVOS. Nonetheless, it is our interpretation that within the context of Native Alaskan history, the EVOS represents an alienation of life experiences that had adverse consequences for individual and communal life.

5.2.10 Subsistence: Demand Conditions

The demand conditions for subsistence are relatively straightforward:

- Traditional knowledge needs to be used to interpret the causes, course, and consequences of resource contamination, including environmental and health effects.

- Traditional knowledge should interpret the relationship between contamination and resources used for subsistence.

- Resources need to be substituted for those damaged.

- Reinforcement of social bonds normally resulting from subsistence practices (e.g., visiting and sharing).

- to changed resource availability and changes in participation in subsistence activities such as harvesting, processing, and sharing.

- Resolution of conflicting needs to refrain from consuming contaminated resources and dietary preferences, values, and needs about the consumption of those resources.

5.2.11 Subsistence: Recommendations

- Native communities should be supported in identifying the contamination of resources and the safety of those resources. This should include participation of community members in risk assessment and risk communication efforts.

- A community based risk assessments and their similarities and differences with probabilistic risk assessments should be acknowledged and developed. Develop communication procedures to resolve differences and answer questions regarding differences in risk assessment.

- The inter-regional and inter-village sharing of resources for those deprived by technological disasters should be supported.

- Resources that meet economic and cultural needs of affected communities should be provided.

- Ceremonies, rituals, or other culturally appropriate expressions that address the grief, anger, frustration, and other emotions that result from damage to natural resources should be promoted. These same cultural activities can promote communal feelings in a time of loosened social bonds.

- Specific plans to address the subsistence food needs of "at-risk" populations such as youth, elderly, disabled, and the sick should be developed.

- Culturally-sensitive risk-communication programs that involve community members should be developed, implemented, and monitored.

5.3 LESSONS LEARNED: SOCIAL ORGANIZATION

The concept of "social organization" refers to the social components of a community and their interconnections. This includes demographic, political, economic, religious, and other formal social institutions as well as less formal ones such as kinship and friendship networks, as well as voluntary organizations. The literature about the EVOS discusses several elements of community social organization, but by no means are all elements of social organizations analyzed, nor are all of the issues raised treated equally or even thoroughly. Nonetheless, there are some significant issues discussed that illustrate how the social structures and processes within these communities influenced how the oil spill and cleanup resulted in certain types of impacts or the mitigation of overall effects of the oil spill.

Again, one of the striking issues regarding social organization is the relatively limited range and the depth accorded any one element in the literature. The issues that received the most attention and which have "lessons learned" implications can be grouped into several categories: governance/leadership; response organizations; communication; social status, social bonds and community interactions; and emergent groups. We discuss each of these below. However, the overriding "lesson learned" that emerges from these collective points is that social organization is disrupted by these types of events; and, more disruption occurred than was necessary because of how the cleanup was implemented. Social disruption is itself a source stress, which we discuss in Section 5.4, and it also has implications for implementing effective responses to events which threaten communities. It is obvious that social disruption should be minimized in these types of events. Yet, what emerges from the literature is that even examining a relatively narrow set of variables shows pervasive social disruption resulting from the EVOS (cf. Russell et al. 1996; Picou and Gill 1997; Dyer, Gill, and Picou 1992). The individual "lessons learned" discussed below aggregate into the wider issue of significant social disruption occurred in the social organization of Alaskan communities as a result of the EVOS and cleanup.

5.3.1 The Political Structure of Communities Provided Different Resources for Community Response to the EVOS

Political structure and organization affected community response to the EVOS. Communities in boroughs had more resources than lone municipalities. Native Organizations such as the North Pacific Rim and the Kodiak Area Native Association were resources for villages, but these resources were generally less than those provided by boroughs. Differences in community political structure and the relationship of response efforts to the political structures in communities resulted in misunderstandings by government agencies and Exxon about the locus of authority and responsibility in some communities. However, those communities that could muster help through overarching political structures such as a borough or regional Native organization had more resources to aid their community. For example, Seward and other Kenai Peninsula Borough communities had limited municipal budgets for response efforts. However, monies had to be spent in response efforts, but the borough provided reimbursements and other fiscal help to offset municipal expenditures. In communities such as Cordova where there was no borough or other overarching political structure, expenditures came out of city reserves. The only recourse was to seek reimbursement from Exxon.

5.3.2 The Disruption of Governance and Municipal Functions by

the EVOS Cleanup had Adverse Effects on Communities

Several sources suggest that disruption of municipal functions was widespread in communities affected by the EVOS (e.g., McClintock 1989; IAI 1990d; Reynolds, 1993; Russell et al. 1996; Picou and Gill 1997). In Native communities the staff of entire municipal governments was hired by VECO for cleanup work. In some non-Native communities, municipal employees also left to take cleanup work, while in other communities, seasonal employees or part-time staff were unavailable because they also took cleanup work. These staffing issues undermined the ability of municipalities to govern and to deliver municipal services. In larger communities such as Valdez, Kodiak, Seward, and Homer, the regular business of government was taken over by oil spill response activities (e.g., McClintock 1989; IAI 1990d). Projects were delayed, grants not completed, and other usual business of local government was interrupted. In some communities such as Kenai and Seward and to some degree Homer and Kodiak, there was less disruption because borough government provided extra resources for municipalities. In most communities the delivery of municipal services was disrupted and this was more so in those communities most affected by the EVOS. The table below – taken from data collected for the Oiled Mayors Study (IAI 1990d) – shows community perceptions of disruptions of service delivery by exposure status. The over-riding "lesson learned" here is that in all municipalities and especially in Native communities, governance functions were disrupted by the EVOS.

Percentage of Household Survey Respondents Reporting Declines in Community Services by Exposure Status, Oiled Mayors Study Data, 1990

	Exposure Status		
Government Service	not exposed	low exposed	high exposed
schools	4.2	7.9	15.0***
water	6.8	8.6	15.9**
sewer	3.5	5.3	9.8*
solid waste	13.5	24.3	37.0***
utilities	5.7	9.0	12.9*
roads	24.2	41.7	42.1***
airports	6.3	14.2	30.0***
parks	9.8	19.8	25.5***
health	7.7	12.7	18.9***
emergency medical services	1.9	6.0	9.9***
child care	13.0	26.6	33.0***
social services	7.7	9.2	24.0***
mental health	7.7	10.4	23.5***
alcohol counseling	6.6	12.4	27.2***
fire	1.4	1.8	6.3**
police	7.0	13.5	28.9***

x^2 test for trend * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

5.3.3 Leaders Were Essential to Effective Community Response to the EVOS, but They were Often Exhausted by the Demands of EVOS Response Efforts

Communities in boroughs generally had more leadership resources than lone municipalities or Native villages. Leadership resources in villages often took cleanup employment resulting in diminished availability of community leaders.

In Cordova – where there is no borough – municipal officials as well as the local fisherman's union (Cordova District Fishermen United) were each essential leadership resources.

Leaders in communities with limited leadership resources became over-loaded by the demands of response efforts. Regardless of if they were formal or informal leaders, there were a range of demands on leadership resources including: organizing response efforts to protect against direct oiling or to protect critical habitats; consulting with state and federal government entities in developing these response efforts; consulting with Exxon, VECO, and other private entities regarding implementing emergency response efforts; negotiating with Exxon representatives regarding reimbursements for community response activities; communicating with Exxon regarding administrative procedures in developing response efforts and seeking reimbursements; responding to local, national, and international media inquiries about the oil spill; responding to citizen inquiries about the course, possible consequences, and other related aspects of the spill; participating in community information programs regarding the course, progress, consequences, and related aspects of the effects of the oil spill; and, other such spill-related activities.

These activities were often done in conjunction with or in place of the regular duties of these officials. In fact, municipal officials interviewed for the Oiled Mayors Study reported that such spill-response activities consumed extraordinary time and energy that compromised the functioning of local government. For example, a Seward municipal official (Port Director) observed, "That was a key impact for us, putting everything else to the side for the entire year. The budgets, the cycles, the initiatives we had going, using the energy, the energy we needed. This same official elaborated on the range of consequences for how different leadership positions within the Seward City government were affected:

> What happens in the operations of local government once the oil spill happened, it shut down. Non-essential services uh, and all available excess if there was any, we run a tight ship was redirected to EOC [Emergency Operations Committee] and redirected to the oil spill. It basically came to a halt. "Was the normal process of the government operations the same"? No, every individual changed, every individual spent a good deal of time updating themselves as to where this thing was and the possibility of them having a big role or lessor role. Were there specific processes that were disrupted, yes, in many projects. The people flow and information flow was very much disrupted, the mayor took on a big role with the public relations and the media. He was our chief media contact, but the number of people coming in, in addition to dealing with the crisis, the number of on lookers coming in and ranking people coming in flying in from all over the world, because if they weren't dealt with then they create situations in and of themselves. Created this also, where the particular individuals whose functions of local government were especially effecting the EOC guys and the fire chief and myself, the harbor master, (the City Manager) and head of finance were there services that affected everybody. Since there were services and functions that were developed that did not exist before. I think the only one that didn't really exists was logistics and I have a great deal of background in that so I felt comfortable dealing with it. I can handle air freight from anywhere (Oiled Mayors Study Interview With Port Director: City of Seward).

Other interviews conducted for the Oiled Mayors Study and interviews conducted with municipal personnel in Seward, Cordova, and Kodiak during 1992 support the general observation that leadership resources within communities exposed to the oil spill were consumed by the necessity to participate in a range of spill-response activities. Even in those communities where leadership resources were reported to be sufficient, new leadership emerged from communities which also resulted in some conflicts regarding roles and responsibilities. These conflicts, which are typical of disaster events (Drabek 1986) further

occupied leadership resources. For example, the following quotation from an interview completed for the Oiled Mayors Study expresses this issue:

> The strength of the community were that we do have an ample supply of strong willed leadership type people, ready, willing, and able to jump in and grab the reins and do something with it. . . . That was our strength. The weakness was the conflict in the various factions for leadership positions. . . . (Oiled Mayors Study Leadership Interview, Larsen Bay)

Thus, even where leadership resources emerged in response to the event, there was often conflict regarding the roles, status, and responsibilities of these emergent leaders and ultimately this diminished their overall effectiveness.

While the demands of spill-response activities diminished the over-all functioning of municipal government, it also adversely affected the personal functioning of municipal officials. That is, elected and non-elected municipal leaders report feelings of "burnout" and "stress" resulting from the co-occurrence of: the duration of demands to participate in spill-response activities, working to maintain their usual responsibilities, and disruptions that resulted from leaders being in conflict with other leaders or individuals. Among the short-term effects of this perceived "burnout" and "stress" were limited energy for work, conflicts in interpersonal interactions, and decreased individual effectiveness. The long-term consequences include leaving public life and an overall unwillingness to participate in other municipal or community leadership positions, thereby decreasing the availability of already scarce leadership resources. In some communities, the demands of the spill resulting in recruiting individuals to leadership activities in which they had not previously participated. This created a larger pool of leadership for these communities

5.3.4 Unfamiliarity with the Political Structures and Processes of Native Communities Resulted in Misunderstandings and Conflicts between Natives and Outsiders

Native communities have different political structures and processes than non-Native communities. There is usually a Village Council, a Village Corporation, and a Regional Native organization (e.g., Kodiak Area Native Association, the North Pacific Rim) as well as a municipal government. Exxon/VECO and some state/federal agencies unfamiliar with these diverse entities sometimes created conflicts among these institutions by establishing working relationship with an entity that may not have been the most appropriate for EVOS response activity. Similarly, unfamiliarity with political processes, the roles of elders and Village Councils in decision making resulted in strains among the various political entities within Native communities; and, it often resulted in miscommunications and misunderstandings with external agencies (cf. McClintock 1989; IAI 1990c).

5.3.5 Federal or State Agencies within Communities were Important Assets for Disaster Response Activities

Communities in which federal or state agencies had a presence could also draw on the resources of these entities. This was especially the case in communities such as Seward and Kodiak where there were multiple and powerful federal and state agencies. In Seward, the National Park Service, the U.S. Fish and Wildlife Service and other agencies worked as part of the Multi-Agency Coordinating Group that was an effective response organization. In Kodiak the U.S. Coast Guard was instrumental in providing information and assisting in certain response efforts. In each case these entities could muster resources that communities could not. They provided essential help that was not always available in smaller communities or those without such resources.

5.3.6 Multi-Agency Coordinating Committees, Incident Command Systems, and Emergency Service Councils were Effective Response Organizations

The structure of response organizations influenced the capability of communities to muster internal and external resources for response efforts. In communities such as Seward, Homer, and Kodiak multi-agency response groups organized diverse resources and acted as the agency for interaction with Exxon and VECO. These entities had both the authority and power of their respective communities to negotiate and otherwise deal with Exxon/VECO for cleanup operations. These types of groups tended to gather more resources, use a diversity of contacts for information gathering, provide for information communication to their communities, and to organize the diverse resources within their communities for response efforts. Native communities were part of these groups in Kodiak, Seward, and Homer, but outlying communities could not always participate because of communication issues or their ability to travel from their communities to the meetings.

Regional Native organizations (e.g., Kodiak Area Native Association and the North Pacific Rim) were useful resources for their constituents, but with limited staffing and resources, they could not service all the needs that emerged. They also could not act as response organizations in the same way as the multi-agency groups, although these Regional Native organizations sometimes participated in multi-agency groups.

Multi-Agency Coordinating Groups developed in response to the specific needs of responding to the EVOS. These efforts were especially successful in those communities with existing disaster response plans. Multi-Agency Coordinating Groups formed around these predefined emergency response organizations and plans and they mobilized more quickly than in most other communities. Where such preexisting plans and emergency response organizations did not exist, it took more time and effort and otherwise delayed or impeded response efforts.

Post-spill, an organization emerged to respond to regional concerns about oversight and monitoring of the oil industry. This citizen's group (the Regional Citizen's Advisory Council) provides information and oversight for communities throughout the region. It therefore broadens area wide participation and interest in the issues and risks associated with of oil transport.

5.3.7 Information Dissemination Meetings about the EVOS were Essential for Community Information Gathering and Rumor Control

Communities instituted regular meetings, newsletters, and information bulletins to inform citizens about the particulars of the oil spill and cleanup. These information sources were a primary means by which individuals learned about the event and they also functioned as "rumor control." Television and radio news were also significant sources of information regarding the event, although coverage was uneven: Native communities were covered less than non-Native communities. Native communities also had fewer communication resources to communicate with other entities about event particulars.

5.3.8 The Social Organization of Native Communities Buffered Some Social Impacts from the EVOS

Native communities have a more communal orientation than non-Native communities (Jorgensen 1995b: 19-21). This communal orientation is, in part, kinship based. That is, Native households and networks are organized around kinship whereas households and networks in non-Native communities show fewer of these characteristics. These communal structures of Native communities resulted in sharing, visiting, and other interactions that resulted in creating social support. Although non-Natives also exhibit communal orientations in smaller, close-knit communities, these ties are not the same as those in Native

communities where cultural variables promote the communal ideology in a different way than in non-Native communities (Jorgensen 1995b:21-22). Ideology and social structure interact in different ways in non-Native and Native communities.

5.3.9 Changes in Traditional Roles and Status in Native Communities During the Cleanup Created Social Tensions

The literature indicates that in some Native communities the cleanup contractor hired younger persons to supervise cleanup crews that contained older persons. Or persons of lower or equal status with other in their community were also placed in supervisory positions (McClintock 1989; IAI 1990c). In family life, older children sometimes assumed the role of parents while mothers and fathers worked on the cleanup. These older children were sometimes in conflict with their parents when they returned. Elders in villages did not have a defined role in the cleanup and this conflicted with their usual status within Native villages. Men who had status as subsistence hunters or commercial fishermen temporarily lost that status during the EVOS. Their roles as cleanup workers did not have the same status as the highly valued status of hunter or fisher. These types of changes in role and status within Native communities resulting from the VECO cleanup created social tensions that would not have existed otherwise.

5.3.10 Social Statuses within Fishing Communities Were Disrupted by the Cash Received from Cleanup Employment

In Alaskan commercial fishing communities, there is a status hierarchy among commercial fishermen. High-liners represent the epitome of the fishing community and others fall in line after this. Income, quality and quantity of gear, fishing knowledge, and competitiveness are among the salient factors that sort fishermen into different status categories. When commercial fishing was disrupted because of the EVOS, the cleanup provided a path to upward mobility for some individuals who could acquire new boats and equipment not because they were good fishermen, but because they made lots of cleanup money. An often heard sentiment in fishing communities was, "I am a fisherman not a cleanup worker." That is, individuals wished to earn their money performing their social role as fishermen and not as cleanup workers; and, they wished their status in their community to be determined by their fishing success and capabilities, rather than their income from cleanup work. The status quo was disrupted when novel, but not necessarily valued, means of acquiring new status symbols (e.g., boats and equipment) threatened the existing hierarchy. This resulted in dissension, conflicts, and some long-term hard feelings in commercial fishing communities.

5.3.11 Emergent Groups Were A Source of Solidarity as Well as Conflict

Emergent groups formed more in non-Native than in Native communities. In non-Native communities organizations formed such as "The Crude Women," "The Mosquito Fleet," "The Deckhands," "Cordova Small Business Owners" and other informal and formal groups. These groups formed specifically in response to the EVOS. This is a common feature of both natural and technological disasters (cf. Gist and Lubin 1989). However, in natural disasters emergent groups often function to promote community solidarity, but in technological disasters they are often sources of conflict (Kroll-Smith and Couch 1990). These groups advocate for different positions regarding causes, blame, or impacts and these differences often generate conflict. In the EVOS emergent groups sometimes generated conflicts as occurred when the Cordova Small Business Owners came into conflict with the Cordova Chamber of Commerce regarding EVOS impacts. However, in other communities such as Homer and Kodiak emergent groups were sources of solidarity (cf. Button 1993). They functioned to bring together people for mutual support and with mutual interests in response to an event that threatened their community.

5.3.12 Demand Conditions for Social Organization

The demand conditions for social organizations address the major issues of minimizing social disruption, promoting local leadership, and coordinating with other entities to muster resources to respond to an event with minimal damage to the social fabric of communities. These demand conditions are as follows:

- Leadership resources are needed to respond to disaster events and maintain community functions and cohesiveness.

- Political and organizational resources sufficient to continue community and governance functions must be maintained.

- Extra-community resources need to be gathered to respond to a threat to the community.

- Inter-agency and inter-community cooperation is necessary to respond effectively to major disaster events.

- Social cohesiveness is essential to maintaining community equilibrium.

- Communication about the event is essential.

5.3.13 Recommendations For Social Organization

Recommendations regarding the social organization social factor are intended to address two major points. One, prevent social disruption by planning and providing resources that support existing community capabilities. Two, organize response efforts that are consistent with existing social organization. With these two points in mind we suggest the following general recommendations.

- Governance and municipal functions of local communities must be maintained.

- Promote coordination of all extra-community agency resources within community response structures. Specifically, define roles for local offices of state/federal government for assisting communities in disaster response efforts.

- Assure local autonomy in disaster response planning and organization to minimize feelings and experiences of loss of control.

- Promote the development of Multi-Agency Coordinating Group type of entities that integrate the stakeholders and resources within communities in developing and implementing response efforts.

- Provide community leaders with resources to maintain their roles without experiencing burnout.

- Promote response organizations and activities that do not unnecessarily disrupt existing statues, roles, and patterns of interaction.

- Develop linkages with other communities and agencies to promote resource sharing for response activities.

- Assure communication among residents regarding the threats and risks associated with the disaster event.

5.4 LESSONS LEARNED: SOCIAL HEALTH

For our purposes "social health" as a social factor addresses research findings about social support, individual psychological distress, social conflicts, and other disruptions of community equilibrium as expressed by increased crime and other psychosocial indicators. The lessons learned we develop here about "social health" address relationships among individual psychosocial distress, disruptions of community equilibrium, and community social support resources. The Factor-by-Factor Analysis develops the details about these issues and some of the generalizations about the social and psychological issues that affected social health in Alaskan communities. Here we build on this analysis and derive "lessons learned" that have direct implications for developing recommendations for response to any future events similar to the EVOS.

5.4.1 Mental Health Conditions Vary with Exposure to the Effects of the EVOS, Occupation, Resource Dependence, Culture, and Gender

The three major sources of information about mental health conditions (stress symptoms, depression symptoms, general anxiety disorder, post-traumatic stress disorder [PTSD]) indicate that there are "at-risk" groups. Russell et al. (1996) present data from the Oiled Mayors Study showing that depression symptoms, general anxiety disorder, PTSD, and increased substance abuse are associated with exposure The Oiled Mayors Study "exposure" measure was developed from responses to the following questions: Did you or anyone in your household use, before the spill, areas along the coast that were affected by the spill? Did you work on any shoreline or water cleanup activities of the oil spill? Are there other ways that you came into contact with the oil spill or cleanup activities, such as during recreation, hunting, fishing, or gathering activities? Did you have any property that was lost or damaged because of the oil spill or cleanup? Did the oil spill cause any damage to the areas you or other household members fish commercially? Has the oil spill directly affected the hunting or gathering activities of any members of this household? (IAI 1990c) to the EVOS. The more exposed a community, the more likely individuals would experience these conditions post-spill (Russell et al. 1996:873-875). Within the "high-exposed" communities, Natives, women, and younger persons were more likely to have symptoms or psychiatric conditions. Two tables below from the Oiled Mayors Study summarize some of the important findings about exposure status, psychological distress, and at-risk populations.

This first table shows "exposure scores and indicates that Native communities were more exposed than non-Native communities. And, the commercial fishing communities of Cordova and Kodiak were the most exposed non-Native communities."

Mean Exposure Index Score and Percentage of Community Residents in High, Low, and Not Exposed Groups by Community, Oiled Mayors Study Data, 1990

Community	N	Mean Score	% High Exposed	% Low Exposed	% Not Exposed
English Bay	24	3.92	62.5	37.5	0.0
Tatitlek	14	3.79	71.4	21.4	7.1
Chenega Bay	11	3.73	72.7	18.2	9.1
Larsen Bay	22	3.59	54.5	36.4	9.1
Akhiok	11	3.27	45.5	45.5	9.1
Karluk	10	2.90	40.0	40.0	20.0
Cognac Bay	30	2.53	23.3	50.0	26.7
Cordova	66	2.51	37.9	24.2	37.9
Kodiak	119	2.36	26.9	38.7	34.5
Seward	60	2.10	23.3	36.7	40.0
Valdez	65	1.77	16.9	30.8	53.3
Petersburg	101	0.51	2.0	13.9	84.2
Angoon	60	0.30	0.0	5.0	95.0
Total	593	1.96	24.5	28.2	47.4

The second table shows "odds ratios" for the psychological conditions measured by the EVOS household survey and their relationship to exposure status. GAD refers to "general anxiety disorder" PTSD is "post-traumatic stress disorder" and CESD is a measure of symptoms of depression. An odds ratio of more than 1.0 indicates increased risk.

Odds Ratios (and 95% Confidence Intervals) for Psychiatric Disorders Associated with Sociodemographic Characteristics and Increasing Levels of Exposure to the *Exxon Valdez* Oil Spill and Cleanup Activities: Results of Logistic Regression Analyses

	Psychiatric Disorder			
	GAD	PTSD	CESD≥16	CESD≥18
Risk factors	Odds Ratio (95%CI)	Odds Ratio (95%CI)	Odds Ratio (95%CI)	Odds Ratio (95%CI)
Sex				
Male	1.00	1.00	1.00	1.00
Female	1.90 (1.13-3.19)	2.20 (1.10-4.42)	1.66 (0.94-2.92)	2.10 (1.13-3.91)
Age				
25 or older	1.00	1.00	1.00	1.00
18-24	1.14 (0.44-2.95)	1.45 (0.45-4.64)	3.14 (1.29-7.65)	2.17 (1.46-5.70)
Ethnicity				
Non-Native	1.00	1.00	1.00	1.00
Native	1.30 (0.77-2.22)	1.02 (0.50-2.08)	1.81 (1.02-3.19)	1.38 (0.74-2.57)
Exposure				
Not exposed	1.00	1.00	1.00	1.00
Low exposed	1.91 (1.01-3.60)	0.84 (0.34-2.07)	1.52 (0.78-2.96)	1.69 (0.82-3.50)
High exposed	3.73 (1.99-6.97)	2.63 (1.22-5.66)	1.81 (0.91-3.61)	2.13 (1.01-4.50)

This analysis indicates that exposure status, female gender, Natives, and the 18-24 age group have the highest risk factors for these types of conditions. Other data from the Oiled Mayors Study show that spill-related income and changes in family or social relationships were associated with increased psychological distress (Palinkas et al. 1992).

Picou and Gill (1996) present data showing that a measure of stress, the Impacts of Events Scale, is highest in a "renewable resource [dependent] community" (Cordova) in comparison to a community that is not so dependent on locally harvested renewable resources (Valdez) and a control community (Petersburg) (Picou and Gill 1996: 886-889). Their data also show that those engaged in resource extraction (commercial fishermen) showed higher measures of stress than non-fishermen; and, these measures persisted over time indicating a condition of "chronic stress" (Picou and Gill 1996:890).

In sum, these data from the Valdez Counseling Center Study (Donald et al. 1990) show that there are segments within the communities exposed to the EVOS that were "at risk" for mental health problems. For future events, it might be predicted that those most dependent on the resources damaged, Natives, women, and those in younger age brackets (less than 45) would be among the most "at-risk" populations.

5.4.2 EVOS Related Psychosocial Problems Contributed to Social Disruption

Social disorder contributed to diminished community health. Social disorder resulted from increased crime; in-migration; domestic violence; substance abuse; and, social conflicts. Data from the Oiled Mayors Study, Picou and Gill (1997), McClintock (1989), Reynolds (1993), Endter-Wada et al. (1993), and Donald et al. (1990) indicate that the psychosocial problems and conflicts in communities increased after the EVOS. For example, Oiled Mayors Study household survey data show a direct association between psychosocial problems and the degree of exposure to the EVOS. The three tables below show the odds ratios and correlation between exposure status and drinking, drug use, and domestic violence. These types of problems contributed to social disruption in communities. Ultimately this disruption itself became a source of stress that diminished the capabilities of communities to muster social support resources to respond to those in need.

Percentage and Odds Ratio of Household Survey Respondents Reporting More Drinking and More Drinking Problems by Exposure Status, Oiled Mayors Study Data, 1990

Social Unit and Problem	Exposure Group: % High Exposed (n=133)	% Low Exposed (n=152)	% Not Exposed (n=243)
Community			
More drinking	58.3***	39.3	23.6
Odds Ratio	2.5	1.7	1.0
More drinking problems	47.9***	31.8	19.9
Odds Ratio	2.4	1.6	1.0
Family and Friends			
More drinking	30.1***	17.8	10.3
Odds Ratio	2.9	1.7	1.0
More drinking problems	28.2***	14.6	10.3
Odds Ratio	2.7	1.4	1.0

x^2 test for trend * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Percentage and Odds Ratio of Household Survey Respondents Reporting More Drug Use and More Drug Problems by Exposure Status, Oiled Mayors Study Data, 1990

Social Unit and Problem	Exposure Group: % High Exposed (n=96)	% Low Exposed (n=132)	% Not Exposed (n=204)
Community			
More drug use	49.4***	38.9	24.1
Odds Ratio	2.0	1.6	1.0
More drug problems	40.4***	28.8	21.2
Odds Ratio	1.9	1.4	1.0
Family and Friends			
More drug use	23.7***	14.4	4.5
Odds Ratio	5.3	3.2	1.0
More drug problems	25.0***	9.4	4.4
Odds Ratio	5.7	2.1	1.0

x^2 test for trend * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Percentage and Odds Ratio of Household Survey Respondents Reporting More Domestic Violence and More Domestic Violence Problems by Exposure Status, Oiled Mayors Study Data, 1990

Social Unit and Problem	Exposure Group: % High Exposed (n=98)	% Low Exposed (n=113)	% Not Exposed (n=191)
Community			
More domestic violence	48.7***	21.1	16.8
Odds Ratio	2.9	1.3	1.0
More domestic violence problems	43.0***	18.2	15.7
Odds Ratio	2.7	1.2	1.0
Family and Friends			
More domestic violence	24.5***	5.3	3.3
Odds Ratio	7.4	1.6	1.0

x^2 test for trend * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

5.4.3 Native and Non-Native Patterns of Mental Health Problems are Different

Gill and Picou (1997:179-180) present data from their research in Cordova that suggests that Natives experienced stress differently than non-Natives as measured by the Impacts of Events Scale. These data indicate that Natives experienced more "intrusive recollections" and "avoidance behaviors" – subscales within the Impacts of Events Scale than commercial fishermen; and, these measures were observable four years after the EVOS (Gill and Picou 1997:180). Data from the Oiled Mayors Study presented by Palinkas et al. (1992, 1993) in several publications also indicate differences among Natives and non-Natives in the types of disorders and the clustering of symptoms. These are important findings that suggest either that the measures of stress used in these studies are not "culturally appropriate" or that Native's experience of this event as stressful was different from that of non-Natives.

5.4.4 Children Were Adversely Affected by the EVOS

Data from the Oiled Mayors Study indicates that children were another "at-risk" population that deserves special mention in our discussion. Exposure to the EVOS and problems in children's behavior is indicated in the table below that shows data analyzed from the Oiled Mayors Study household survey. This table shows that the more parents were exposed to the oil spill and cleanup, the more they were likely to report a decline in their children's grades, their children's fear of being alone, their children fighting with other

children, and children arguing with their parents. Higher parental exposure to the EVOS, the more they were likely to report problems getting child care. Higher parental exposure is also associated with reports that their children were affected by the EVOS. Other Oiled Mayors Study data also show that when parents participated in the cleanup, they were less likely to report that their children's grades and schoolwork had improved since the spill; more likely to report their children being afraid of being left alone since the spill; and, to report their children had more trouble getting along with their parents than before the spill.

Effects of Oil Spill on Children and Availability of Child Care by Exposure Status
Oiled Mayors Study Data, 1990

	Exposure Group		
Changes since the oil spill	High Exposed (n=82)	Low Exposed (n=88)	Not Exposed (n=119)
Decline in relations with other children in community	2.85	2.74	2.72
Children have more trouble sleeping now	3.68	3.90	3.89
Children's grades and school work have declined	2.87*	2.57	2.50
Children get upset when someone talks about spill	3.29	3.66	3.51
Bedwetting a new problem for one of my children	3.76	4.00	3.97
Oil spill has had an effect on children	2.85***	3.59	3.61
Children do not like being left alone	3.17***	3.85	3.89
Children fight more with other children	3.64**	3.97	3.97
Children have more trouble getting along with parents	3.54***	3.99	3.94
Children have more trouble getting along with siblings	3.08	2.87	2.89
Problem finding child care during the oil spill	2.78***	3.30	3.66

The lower the score, the greater the agreement with the statement * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

5.4.5 Stress Resulted from the Direct Effects of the EVOS and the Social Disruption Associated with the Cleanup

Picou and Gill (1996), Gill and Picou (1997), Russell and others (1996), and McClintock (1989) provide data that indicate that the EVOS was a stressful event for residents of Alaskan communities. The stressors from direct exposure include: observations of the effect of the EVOS on wildlife and the environment; persistent uncertainty about the possible health effects of hydrocarbon exposure, especially in Native communities; threats to present and future economic viability; threats to valued ways of life; and, uncertainty about long-term environmental effects of the spilled oil. These stressors were largely ones that could not be controlled. However, the nature of the cleanup resulted in social disruptions that also proved to be a major stressor that had adverse consequences for individual mental health and overall community "social health." Future events are also likely to result in social disruptions that will be stressors. These types of stressors can be mitigated more readily than the stressors resulting from some of the more direct effects of the EVOS.

5.4.6 Community Resources were Limited for Response to Mental Health Needs

There were limited resources to respond to the stress and mental health problems that emerged after the event. PTSD, symptoms of depression, general anxiety disorder, and "stresses" were associated with exposure to the oil spill and cleanup. Yet, most communities had only limited formal resources for response to these conditions. Native communities and smaller municipalities had the most limited resources. In some Native communities, the Community Health Aides and counselors left their jobs to work on the cleanup. In other instances, support programs such as Alcoholics Anonymous were suspended because of cleanup work. Regional Native organizations such as the Kodiak Area Native Association and the North Pacific Rim provided some outreach services to villages, but in general large

and small communities appeared to be ill-prepared for the intensity of psychological distress resulting from the EVOS. What limited formal resources that did exist for response were overwhelmed by the demands for services (cf. IAI 1990d).

5.4.7 Cleanup and Disaster Response Personnel Are Prone to Stress Related Psychosocial Problems

Palinkas et al. (1992) and IAI (1990d) show that persons who were involved in cleanup efforts experienced more stress-related mental health problems than other community members. This analysis did not compare findings with other "at-risk" groups such as fishermen, but the analysis does suggest that participation in the EVOS cleanup was a risk factor for increased mental health and social problems.

5.4.8 The EVOS Changed Residents Perceptions of Their Vulnerability to Oil SpillEvents

One of the important lessons about technological disasters, in general, is that they often result in changes in perceptions about the risks of modern life (Couch and Kroll Smith 1991). The experience of Alaskan communities exposed to the EVOS show similar changes in their assessments of the safety of their homes and ways of life following the EVOS. That is, their perception of risk has changed. For example, the Oiled Mayors Study household survey data show that 54% of participants felt that the effects of the spill would last more than five years. More than half of all individuals interviewed for the Oiled Mayors Study Household Survey thought that another oil spill would occur in the next ten years. Individuals exposed to the oil spill are more likely to perceive another oil spill will occur in the future than those not exposed. Ethnographic data from the Oiled Mayors Study (IAI 1990c) shows that residents of these communities believe their economic futures are uncertain because of the potential effects of future oil spills. Other data collected by Picou and Gill (1997) and Russell (1992) suggest feelings of increased vulnerability to the threats of environmental pollution. For some in these Alaskan communities, there are changes in their feelings about home and community as a safe haven from the threats and problems of modern life. As one Kodiak fishermen observed:

> I kinda feel like it [the oil spill] made us realize that we are not isolated anymore and we are just north of LA [Los Angeles] . . . we got dumped on, we are totally powerless, we can't do a thing about it, and it can't be cleaned up. . . it destroyed the illusion that things are alright . . . (Russell Field Notes, Kodiak Island, 1992).

This quotation expresses a theme of a perception of increased threats and vulnerability, and feelings of powerlessness. These feelings of a changed environment, one in which individuals are more at risk and more exposed to the potential dangers of future threats from an oil spill have persisted into the present.

5.4.9 Social Conflicts Undermined Community Solidarity and Social Support

Conflicts between neighbors, friends, and family members were a common outcome of community interaction with the EVOS. Data presented by Picou and Gill (1997), Russell et al. (1996), McClintock (1989), Reynolds (1993) and Endter-Wada et al. (1993) show that social conflicts within communities were common during the EVOS. Conflicts existed about a wide range of issues including: the moral acceptability of working for Exxon and its contractors; the actions of community members in their relationships with Exxon; arguments about preferential hiring for cleanup work; support for or opposition to the oil industry; proper response actions; tensions between cleanup workers and community members; tensions between Exxon and community leaders; and, tensions among different segments of the fishing industry. Conflicts were divisive. Divisiveness also contributed to diminished social solidarity and it also undermined community social support. We interpret these findings as suggesting that the undermining of community support compounded stress and other mental health problems. The social bonds and

connections that usually act to buffer stress responses to disasters appear to have been diminished by conflicts, other sources of social disorder, and the nature of the cleanup process. At least some of these factors can be mitigated in future response efforts by promoting social solidarity and organizing cleanup efforts such that they minimize divisiveness within communities.

5.4.10 The "Therapeutic Community" Process was Undermined by the Nature of the Cleanup

Throughout the EVOS literature are indications of perceptions that residents lost control of their community and felt powerless when Exxon/VECO instituted their cleanup (McClintock 1989; IAI 1990c; Endter-Wada et al. 1993; Picou, Gill, and Cohen 1997). The process of losing control, feeling powerless and overwhelmed in the context of a cleanup effort people believe is not effective nor sincere, undermines mitigating the threat of a disaster as well as the formation of the "therapeutic community" process which is part of community recovery. An important lesson learned from this event is that there are organization and process issues in structuring cleanup efforts and in agency interactions with communities that do not necessarily have to result in lost of control and powerlessness for affected communities.

5.4.11 Promote Recovery

The literature about technological disaster focuses on impacts with little attention to recovery from the social and emotional effects of these events. The research literature is virtually silent about recovery of communities from the EVOS. We know that there were community-based programs that developed such as Save our Sound and Sound Alternatives which were intended to address both coping and recovery. The Regional Citizen's Advisory Council has funded some recovery programs (Picou 1996). Yet, knowledge about how recovery occurs and how it can be assisted is limited. An important lesson learned is that recovery should be better understood as a social and community process; and, efforts to promote recovery should be part of every disaster response effort. For example, the two community-based efforts noted previously (Save Our Sound and Sound Alternatives) exemplify the development of the "therapeutic community" process that was undermined by the structure of the cleanup. These types of programs can mitigate impacts to social health.

5.4.12 Baseline Information about Social Health is Limited

A major difficulty in interpreting much of the data regarding the mental health effects of the EVOS is the absence of base-line data for post-event comparisons. The research that collected EVOS mental health data (e.g., Picou and Gill 1996; Palinkas et al. 1993; Russell et al. 1996; IAI 1990d) used post-event research designs that had could not compare pre- and post-spill levels of stress, depression, and other psychological symptoms and conditions. This has inherent problems, but the research is nonetheless suggestive about both the effects of the EVOS on mental health and some of the pre-existing conditions within Alaskan communities. For example, Russell (1991) reports that measures of PTSD post-EVOS show that Native women have high rates in comparison to other respondents. The patterning of their symptoms suggests that pre-existing conditions as well as the EVOS may account for the salience of PTSD among Native women.

5.4.13 Demand Conditions: Social Health

The demand conditions for social health are focused on providing the resources for responding to stressors on individual and community well-being. These demand conditions are as follows:

- *Formal mental health resources for response to stress and other mental health conditions.* Many communities offer limited or occasional resources and these can be easily

overwhelmed in a major disaster event. This demand condition focuses attention on the inevitability of stress and other psychosocial problems as outcomes of these types of events; and, the need for resources to respond with culturally appropriate interventions.

- *Informal social support resources for mitigating stress, social disruption, and other psychosocial problems.* Informal resources such as neighboring, visiting, and support groups are important resources for responding to community crises. This demand condition acknowledges the need to promote social support resources in the event of future disasters.

- *Attention to promoting social solidarity and minimizing divisiveness.* Divisiveness and conflicts diminish community solidarity. This demand condition recognizes the need to respond to situations that can undermine social solidarity.

- *Identification and response to at risk populations, especially Natives, children, those predisposed to stress, and those most affected by damaged resources.* Disaster events often most affect populations that are "at-risk." Who is at-risk may vary with the disaster event, but there is a need to acknowledge the existence of at-risk populations and respond to their special needs.

- *Attention to uncertainty that results from technological disaster.* Events that spill or otherwise distribute toxic substances in an environment usually create uncertainty about their short and long term effects. Social health can be promoted when this uncertainty is acknowledged and appropriate interventions implemented.

- *Response to the needs of those involved in the front-line of disaster response events.* Responders are in need of care themselves.

5.4.14 Recommendations: Social Health

- *Establish base lines for mental health conditions in communities exposed to the transport of oil through Alaskan waters.* The scientific literature about technological disasters, in general, and the EVOS in particular, indicates that mental health problems are outcomes of these types of events. Although culture, social organization, and other sociocultural variables receive the majority of research attention, the psychosocial and mental health problems are also important to characterize conditions in potentially exposed communities. This effort should include gathering information about sub-groups and conditions within communities that can identify at-risk populations. This information would be invaluable for planning, research, and service delivery purposes.

- *Plan for resources to deliver mental health services for disaster events.* There is a need to establish community-state linkages to plan for programs and delivery of services. In addition to data regarding mental health conditions, planning for service delivery in disaster events is also important. In addition to "critical incident debriefing" discussed below, planning should address the capabilities of communities to meet demands for mental health services. Linkages with state and/or federal sources that can provide services for acute circumstances should be integrated into program planning efforts.

- *Ensure that resources exist to respond with cultural awareness and sensitivity to cultural differences among affected populations.* Native Alaskans, Filipinos, Hispanics, and other ethnic populations are part of the coastal communities in Alaska. These populations may experience these events differently than the dominant culture. Culturally sensitive interventions and training should be part of the mental health response planning and program effort.

- *Planning and training for "critical incident debriefing" is available for communities and responding agencies.* This should also incorporate resources to address the social stresses as well as the psychological stresses that accompany disaster events. Research efforts for other disasters and the EVOS shows that persons who respond and are involved in cleanup work are more likely to experience adverse reactions which can be mitigated by "critical incident debriefing" intervention.

- *Develop culturally sensitive resources and plans for risk communication.* The uncertainty about the effects of toxic contamination is a major source of stress in technological disasters. Such a source of stress can be compounded where there are cross-cultural issues in risk perception and risk assessment. Assessments of risk and explanations of their probable effects should consider the cultural differences among populations as well as the importance of community-based risk assessments that are likely to differ from probabilistic risk assessments of science.

- *Plan interventions and promote projects that encourage social solidarity and that support communal activities in response to the disaster event.* The loss of community solidarity and divisiveness are sources of stress that generate social and psychological impacts. Community based projects such as Save our Sound and Sound Awareness should be encouraged and similar projects promoted in response to future disaster events. These encourage autonomy and solidarity that may buffer the effects of the disaster event. Planning efforts should address actions to encourage formation of the "therapeutic community" process in affected communities.

- *Develop plans to promote community-based recovery programs that are aided as necessary by state, federal or other resources.* Recovery needs to be addressed as a formal stage of the disaster process. Recovery as a process needs to be understood through research efforts, but there is an overriding practical need to mitigate the effects of an event by developing community-based recovery efforts, monitoring these efforts, and providing assistance as necessary.

5.5 LESSONS LEARNED: ECONOMIC CHARACTERISTICS

By economic characteristics we mean the structures and processes within communities that are the modes of production, exchange, and distribution of resources. For our purposes, we can examine economic characteristics as the "way people make a living." The economic institutions and processes of Alaskan coastal communities are highly dependent on the natural resources. Contamination of these resources resulted in direct damages to fishermen and related damages to those who support or depend on commercial fishing. Some damages were mitigated by the privatized cleanup that resulted in a "money spill" into many affected communities. Our lessons learned discussion for economics thus addresses the issues of who lost and gained and the effects of cleanup cash in affected communities.

5.5.1 Community Economic Structure Buffered the Economic Impacts on Affected Communities

Commercial fishing in south-central Alaska suffered the most economic damage from the EVOS. Communities such as Cordova, Kodiak, Seldovia, and Homer have large commercial fishing fleets that could not fish because of the EVOS. However, the structure of local fishing economies is variable. In communities such as Cordova, commercial fishing is the dominant economic sector, but the sector itself is not as diversified as in some other fishing communities. In Kodiak, commercial fishing is also the dominant economic sector, but it is a much more highly diversified commercial fishery. Communities

such as Valdez, Seward, and Kenai have a commercial fishing sector, but the overall economies of these communities are diversified. The EVOS shows that the more highly diversified economies were buffered from the effects of the EVOS and the diversified commercial fishing communities fared better than those with less diversification. The essential lesson learned here is that the more economically dependent an economy is on natural resources, the more at-risk that economy for losses related to a technological disaster.

5.5.2 Some Businesses Prospered and Some Floundered Because of the EVOS

Cohen (1997) and the Oiled Mayors Study (IAI 1990b, 1990d) provide data that show that some types of businesses – one's providing goods and services to the cleanup – prospered as a result of the EVOS. Commercial fishermen, service businesses, and tourism businesses were among those in this category (IAI 1990d:121). Other businesses, especially those that did not provide goods or services to the cleanup generally showed more net income decreases than increases: they lost (IAI 1990d:125). The fish processing industry and some commercial fishermen also showed the greatest losses as a result of the spill. The reasons for losses across businesses included: closure of the commercial fisheries, decreased demands for goods and services, and increased costs of doing business.

5.5.3 Small Businesses Were Highly Vulnerable to Economic Loss

Smaller communities, and especially smaller businesses in these communities, were highly vulnerable to economic impacts. Local businesses could not compete with the $16.69/hour wages offered by cleanup contractors and therefore lost labor on which they were dependent (IAI 1990d; Endter-Wada 1993; Davidson 1990). Similarly, small businesses often did not receive contracts to deliver goods or services for the cleanup and without business from commercial fishing, they lost income (IAI 1990d). These small businesses were among the most vulnerable to economic loss as a result of the EVOS.

5.5.4 Economic Losses Among Commercial Fishermen Were Unevenly Distributed

Some commercial fishermen lost more than others. Small operators were especially vulnerable to lost income because their vessels were often not used for cleanup operations and therefore they did not benefit from cleanup employment. Similarly, small operators had fewer options to change gear and travel to more distant locations for alternative fishing possibilities. Some larger operators also lost because they did not participate in the cleanup either for ethical and moral reasons – they believed the cleanup insincere and therefore they should not participate – and in other cases not all available vessels were hired for cleanup work. Consequently, within fishing communities some commercial fishermen gained significant benefits through cleanup work while others experienced significant losses (IAI 1990b; Cohen 1997).

5.5.5 Assessing the Long-Term Economic Effects on Commercial Fishing is Complicated

Commercial fishermen argued that perceptions of Alaska seafood as contaminated by the EVOS resulted in a drop in demand and fish prices after the EVOS. Several analyses of salmon prices (e.g., Owen 1995) argue that world market factors complicate attributing changes to the EVOS. Similarly, Cohen (1997) argues, "The powerful forces of market realignment were far more potent than the accident (EVOS) in shaping competitive conditions and reducing Alaska's commanding international position as a supply source" (Cohen 1997:154). What is clear is that one longer-term impact is that some fishermen became more competitive as a result of cleanup income which allowed them to purchase new boats or upgrade their existing gear. This gave them a clear competitive advantage over fishermen who did not participate in the cleanup (IAI 1990d).

5.5.6 The "Money Spill" Created Social Impacts and Did Not Mitigate All the Economic Losses

Nearly every research project noted the disrupting effects in communities of the expenditure of large sums of money on the cleanup (e.g., IAI 1990d; Endter-Wada et al 1993; Cohen 1997; Picou and Gill 1997; Davidson 1990; Keeble 1991). People argued over why some received lucrative cleanup work and others did not. Others argued about perceived "gouging" of Exxon while still others simply were distressed by the perceived "greed" of their neighbors who wished to "cash-in" on the money spill. For many the cleanup was a source of economic benefit that offset some of their short-term losses related to the EVOS (Cohen 1997). For others, cleanup employment only resulted in mitigating some of their losses without resulting in a large economic gain. Furthermore, Cohen (1997) and the Oiled Mayors Study (IAI 1990d) describe the "porous" nature of the Alaskan economy in which expenditures are often outside local communities and therefore they receive limited to no benefit as a result. Although large sums of money were spent in the cleanup, the economic gains were unevenly distributed; and, the economic benefits were not such that, in many cases, they offset the losses related to the EVOS.

5.5.7 Local Governments Experienced Fiscal Impacts Related to the EVOS

Smaller municipalities are the rule in coastal Alaskan communities. Budgets of less than 5 million dollars a year are common and reserves are often limited. A major event such as the EVOS often required the expenditure of municipal funds on response activities and diverting funds away from other projects and service delivery. Reserves were tapped where it was necessary (IAI 1990a). Additionally, some revenues declined because of decreases in taxes such as raw fish tax, although other revenues increased (e.g., hotel-motel taxes.) Many smaller local governments did not have the resources and others did not have the time because of EVOS demands to document their expenditures and all of their lost revenues (IAI 1990d). Furthermore, although Exxon reimbursed municipalities for some expenditures/losses, some types of expenditures were excluded from consideration (IAI 1990d). The net effect was that municipalities experienced fiscal losses related to the EVOS.

5.5.8 Economics: Demand Conditions

The demand conditions for economics address a diversity of issues relating to assessment of economic loss and gain. The issues include:

- determination of the configuration of local economic sectors;
- evaluation of the direct effects on specific sectors dependent on damaged resources;
- evaluation of the indirect effects on specific sectors dependent on damaged resources;
- determination of trends in economic sectors and specification of the industry context affecting those trends (e.g., world salmon prices);
- evaluation of event effects on specific economic sectors in relationship to economic trends and their industry context;
- response to short-term effects on business and personal incomes and the economic well-being of community economic structure;
- adapting to long-term changes in economic conditions;

- recovery of damages;

- assessment of effects on the fiscal conditions of municipal and tribal governments;

- evaluation of the full economic costs and benefits of cleanup operations in relationship to economic costs of damages incurred; and

- record keeping documenting fiscal losses and damages.

5.5.9 Economics: Recommendations

The following steps are recommended:

- support a claims/reimbursement process that fairly assesses losses and compensates those affected;

- provide short-term economic support to private sector businesses that suffer losses related to future events;

- provide fiscal support to local governments in their disaster response efforts;

- construct cleanup operations that minimize the disruption of local economies; and

- provide support for record keeping and other means to document costs related to cleanup operations.

6.0 OBSERVATIONS: LITIGATION ISSUES AND THE EVOS

There is a very limited set of information in the public domain that assesses the effects of litigation on Alaskan communities exposed to the EVOS. Given the limited primary data about litigation issues, any discussion of "lessons learned" would be forced and not solidly based in data. However, there are some observations that can be made about the litigation process of the EVOS as it relates to social issues in Alaskan communities. These observations derive from selected items of literature (Jorgensen 1995a; Picou, Gill, and Cohen 1997) and from the personal experiences of the authors of this report who participated in parts of the litigation process as expert witnesses. Mike Downs and John Russell were both expert witnesses for plaintiff attorneys and participated in preparing reports and giving depositions related to the social, economic, psychological, and municipal effects of the EVOS on Alaskan communities. We offer the following observations about the interactions of social impacts and the EVOS.

6.1 LITIGATION IS INEVITABLE

Technological disasters seem to inevitably result in litigation by those damaged against the human agency that caused an event. In this instance, those damaged pursued litigation again Exxon, Alyeska, and others. Reports in newspapers, popular publications (e.g., Keeble 1991; Davidson 1990), and the observations of the authors of this report indicate that attorneys were among the first "outsiders" who began the flood into the affected communities after the spill. Where there are economic or other damages and human agency is involved, there is likely to be litigation. This is a characteristic of technological disaster events.

6.2 LITIGATION IS DIVISIVE

Reynolds (1993) illustrates the divisive nature of litigation related to the EVOS. She reports on the case of litigation by the former Cordova Chamber of Commerce president against certain members of the Cordova City Council and the Mayor. This litigation was firmly rooted in issues related to the EVOS as described by Reynolds. Litigation by business owners, fishermen, and others against Exxon also created arguments within some communities about the moral basis of those suits, since some argued that claims were not well founded. Litigation became another source of divisiveness within communities. Although it may have addressed economic and other needs of those affected by the EVOS, it also created factions and hard feelings.

6.3 LITIGATION INHIBITS RESOLUTION OF THE EVOS

Psychological tests with members of Cordova District Fishermen United found that those involved in litigation had higher levels of depression than those not involved in litigation, and found that those who had sold items because of economic loss had higher levels of anxiety than those who had not sold items to compensate for economic losses.

6.4 LITIGATION MAY NOT FAIRLY COMPENSATE ALL AFFECTED

Jorgensen (1995a) argues that Natives were not fairly compensated in part of their litigation that was settled. He also notes that some of the claims against Exxon by Natives misunderstood the nature of damages to these communities. Gill and Picou also suggest the dismissal of some Native claims against Exxon are in fact harmful:

> The denial of any damage claims for the non-economic component of Alaska Native culture by the court was an artificial separation of traditional cultural values, meanings and behaviors from a strictly economic valuation of harvest production. Because Alaska Native culture does not distinguish between economic production and cultural practice in a way that conforms to Western legal conventions, they were further victimized by the *Exxon Valdez* oil spill through the court's lack of recognition of deleterious cultural impacts experienced as a result of this technological disaster (Gill and Picou 1997: 183).

There is also anecdotal information in newspaper and other sources that indicates that many small fishermen, businesses owners, and others do not feel as if litigation has fairly compensated them for their losses. The litigation process does not necessarily pursue fairness and those who participate in litigation may not receive the compensation they believe justified.

6.5 LITIGATION CAN INHIBIT DATA COLLECTION OR PREVENT PUBLIC RELEASE OF DATA

Native communities acquired legal representation early in the EVOS. Attorneys for the Native communities limited access by researchers to these communities. This resulted in limiting research about the effects of the EVOS to that approved by these attorneys. This is clearly not in the best interests of social scientists and it may not be in the best interests of those damaged by the EVOS. In other instances, data collected for assessment of biological effects was kept from the public record because of its status as related to federal/state litigation against Exxon. In Native, and in some non-Native, communities there was skepticism and suspicion about the results of these studies. Much of the science was not trusted because of feelings that some data were public and some were not and this raised questions. It could be

argued that some of the concern about food safety in Native communities was exacerbated by data collected but kept private for litigation purposes.

6.6 CONFIDENTIALITY OF SOCIAL SCIENCE DATA DOES NOT HAVE STANDING IN THE COURTS

It is a common practice of social scientists involved in data collection to guarantee the confidentiality of data collected. However, if the data collected is deemed relevant to court proceedings, the courts have the power to compel production of the data and essentially violate the confidentiality guaranteed by the social scientists. If true confidentiality is to be maintained, then records names and other identifiers that can compromise confidentiality need to be excluded from research records that can be subpoenaed for inclusion in litigation.

6.7 SOCIAL SCIENCE RELATED TO EVOS LITIGATION IS CONTROVERSIAL

Jorgensen (1995a) provides one set of arguments about the nature of social science data used in litigation against Exxon. He suggests that a report prepared by social scientists for Native claims against Exxon incorrectly reified the concept of culture and had "severe consequences" for the Native argument about damages (Jorgensen 1995a:2-3). He also takes to task social scientists for Exxon who argued that Native and non-Native culture in Alaska are not different; and, that ethnicity is a better explanation of these differences and their consequences for EVOS-related impacts (Jorgensen 1995a:3ff.). There was a wide range of social science data collected for litigation purposes and other data that were assembled from existing studies that were never entered into evidence. The materials that did become part of the court record show the importance of providing scientifically sound data. The most reliable way to assure that data collected to describe these types of events is to use reputable social scientists and to have their research procedures and findings subject to a peer review process.

7.0 GENERAL RECOMMENDATIONS

There are a number of recommendations that transcend the individual social factors we have previously discussed. These recommendations are of two types: information that is needed to provide effective responses to these types of events and actions that can be taken to mitigate or prevent social impacts.

7.1 INFORMATION RECOMMENDATIONS

Alaskan coastal communities near oil transport corridors are at-risk for the impacts of any future oil spill. In addition to constructing sociocultural profiles of these communities, the following information would be useful for those planning response efforts in these communities.

- The characteristics and patterns of resource dependence, including their economic, cultural, and social importance should be assessed.

- Patterns of subsistence practices in Native uses of natural resources; and, non-Native economic and other (e.g., recreational) patterns of resource use should be characterized.

- Traditional ecological knowledge about important resources and environmental processes for both non-Native and Native communities should be developed.

- Options to replace natural resources that have significant cultural, social, and economic importance should be assessed.

- The risk factors in social organization, culture, and economic structure that predispose particular communities to social impacts should be described.

- Community assessments of risk, blame, and responsibility in order to construct better risk communication programs should be described.

- Information about exposure to toxic substances and contamination of resources for particular communities should be developed.

- Stakeholders who are likely to experience economic damages and the nature of those damages should be identified.

- Time lines and a history of significant events and interactions between agencies, communities, and other responsible parties should be developed.

- Recovery issues for communities exposed to damaged resources should be assessed.

7.2 PLANNING RECOMMENDATIONS

The following planning or "action" recommendations address more general issues that can provide support for response efforts to any future oil spill event.

- Community disaster response plans include processes for acknowledgment and assessment of social impacts should be assured.

- Inter-agency disaster response capability that coordinates state and federal with local disaster response efforts should be developed.

- Procedures for communicating warnings related to threats to public health and safety should be established.

- Community interest groups in developing materials and communications about health and other risks related to toxic exposure and other event effects should be included.

- A regular process to communicate agency needs and issues with community leadership should be established. Consistent contact person to maintain trust and open communication should be provided. Newsletters, e-mails, and other regular information transmissions can reduce concerns and anxiety about the actions of responding agencies.

- Coordination with other agencies to minimize conflicting communications should be implemented.

- Procedures for responding to media inquiries and requests for interviews should be developed.

- Liaison procedures for interacting with community groups and leaders should be developed. This should include training for agency personnel in addressing issues of consensus and 'dissensus' among different agencies and communities.

- An agency-community working group to address conflict resolution and problem solving regarding issues and concerns to different stakeholders and event participants should be developed.

- Community expectations and needs regarding interaction with responding agencies should be assessed.

- Assistance for communities to identify the risks and threats from exposure to toxic substances by acknowledging traditional risk assessments as well as formal risk assessments should be provided.

- Assistance in enabling communities to develop a process for developing consensus and resolving 'dissensus' should be provided.

- Culturally-sensitive plans for assistance to Native communities, including acknowledging traditional political structures and cultural beliefs should be developed.

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